



SUSTAINABLE ECONOMIC IMPACT OF THE CONGO RIVER: LESSONS FOR REGIONAL DEVELOPMENT AND RESOURCE MANAGEMENT

Kyungu Lubaba Lubadi^{1, }, Bobo Chazireni^{2, },
Freddy Aliamutu Kansilembo^{3, }

1. Department of Social Sciences, Durban University of Technology, Durban South Africa.
2. Department of Social Sciences, Durban University of Technology, Durban South Africa.
3. Department of Social Sciences, Durban University of Technology, Durban South Africa.

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Abstract:

The Congo River, a vital resource for millions of people and diverse wildlife, faces increasing pressure due to fluctuating rainfall patterns, resulting in water scarcity. Additionally, inadequate transboundary water management further exacerbates these challenges, highlighting the need for coordinated and sustainable governance strategies. This study investigates the current state of water management and the role of youth education in protecting the Congo River Basin's freshwater resources, which spans multiple nations. The research aims to understand how environmental awareness and youth involvement can help mitigate water scarcity issues and promote sustainable practices in the region. The study employs a qualitative approach, including surveys and interviews with both schoolchildren and adults, to assess their knowledge of the Congo River's significance and the impact of poor water management on local and regional economies. The results reveal a significant gap in the knowledge of both adults and children regarding the importance of safeguarding the river, despite its critical role in transportation, agriculture, and local livelihoods. Many participants are unaware of the river's potential to flood, dry up, or become contaminated, highlighting the need for better education and awareness programs. Additionally, the study finds that the Congo River's economic potential, especially in maritime transport, is hindered by underdeveloped infrastructure and poor management, which limits its role in alleviating water and energy scarcity in the region. The findings suggest that empowering youth through education on environmental conservation, particularly water management, is key to ensuring sustainable practices for future generations. In conclusion, increased awareness and investment in infrastructure are essential to unlock the Congo River's full potential as a critical economic and environmental resource for global economic advancement.

Keywords
Congo River; Water
Management; Youth
Education;
Environment
Awareness;
Sustainable Practices

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1.0 INTRODUCTION

The adoption in 1997 of the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention or UNWC) marked a milestone in the codification and progressive development of international water law¹. The context of the Congo River waterway, particularly regarding water conservation and management, involves both national and international considerations that require prompt and effective ecological measures. Central natural awkwardly position taken by the Congo River of flowing from South to North place the river in a strategic position to offer abundant water to curb future effects of droughts. It is interesting to note that within the international relationships, the sources of the freshwater s of the Congo Basin (CB) cross the borders of many countries, but proper transboundary management of freshwaters is lacking². Freshwater is the most significant resource since it is essential for human health, agriculture, the environment, urbanization, and sustainable economic growth³. The Congo Basin, which covers 3.7 million square kilometers in six Central African countries, is a key natural and cultural region⁴. Utilizing the ethnographic fieldwork that was conducted along the Congo River's waterways, this study tries to examine the issues associated with regulating medium-scale river transportation between the rural and urban sustainable economies of the DR Congo River⁵. The Congo River, one of Africa's most important waterways, is crucial to the socioeconomic fabric of the Democratic Republic of the Congo (DRC) and crucial Africa as a whole. It has been said that The Congo Basin: A world without it means a world without life⁶. As the world's second-largest river by discharge volume

¹ Inogwabini, B. I. 2020. The changing water cycle: Freshwater in the Congo. *Wiley Interdisciplinary Reviews: Water*, 7 (2): e1410.

² Ibid

³ Inogwabini, B. I. 2020. The changing water cycle: Freshwater in the Congo. *Wiley Interdisciplinary Reviews: Water*, 7 (2): e1410; Bennett, G., 2025. Status of drinking water supply and water stress levels in the African Great Lakes region: a time-series analysis from 1980 to 2020. *Water Supply*, 25(2), pp.228-239.

⁴ Moleka, P., 2025. Post-Extractivism and the Crisis of Development: Reimagining the Congo Basin as a Knowledge Economy.

⁵ Lambertz, P., 2024. Baleinières' Riverine Environment and the Materiality of Transport Regulation on Congo's Inland Waterways. *Africa Spectrum*, 59(3), pp.375-394.

⁶ Peya, M.I., 2022. *The Congo Basin: World without it, world without life*. Editions L'Harmattan; Lambertz, P. 2024. Baleinières' Riverine Environment and the Materiality of Transport Regulation on Congo's Inland Waterways. *Africa Spectrum*, 59 (3): 375-394.

and the deepest, the Congo River has enormous natural potential⁷. However, structural, environmental, and governance issues continue to impede its long-term economic viability. This study aims to investigate the Congo River's long-term economic impact, drawing important lessons for regional development and resource management, particularly in light of severe environmental changes and infrastructure inadequacies. The DRC abundant natural resources, the country lacks adequate transportation infrastructure⁸. Additionally, it is essentially landlocked, with only roughly 37 kilometres of undeveloped Atlantic coastline. In this environment, the Congo River emerges as a critical route for inland transit, trade, and access to basic amenities. The river serves a large population by providing freshwater for home use, irrigation, sanitation, and public health services, which are especially important for vulnerable groups like women and children⁹. For this reason The Maputo Protocol acknowledges women's access to energy as part of the right to food security (Article 15) and the right to a healthy and sustainable environment (Article 18). Both sections place a positive duty on member countries to take adequate measures to enable women's access to a variety of sustainable modern energy source¹⁰. However, DR Congo's infrastructure constraints, such as antiquated vessels, underequipped ports, and insufficient investment in maritime development, significantly limit the river's economic and logistical potential¹¹. Environmental sustainability is an important aspect of the problem. The Congo River Basin is both ecologically rich and environmentally fragile. It is under growing threat from deforestation, biodiversity loss, unsustainable fishing, and climate-related events such as flooding and drought¹². Urban expansion, fuelled by population increase and unregulated agriculture, hastens forest deterioration,

⁷ Harrison, I.J., Brummett, R. and Stiassny, M.L., 2016. The Congo River Basin. *The wetland book*, 1, p.845.

⁸ Mufungizi, I., 2025. Mineral potential facing socio-economic development challenges: case study of the democratic republic of Congo, a 'geological scandal'. *International Geology Review*, 67(6), pp.754-776

⁹ Van Pul, P., 2023. *Hydrography and Navigation on the Congo River*.

¹⁰ Muluken K. Amid (2025). Mainstreaming the Gender Dimension of Climate Change under the African Commission on Human and Peoples' Rights Mandates: Appraising State Reporting Guidelines and State Reports. *The Journal of Sustainable Development, Law and Policy*. Vol. 16:2.131

¹¹ Schäfer, D., Abraham, I., Allen, B., Camprubi, L., DiMoia, J., Fawaz, M., Irani, L., Jeon, C., Kett, R., Kirloskar-Steinbach, M. and McAllister, K., 2024. *The Planning moment: Colonial and postcolonial histories*. Fordham Univ Press

¹² Idem

further jeopardizing the region's ecological integrity. Furthermore, extreme weather events associated with climate change increase community vulnerability and hinder water management, agriculture, and disaster preparedness. On the governance front, the Congo River's transboundary nature—shared by nine basin countries— requires integrated legal and regulatory frameworks to guarantee regional collaboration and sustainable water usage. These frameworks, however, are either poorly designed or executed. Inadequate institutional capacity and a lack of coordinated transboundary water governance make it difficult to capitalize on the river's potential for both environmental resilience and economic prosperity¹³.The Congo River has great economic potential. Because of its advantageous location and ease of navigation, the DRC's abundant natural resources, such as minerals, timber, and agricultural products, may be exported at a reasonable cost. However, systematic underinvestment, lax enforcement of safety and environmental standards, and inadequate infrastructure continue to under realize present economic gains¹⁴.The DRC has been pointed out as one of unsecured nation in the African continent thus, women and children have been victims of development exclusion and social injustices. While, the Commission for Gender Equality (CGE) the Maputo protocol Art.2 focuses on the women rights of elimination of discrimination, Econmic welfare (13),foods security (15), sustainable development and environment (18), prevention of conflict and Management art.10 (1)¹⁵ Gender mainstreaming in climate change actions aligns with the African Charter on Human and Peoples' Rights (African Charter) and the Maputo Protocol on the Rights of Women in Africa, which recognize the right to a clean and healthy environment, food security, and sustainable development. The African Union Convention for the Protection and Assistance of Internally Displaced Persons (IDPs) in Africa (Kampala Convention) encompasses the rights of IDPs (especially women's rights) who have been displaced as a result of either

¹³ Awazi, N.P., 2025. Meeting the energy needs of the urban and rural poor in the Congo Basin through renewables: challenges and prospects. *Renewable Energy Systems: The way forward*, pp.7-1.

¹⁴ Jonathan, M.U.Y.A. and Kinshasa, D.R.C., A focus on DRC's Economy: Main Sources of Growth and Vulnerabilities.

¹⁵ Amid, M.K., 2025. Mainstreaming the Gender Dimension of Climate Change under the African Commission on Human and Peoples' Rights Mandates: Appraising State Reporting Guidelines and State Reports. *Journal of Sustainable Development Law and Policy (The)*, 16(2), pp.131-153.

natural or man-made disasters, including climate change¹⁶. In the course of human rights, women have been excluded in the development sustainable projects because of the gender disparity against the Maputo Protocol (Art.2)¹⁷. Reason being, in DRC along the Congo River journeys the inclusive development is further hampered by the persistence of social injustices because, female entrepreneurs who encounter harassment and insecurity along transportation routes¹⁸. In this situation, sustainability necessitates a multifaceted approach that incorporates social justice, environmental preservation, and economic growth. A reassessment of the legal and regulatory tools, significant infrastructure investment, improved regional collaboration, and the encouragement of community-level involvement in decision-making the ecological protection is all necessary for a sustainable future for the Congo River. Ensuring ecological balance while optimizing economic use demands both upstream and downstream coordination, robust institutional mechanisms, and the political will to align development initiatives with the principles of sustainability. This study thus contributes to an urgent dialogue on how the Congo River can be sustainably managed to serve as a catalyst for regional stability, economic resilience, and ecological stewardship in the DRC and the wider Central African region. Reason being, furthermore, their management is inextricably linked to environmental sustainability, water-related dangers, public health, and many ecosystem functions¹⁹. The Congo River have several hippopotamuses and crocodiles are not bred or nourished by the local or national governments. It has been reported that some casualties have been caused by these dangerous species, which attack tourists or fishermen at first sight and sometimes kill them. It was stated that a few Congo River users had escaped the crocodiles and well the hippopotamus attacks. Additionally, there has been an ongoing Deforestation around urban centres is mostly caused by urban agriculture because of population growth, as well as city spatial development, both of which have a significant impact on forest stability and integrity. Deforestation and forest degradation are primarily caused by shifting

¹⁶ Idem 131.

¹⁷ Ibid.

¹⁸ Mangwanda, J. and Mangwanda, M., 2025. 6 Conflict and poverty in the eastern region of the Democratic Republic of Congo and the socio-economic challenges faced by Congolese women. *Conflict and Poverty in Africa: A Research Companion*.

¹⁹ Inogwabini, B. I. 2020. The changing water cycle: Freshwater in the Congo. *Wiley Interdisciplinary Reviews: Water*, 7 (2): e1410.

agriculture²⁰. As a result, this paper will be organized into five sections. The first section addresses the study's introduction, and the second section will focus on the study's conceptual clarification in order to enlighten the way forward. The third part of the study will address the DRC law and policies relating to the Congo River's management and a sustainable future. The fourth section of the paper discusses the legal way to tackling the Congo River governance and the legal sustainability of its global importance. Finally, the fifth section brings the investigation to its conclusion.

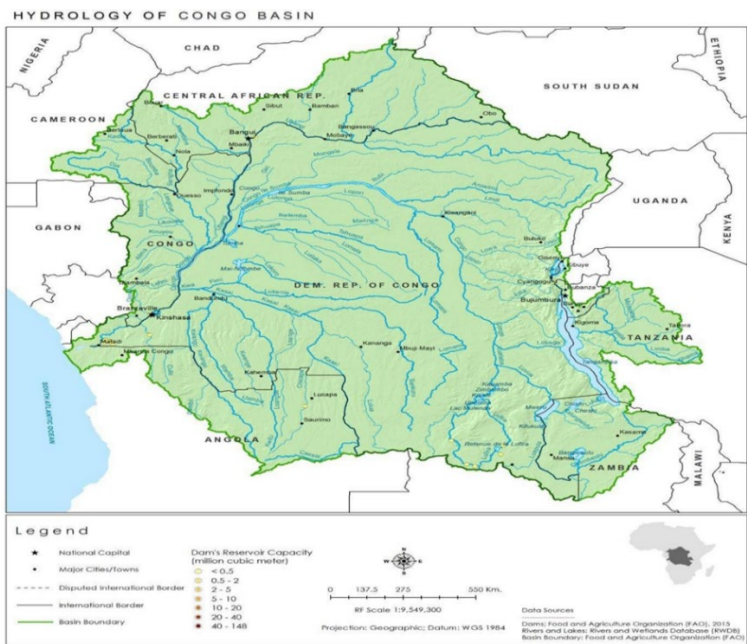


Photo WWF2020

²⁰ Bennett, G., 2025. Status of drinking water supply and water stress levels in the African Great Lakes region: a time-series analysis from 1980 to 2020. *Water Supply*, 25(2), pp.228-239.

2.0 CONCEPTUAL CLARIFICATION OF THE STUDY

2.1 The Origin of the Awkward South to North Position of the Congo River

The Congo River's unusual flow pattern, in which the three sections appear to move in one opposite to the conventional downstream direction observed in most river systems, is primarily attributed to a complex interplay of geological formations, seasonal variations, and the unique geographical setting associated with the Eastern Tectonic Graben. The basin's drainage patterns may provide information on its geomorphic development during the Neogene. The Congo Basin's multistage evolution explains the juxtaposition of different drainage patterns. Several factors influence the drainage pattern, including lithology and tectonics, which dominate in some locations, with overlap zones where controls interact²¹. “We demonstrate that the shift from the dry to the rainy season in the southern Congo is initiated by a decrease in moisture export to the Sahel three to four months before the rainy season beginning (RSO), also known as the pre-transition period. During this time, evapotranspiration (ET) is low due to low surface solar radiation caused by low insolation and a high concentration of low-level clouds. Column water vapor rises during the early transition phase, one to three months before the RSO, when marine moisture transfer increases. Meanwhile, ET begins to increase due to increases in surface radiation and vegetation photosynthesis, despite a lack of soil moisture”²². The unusual south-to-north flow of the Congo River—contrary to the more typical north-to-south direction of many major rivers—has significant implications for the fluctuation of water levels. This geographic orientation contributes to pronounced seasonal variability, often resulting in either water shortage during the dry season or heavy flooding during the rainy season. These variances have far-reaching ramifications for the Democratic Republic of the Congo's socioeconomic situation. While the equatorial region receives generally regular rainfall throughout the year, the North-eastern and South-western parts alternate between six-month rainy and dry seasons. However, this yearly oscillation helps to manage and stabilize the Congo River's flow

²¹ Flügel, T.J., Eckardt, F.D. and Cotterill, F.P., 2014. The present day drainage patterns of the Congo river system and their Neogene evolution. In *Geology and resource potential of the Congo basin* (pp. 315-337). Berlin, Heidelberg: Springer Berlin Heidelberg.

²² Worden, S. and Fu, R., 2025. On the mechanisms that control the rainy season transition period in the southern Congo Basin. *Climate Dynamics*, 63(3), p.157.

via its various sections. Various sections have a river discharge increase because of the huge number of tributaries that drain the three main reaches of the Congo basin. In support of the idea, throughout the middle reach, the annual average river discharge increases gradually from 7 640 m³/s at Kisangani to 41 000 m³/s at Kinshasa, over a river centreline distance of 1 734 km. This increase is caused by the contribution of numerous major tributaries that drain the northern and southern catchments of the Congo basin and which join the main stem along the middle reach. These major tributaries are the Lindji, Awuruwimi, Oubangi, Sangha and Alima Rivers from the north; and the Lomami, Lulonga, Ruki and Kasai Rivers from the south²³. Water scarcity at the Inga Hydroelectric Power Station is currently causing widespread power outages in Kinshasa, the capital city, and the Greater Katanga Province, owing mostly to seasonal climatic variations. This situation has produced several public grievances, emphasizing the vulnerability of national infrastructure to environmental and climatic unpredictability²⁴. Participants in this discussion emphasize that economic factors and supportive policies have emerged as significant motivators for assimilation²⁵. Respondents note that women travelling alone for business purposes continue to encounter harassment from security personnel, peers, or boat owners. Such experiences can discourage women from participating in business activities along the Congo River and its adjacent lakes. The government should enhance security on the waterways and promote a range of recreational activities, including canoeing, swimming, and annual boating competitions. Proposed event locations include routes from Bukama to Kindu, Ubundu to Kisangani, and eventually to the Atlantic Ocean. However, it is crucial to recognize that travelling by boat poses risks due to various navigational challenges²⁶.

²³ Bates, P.D., Tshimanga, R.M., Trigg, M.A., Carr, A., Mushi, C.A., Kabuya, P.M., Bola, G., Neal, J., Ndomba, P., Mtalo, F. and Hughes, D., 2024. Creating sustainable capacity for river science in the Congo basin through the CRuHM project. *Interface Focus*, 14(4), p.20230079.

²⁴ Khougali, G., 2024, October. Reviewing the Energy Security Challenges and Risks in the Eastern Africa Power Pool Grids. In *2024 IEEE PES/IAS PowerAfrica* (pp. 01-05). IEEE.

²⁵ Moleka, P., 2025. Post-Extractivism and the Crisis of Development: Reimagining the Congo Basin as a Knowledge Economy.

²⁶ Lambertz, P., 2024. Baleinières' Riverine Environment and the Materiality of Transport Regulation on Congo's Inland Waterways. *Africa Spectrum*, 59(3), pp.375-394.

2.2 An Effective Approach Upon the Preventive Policies of the Congo River Sustainability

The 1997 adoption of the United Nations Convention on the Law of Non-navigational Uses of International Watercourses (UN Watercourses Convention or UNWC) was a significant milestone in the definition and development of international water law²⁷. Arguably, their most significant contribution to the formation of international water law was the use of the General Act of the Berlin Conference (1885) to apply its principles in the Congo River basin²⁸. Despite the Congo River's significant importance for water security, economic development, and ecological sustainability, several legal and institutional administrative bailouts hinder its effective management and sustainable utilization. Today, an effective Management of the ecology and the ecosystem feature can be monitored and enhanced through technological gadgets. While industrial logging contributes to deforestation and forest degradation in tropical areas. It leads to biodiversity loss, a fall in forest carbon reserves, and a reduction in local livelihoods. Many approaches are being examined to reduce the negative consequences of human activity on forests, biodiversity, climate, and people's livelihoods²⁹. A major deficiency exists in the absence of a formal, multilateral transboundary water management framework with the nine nations sharing the Congo Basin. This study conducts a normative analysis of water security in light of the Sustainable Development Goals (SDGs) and the demand for change. It investigates the role of river basin organizations (RBOs) and integrated water resources management (IWRM) in water governance, and the extent to which they are consistent with water security

²⁷ Hassan, Z.A., 2025. *The Influence of the UN Watercourses Convention on the Development of a Policy Design in the Nile River Basin* (Doctoral dissertation, The American University in Cairo).

²⁸ Odili, N.C., 2025. Cooperation in a Transboundary Water Context: The African Experience. In *World Scientific Handbook of Transboundary Water Management: Science, Economics, Policy and Politics: Volume 1: Cooperating Over Shared Freshwater Resources Using International Law* (pp. 67-95).

²⁹ Azenge, J.P., Zon, A.O., Diesse, H., Meniko, J.P.P., Ebuy, J., Kassi, J.N.D. and Chirwa, P.W., 2025. Conserving Carbon Stocks Under Climate Change: Importance of Trees Outside Forests in Agricultural Landscapes of Mongala Province, Democratic Republic of Congo. *Earth*, 6(2), p.19.

for development in Southern Africa³⁰. While regional frameworks such as the Revised SADC Protocol on Shared Watercourses offer a foundation for cooperative water governance, their effective implementation is often hindered by ongoing insecurity within the region. In eastern Democratic Republic of Congo (DRC), longstanding instability compounded by natural disasters such as volcanic eruptions, floods, and droughts has substantially limited institutional capacity. Furthermore, illicit exploitation of natural resources by neighboring countries has impeded collaborative efforts. The lack of a binding and enforceable legal mechanism for transboundary resource management reflects a broader gap in commitment to global sustainability goals. This deficiency hampers collaborative efforts on conservation, flood control, and equitable resource sharing. The 2006 Constitution establishes a fundamental legal framework for environmental protection Article 53 affirms states that "Everyone has the right to a healthy environment conducive to their full development. The State ensures the protection of the environment and the health of the population." This provision requires the government to implement laws and policies that advance environmental sustainability. Particularly, the Democratic Republic of the Congo (DRC) has incorporated environmental sustainability standards within its legal framework; however, national laws governing water and natural resources remain inconsistent in their enforcement and scope. Today, around 1.8 billion people worldwide do not have access to safe water. In the Democratic Republic of the Congo, Africa's most water-rich country, 51 million people lack access to potable water, while only 26% have clean drinking water. This is one of the world's lowest access rates²⁸. Also, In November 1976, the Democratic Republic of the Congo signed and ratified the International Covenant on Economic, Social and Cultural Rights. In doing so, the DRC undertook to uphold, safeguard, and promote the rights outlined in the ICESCR. Failure to comply with key rules would result in international responsibility for the Congolese state and the need to rectify the damages caused³¹. Although the Water Law and Environmental Law recognize water as a public good, they lack provisions addressing long-term climate change adaptation, integrated decision-making processes, and ecological resilience. Furthermore, limited

³⁰ Nshimbi, C.C., 2019. SDGs and decentralizing water management for transformation: Normative policy coherence for water security in SADC river basin organizations. *Physics and Chemistry of the Earth, Parts A/B/C*, 111, pp.1-12.

³¹ Idem

institutional capacity and constrained financial resources weaken the enforcement of existing regulations, rendering communities vulnerable to pollution, deforestation, and infrastructure failure. Social and gender considerations are also insufficiently integrated into policy and practice. Despite the DRC's ratification of the Maputo Protocol (Article 2), national policies fall short of mainstreaming gender equality into sustainable development strategies. Women, especially along river trade routes, face harassment and economic marginalization, reflecting broader issues of social exclusion. The absence of adequate legal mechanisms to address these vulnerabilities impedes efforts toward achieving equitable and sustainable development. Additionally, while the Congo River holds potential as a site for tourism and an essential source of clean water at local and global levels, there remains a significant gap in integrating ecological knowledge and community-based insights into policymaking. Local communities are frequently excluded from water resource management, despite bearing the primary impacts of environmental changes and infrastructure projects. Therefore, the watershed lacks a comprehensive legal framework for biodiversity conservation and wildlife protection. Although species such as crocodiles, hippopotamuses, snakes, and disease-carrying insects pose ecological and public health challenges, there are no national or regional policies dedicated to conservation and human safety. The article concludes that establishing a coherent, gender-sensitive, and environmentally sustainable legal regime—supported by effective regulation, institutional coordination, and inclusive participation is essential to advancing sustainable management of the Congo River Basin.

3.0 THE EFFECTIVENESS OF POLICIES UPON THE CONGO RIVER

3.1 Sustainability Theoretical framework

While climate change has become one of spoken issues across the boards. The Sustainable Development and Environmental Education approach serve as the foundation for this study, as it takes into account Transboundary Water Management (TWM). The shortfall of the DRC policies Was marked with the written surveys of DRC students and teachers in the equator province, as well as semi-structured interviews with key informants in the administration of a higher institute of education, revealed a lack of understanding of key environmental issues in the region (climate

change, deforestation impacts), low French literacy, and limited access to teaching and learning materials and the Internet. Overall, this case study demonstrates the immediate adjustments that are needed to avert a current crisis in the DRC's ability to scale up planned sustainable development programs³². All of these Sustainable Development approach of the DRC focuses on integrating environmental, social, and economic aspects to meet current needs while ensuring future generations' ability to meet their own. However, the complexity of understanding what climate change and water conservation with sustainability may confuse the inhabitant with low level of income and those uneducated individuals. In 2002, however, the Committee on Economic, Social, and Cultural Rights (CESCR), the body of independent experts monitoring the implementation of the Covenant by its States parties and interpreting its provisions, confirmed through General Comment no.15 that the human right to water is included in the right to an adequate standard of living, which is recognized in Article 11.42³³ Drawing on these arguments for some, it remains a vague topic that doesn't demand much attention; for others, it's a source of stress, and for many, it's an important issue that can only be fully grasped by "experts" and those deeply familiar with the subject. While the effects of climate change are felt globally, they are not distributed equally the natural disasters promptitude and catastrophes can be added to the lack of will to protect the Congo River Basin ³⁴.In the context of the Congo River Basin, this viewpoint helps to clarify the continual tension between the river's ecological vulnerability and economic prospects. It provides a conceptual framework for examining how insufficient infrastructure, environmental deterioration, and policy implementation issues impede the region's long-term economic possibilities. According to Environmental Education approach, raising awareness and understanding about ecological systems can empower individuals, particularly women and young people, to embrace sustainable activities and influence policy decisions. This approach is especially relevant to the study of youth participation because it supports the idea that education about water management and environmental stewardship is critical for achieving

³² McNamara, E.A., Kermarc, M., Manda, J.Z. and Bush, G., 2018. Tertiary education knowledge and standards in sustainable development: A crisis for the Democratic Republic of the Congo. In *Climate Literacy and Innovations in Climate Change Education: Distance Learning for Sustainable Development* (pp. 85-108). Cham: Springer International Publishing.

³³ Ibidem

³⁴ Nehema, S., 2024. Balancing Survival and Sustainability: Addressing Environmental Justice in the Democratic Republic of Congo.

sustainability. The found knowledge gaps in both adults and children about the river's ecological dangers indicate the need for focused educational initiatives to improve conservation efforts. Furthermore, TWM theory emphasizes the necessity of collaborative frameworks, legal processes, and institutional coordination in managing shared water resources beyond political borders. Given the Congo River's strategic importance to nine countries, this theory highlights the need for integrated governance systems to ensure regional stability and sustainable resource management. Together, these theoretical views allow for a full, multidimensional understanding of the Congo River's difficulties. The study supports the methodological approach of using qualitative approaches, such as interviews, prompt and surveys, to evaluate knowledge diffusion, governance systems, and community participation in freshwater resource preservation.

4.0 LEGAL APPROACHES FOR ADDRESSING THE CHALLENGES OF THE CONGO RIVER

4.1 The Interplay of the Congo River's Role in Hydroelectric Power Generation, Women, Youth and Environment Awareness

The Democratic Republic of the Congo (DRC), like many African nations, faces significant development challenges due, in part, to its dependence on imported goods. The proposal to redirect the Lower Congo River for energy generation, exemplified by the Grand Inga project, has historically garnered support from various stakeholders, including apartheid-era South Africa, the Arab Republic of Egypt, and subsequent southern African states³⁵.

It is crucial to enhance the hydroelectric power generation capabilities of the DRC's dams to ensure reliable energy production, particularly during periods of high-water flow, and to effectively address the challenges inherent in hydropower development. Despite these limitations, Africa has tremendous untapped hydropower potential estimated at 1,750 terawatt-hours (TWh), with major river systems such as the Congo, Nile, and Zambezi providing considerable prospects³⁶. While the hydroelectric output

³⁵ Showers, K. B. 2009. Congo River's Grand Inga hydroelectricity scheme: linking environmental history, policy and impact. *Water History*, 1: 31-58.

³⁶ Lambertz, P. 2024. Baleinières' Riverine Environment and the Materiality of Transport Regulation on Congo's Inland Waterways. *Africa Spectrum*, 59 (3): 375-394.

from the Inga project is a vital asset, it should not be regarded as the only long-term renewable energy solution for the DRC. With the increasing adoption of electric vehicles, certain regions may find that hydroelectric connectivity is not feasible; however, they could benefit from solar energy solutions that are more cost-effective, thereby promoting mobility and trade. The Congo River's role in the waterway transportation and sustainable practices. Amid the ongoing crisis regarding transportation vessels on the Congo River and the Inland Congolese watershed, there has been a notable lack of innovation and creativity in the design of ships, small canoes, and boats. This situation has significantly hindered the Democratic Republic of the Congo's (DRC) efforts to reduce dependence on external waterways and to promote the democratization and sustainability of its waterborne transport system. The emergence of *baleinières*, or homemade small ships, in the DRC has revitalized and expanded the potential of the country's inland waterways, particularly considering the challenges posed by inadequate road infrastructure and the proliferation of low-tech engines from China³⁷. Given their essential role in ensuring food security in the country and the recurring incidents associated with this transportation method, there is an increasing call for the implementation of effective regulatory measures, which many views as a necessary intervention to address this critical issue.

4.2 The Interplay of the Congo River's Role in Agriculture and Water Supply Sustainability

The available evidence indicates that urbanization, excessive deforestation, and agricultural activities, while addressing food demand, also contribute to environmental degradation and transformation. Furthermore, if these activities are not managed sustainably, they have the potential to intensify global warming. Recent research in environmental social science, as noted by Horodecka, has shifted towards viewing the citizen-consumer through a social practices' lens. While agriculture serves as the backbone of many economies and a vital source of foreign revenue, analysts have noted its significant greenhouse gas emissions, which further contribute to global

³⁷ Lambertz, P., 2024. *Baleinières' Riverine Environment and the Materiality of Transport Regulation on Congo's Inland Waterways*. *Africa Spectrum*, 59(3), pp.375-394.

warming³⁸. In the Democratic Republic of Congo (DRC), there is considerable evidence that agricultural practices are primarily characterized by small-scale productivity across the nation. Additionally, many unemployed men in the DRC engage primarily in agriculture, mining, or fishing in the lakes and rivers surrounding their communities. The project's overall goal is to contribute to the complete development of the Inga site and boost power availability, particularly in the Democratic Republic of the Congo and other Central and Southern African countries.

In more particular terms, this project will aid in the completion of preparations for the Inga 3 Project, which is the first phase of the Grand Inga Project. As a result, South Africa is a major backer of the project. South Africa intends to import at least 2.5GW of electricity from Inga III, which is more than half of the initial 4.8GW design, as per its Integrated Resource Plan (6). The South African government signed the Power Purchasing Agreement (PPA) with the Democratic Republic of the Congo to formalize this³⁹. The Congo Basin. According to the findings, large-scale biomass energy production can immediately improve environmental quality and economic growth in this region⁴⁰.

4.3 The Role of the Congo River in Facilitating Local Fisheries

The Congo Basin relies heavily on wild meat and freshwater fish, but certain places are facing extinction due to unsustainable hunting and fishing practices, as well as environmental changes. Arguably, the health and conservation sectors have both called for a ban on the hunting and consumption of wild animals, particularly mammals⁴¹. As a result,

³⁸ Yufenyuy, M., Pirgaloğlu, S. and Yenigün, O. 2024. Dynamic assessment of the impact of agricultural land use change and globalization on environmental quality in the tropical African Rainforest: evidence from the Congo Basin. *Environmental Science and Pollution Research*, 31(1): 1331-1355.

³⁹ Scherer, N. and en la Globalització, O. d. D. 2021. Democratic Republic of Congo Inga hydroelectric power project at risk of becoming another “white elephant”. *Barcelona: Observatori del Deute en la Globalització*, Article ID.

⁴⁰ idem

⁴¹ Ickowitz, A., Pratama, M. F., Rahmah, M., Tata, C. Y., Tang, E. N., Ngondi, J. L. and Mirindi, V.B. 2024. The importance of wild meat and freshwater fish for children's nutritional intake in the Congo Basin. *People and Nature*, Article ID

thousands of different types of fish have perished, as well as more that are on the verge of disappearing and require immediate attention ⁴². Also, the DRC government has attempted to manage the fishing system by regulating the size of the fishing net, the fishing period, and the closing time. Most fishermen in the Democratic Republic of the Congo do not follow fishing net size regulations for fish conservation and reproduction. On the one hand, on the Congo River and Lake Tumba, there have been serious legal violations because of the usage of required fishing nets, but they are also using insecticide- impregnated mosquito nets to catch even the youngest and rarest species that are designed to grow and reproduce⁴³. On the other hand, government representatives are corrupted during fishing season closures, so there is no longer a closed fishing season, and fish are becoming scarce and costly locally.

4.4 The Congo River's Role in Facilitating Commerce and Global Trade

Over time, economies have opted to pursue viable growth paths by matching their aims with the three pillars of sustainable growth and development: social, economic, and environmental⁴⁴. The DRC economy has chosen to pursue feasible growth opportunities by engaging in global trade through hydroelectric power generation. Inga Hydroelectric power generation on the Congo River does not solely benefit the DRC; rather, the electricity is shared with other neighbouring countries. Moreover, the Congo Rivers across the continent have been dammed in the name of 'progress', enriching elites and international businesses with little concern for environmental implication⁴⁵

⁴² Gondola, D. 2002. *The history of Congo*. Bloomsbury Publishing USA.

⁴³ Ndinga, A. B. M., Swana, W. L., Kilingwa, C. M., Mutanda, S. K., Kiamfu, V. P. and Eyul'Anki, D. M. 2023. Fishing techniques used for the exploitation of fish in the flooded swamp forest of the Lake Tumba micro-basin on the Mbandaka-Center for Research in Ecology and Forestry (CREF Mabali) road axis in Bikoro in the Equateur Province (RD Congo). *Acta Aquatica: Aquatic Sciences Journal*, 10 (1): 31-39.

⁴⁴ Yufenyuy, M., Pirgahoğlu, S. and Yenigün, O. 2024. Dynamic assessment of the impact of agricultural land use change and globalization on environmental quality in the tropical African Rainforest: evidence from the Congo Basin. *Environmental Science and Pollution Research*, 31(1): 1331-1355.

⁴⁵ Schulze, F. and Lagendijk, V. 2024. Dam Internationalism: Rethinking Power, Expertise and Technology in the Twentieth Century. Article ID.

5.0 RESEARCH DESIGN

Qualitative research is described as⁴⁶, an approach that entails interpreting the experiences of individuals to generate new social phenomena and concepts. It has been advocated that this study employs a qualitative and descriptive data collection method, to examine the lived experiences and moral frameworks associated with the education of children and women⁴⁷. The research identifies key stakeholders that influence a child's moral behaviour towards the environment, specifically focusing on the Congo River watershed. These stakeholders include the family unit, represented by the mother, educational institutions and teachers (microsystem), as well as the broader home and community context, including religious institutions (ecosystem). Collectively, these roles play a significant part in shaping the child's moral development. Research design is a systematic approach to investigating the specified research problem, encompassing data collection and analysis. Consequently, it outlines the framework and structure for expected outcomes based on the theoretical foundation of the study⁴⁸. To collect, analyses, describe, and propose solutions regarding the challenges related to Moral Education Teaching for high school students, particularly in the context of the Congo River and its global economic impact on learners in grades 9-12, this study employed a convenient and purposive sampling method to identify the research site and participants. Additionally, this study employed a qualitative and descriptive approach to explore the challenges and potential of the Congo River, as well as to assess moral education at Bechet High School in Durban. The research will be guided by five key questions and a drawing prompt to gather data from participants. The inclusion of the drawing prompt is intended to enrich the responses, enabling participants to convey essential information and provide deeper insights into human experiences. The focus of the study will be on the

⁴⁶ Prevett, A., Gersbach, K., Clatworthy, D., Dkhar, D., White, T., Short, M. and Rush, E. 2025. In the thick of it: a candid look at the lived experience of online PhDs with publications or creative works. *The Australian Educational Researcher*, Article ID: 1-25.

⁴⁷ Sillero Sillero, A., Gil Poisa, M., Ayuso Margañón, S., Marques-Sule, E. and Ayuso Margañón, R. 2025. Shifting Compasses: A Qualitative Study of Lived Experiences Driving Perioperative Nurses to Leave the Profession Post COVID-19. In: *Proceedings of Healthcare*. MDPI, 391.

⁴⁸ Lubadi, K. L. 2017. Traditional Practices and Girl Education in Rural Democratic Republic of Congo: Exploring the Voices of Luba Girls. Article ID Nelson Mandela Metropolitan University.

impact of moral education on students at selected secondary schools in Durban, using Bechet High School and its selected learners in KwaZulu-Natal as a case study.

5.1 Conceptualization of the Congo River Waterway Management and Supply

Participants in this discussion emphasize that economic factors and supportive policies have emerged as significant motivators for assimilation⁴⁹. Respondents note that women travelling alone for business purposes continue to encounter harassment from security personnel, peers, or boat owners. Such experiences can discourage women from participating in business activities along the Congo River and its adjacent lakes. The government should enhance security on the waterways and promote a range of recreational activities, including canoeing, swimming, and annual boating competitions. Proposed event locations include routes from Bukama to Kindu, Ubundu to Kisangani, and eventually to the Atlantic Ocean. However, it is crucial to recognize that travelling by boat poses risks due to various navigational challenges⁵⁰. This study examines the interplay between climate change and national resource protection while focusing on empowering women and the younger generation to contribute effectively to the Democratic Republic of Congo's (DRC) national development plan. The initiative aims to enhance children's understanding of climate change through a collaborative approach involving schools, families, government agencies, and key stakeholders. This partnership is designed to provide vocational and ecological skills to students and women, who play a vital role in water usage, consumption, and the sustainable interaction with local fauna and flora. The research was conducted in two primary locations: Bechet High School and the communities of Bukama, Malemba, and Kabalo within the DRC. Participants included mothers and school-aged children residing along the Congo River beaches in the Haut-Lomami and Tanganyika provinces. In these areas, the management of official maritime transportation has diminished, leading residents to use homemade canoes, boats, and balenières powered by Chinese motors for their aquatic transportation needs. Students were randomly selected from different

⁴⁹ Mba, M., et al. *Youth and Environmental Policy in Central Africa*. Brazzaville: Green Futures, 2024.

⁵⁰ Grenfell, George. *Adventures in the Congo*. London: Religious Tract Society, 1902.

schools and villages, ensuring that the process was free from any influence from educational institutions. To maintain privacy and confidentiality, we established regular communication channels through WhatsApp, phone calls, interviews, and art submissions during recess periods. The investigation utilized semi-structured video and phone interviews wherever feasible, with a research assistant conducting additional fieldwork in villages and remote areas of the DRC. This methodology was employed to gather diverse opinions and perceptions while minimizing bias and redundancy in the collected data⁵¹.

5.2 Mechanism Used for Data Collection

This study on the Congo River and its global economic impact aimed to collect empirical data from Grades 8-12. It involved conducting semi-structured one-on-one interviews with individuals at Bechet High School, as well as online interviews with participants from outside South Africa. Key data collection methods included interviews, sketching, and imaginative exercises. Online video and telephone interviews were particularly effective for initial data gathering. The data obtained was analyzed to gain insights into how students and women interpret their real-world experiences in relation to the drawing prompt and the study topic. Understanding the respondents' perspectives was facilitated through data analysis techniques derived from thematic analysis and analysis of drawing-related content. The study emphasized shared experiences to enhance credibility and validity. Respondents' exploratory ideas were documented in either auditory or visual formats. The data collection, treatment, and analysis process required proficiency in multiple languages and the application of various tools and methods, such as establishing rapport, fostering new research relationships, observation, patience, commitment, field notes, recording tools, and drawings. Language played a crucial role in the data collection; therefore, this study primarily utilized English, and isiZulu, as well as international languages such as French, Swahili, and Kiluba to communicate findings, promote auditory and visual comprehension, and generate relevant data. This research is noteworthy for its focus on the real-life experiences of respondents at home, in their neighborhoods, and at school. The acquired data was evaluated to enhance our understanding of how students interpret their lived experiences in relation to the drawing prompt and study

⁵¹ *ibid*

questions. Data analysis methodologies rooted in thematic analysis were employed to interpret the respondents' realities based on the insights gathered from drawings and discussions.

5.3 Mechanism Used for Data Analysis

Qualitative data analysis is the process of making meaning of relevant data acquired from sources such as interviews, on-site observations, and documents, and then responsibly conveying what the data indicate⁵². The data collected was analysed to learn more about how students interpret their real-world experiences in relation to the drawing prompt and research question⁵³. The interpretation of the respondents' world was possible with data analysis techniques, which emanate from the use of data and the thematic analysis drawn from the drawings and the focus group discussions. For the sake of study credibility and validity, this study carried out the shared experiences. Arguably, validity and reliability are critical components of research that ensure the correctness and credibility of results. In both qualitative and quantitative research, principles of validity and reliability are essential²⁴⁵⁴. Validity pertains to accurately measuring the intended outcomes, while reliability refers to the consistency of results. This study utilized exploratory themes presented in aural and pictorial forms. Data collection and analysis required proficiency in multiple languages and the use of various tools and methods, including interviews, relationship-building, observation, field notes, recording tools, and drawings. Languages such as English, isiZulu, French, Swahili, and Kiluba were employed to facilitate communication and data generation. The research focused on respondents' lived experiences at home, in the community, and at school. Data were analyzed to understand how students interpret their real-world experiences concerning the drawing prompt and research questions, with thematic analysis used to interpret the findings from the drawings and focus group discussions.

⁵² Salmona, M. and Kaczynski, D. 2024. Qualitative data analysis strategies. In: *How to conduct qualitative research in finance*. Edward Elgar Publishing, 80-96.

⁵³ Lee, U., Han, A., Lee, J., Lee, E., Kim, J., Kim, H. and Lim, C. 2024. Prompt Aloud!: Incorporating image-generative AI into STEAM class with learning analytics using prompt data. *Education and Information Technologies*, 29 (8): 9575-9605.

⁵⁴ William, F. K. A. 2024. Mastering validity and reliability in academic research: Meaning and significance. *International Journal of Research Publications*, 144 (1): 287-292.

5.4 Mechanism and Used Procedures

After receiving approval from a responsive school, a potential participant was approached through the school Head of the Department (HOD) for Grades 8-12 and for the DRC women a telephonic conversation through an assistant was facilitated and the deal concluded on a one-to-one participant will. Interested appellants were given an appointment for a formal meeting and were given consent letters for them to sign or their parents in case of minor participants 'meeting invitations. The researcher distributed application letters to people chosen randomly after obtaining permission from the Department of Basic Education (DBE) (Gate Keeper Letter of permission), the school, and the children's parents/guardians to use the school premises. The procedure-maintained confidentiality, and the DBE approved the research.

5.5 Mechanism Used and Quality Rigour

Rigour in research study strengthens validity and reliability of study result while enhancing trustworthiness. Trustworthiness in a qualitative research study can indeed focus on a field of study while conducting an inquiry hand in hand with the paradigmatic stand in a discipline. Thus, the importance of research validity or 'trustworthiness' in qualitative research usually refers to research that is 'plausible, credible, trustworthy and therefore defensible' which leads the researcher to be strict in the engagement of certain strategies to maximize validity considering: Member checks, Triangulation of data, Reflexivity, Confirmability, Transferability⁵⁵. Credibility, transferability, and reliability all contributed to the research's trustworthiness. For the research study to be taken into consideration. Therefore, the level of confidence in the reliability of the results is an important component of research legitimacy⁵⁶.

⁵⁵ Kler, Balvinder Kaur. "Bewitched, bothered, and bewildered: Life as a qualitative researcher in a positivist jungle." In *Qualitative Research in Malaysia*, pp. 117-128. Routledge, 2025.

⁵⁶ Bindawas, Abdullah Mobarak. "Promoting Sustainable Tourism Through Employee Skills: Contextualizing Quality Education and the Human Resource Management Perspective (SDG-4)." *Sustainability* 17, no. 2 (2025): 748.

5.6 Mechanism Used for Ethical Considerations

The ethical clearance approval was requested from the Durban University of Technology's ethics research committee. The Research Ethics Committee (ethical clearance IREC 136/22), as well as authorization from the school administrator. The gatekeeper's letter to the DoE dated 2/4/1790 was provided, and human dignity, confidentiality, privacy, and concealment were strictly adhered to. Before administering the survey, each respondent was contacted and given a letter of agreement while being informed about the cause and purpose of the research project. This helped to protect the rights of study participants who wanted to withdraw and gave them the freedom to choose whether to participate in the study. This also provided privacy and confidentiality to study participants who desired to remain anonymous. As a foreign national researcher who has lived in South Africa for over 20 years, it is always hard to discuss a child's or learner's misbehaviour at Bechet High School which has been raised in a tradition and culture that differs from the researchers.

6.0 FINDINGS AND DISCUSSION

Following a thorough evaluation of participants' responses, the study identified significant themes regarding their views on the Congo River and its global economic implications. The evidence indicates that respondents emphasized the importance of the Congo River and its economic impact, particularly concerning the involvement of children and women in community engagement and their role in adapting human behaviour for climate change mitigation. Achieving global economic influence requires clean public administration free from corruption and excessive taxation. Participants highlighted the importance of engaging children at an early age in nature conservation education, fostering morally responsible citizenship, and building progressive capabilities. Additionally, respondents noted a slight lack of awareness regarding the importance of ongoing self-reflection related to water conservation and the ecosystems surrounding the river. The study distilled the following key themes related to learners' perceptions and the importance of the Congo River:

- The Congo River's role in hydroelectric power generation within the Democratic Republic of Congo (DRC) and its neighbouring countries.
- The Congo River's significance in waterway transportation.

- The Congo River's contributions to agriculture and water supply within the DRC and neighbouring countries.
- The river's role in supporting fishing communities in the DRC and adjacent regions.
- The Congo River's influence on commerce and global trade.

Participants from the Haut-Lomami and Tanganyika regions of the DRC and their counterparts in South Africa were organized into two groups for analysis. The first group, designated as FG, consisted of 15 adult women and schoolgirls (grades 9-12) from or residing in South Africa and the DRC, who either live near the Congo River or have travelled within the area. The second group, labelled SBC, comprised 15 schoolboys (grades 9-12) living in South Africa or the DRC, with similar geographic backgrounds relevant to the Congo River. The FG group was composed of 7 adults and girls from DRC villages, while the SBC group included 8 urban school learners, ensuring equal representation of boys and girls, consisting of participants from DRC villages and urban areas in South Africa.

Theme 1: Theme 1: Congo River Watershed Management System.

Participants stressed the importance of enhancing women's health through the provision of clean water from the Congo River directly to households in the Democratic Republic of Congo. This initiative is aimed at improving family health and overall well-being. Additionally, participants recognized the valuable insights gained from group discussions regarding the Congo River and its global economic impact, which serve as supplementary academic support. Respondents recounted exactly their lifelong experiences on the Congo River and its global economic influence:

We would like to formally express our concerns regarding the lack of government initiatives to promote women's health, particularly in our region, which is rich in water resources such as lakes and rivers, including the Lualaba River, also referred to as Kamalondo. The challenges we face in accessing clean water compel us to travel considerable distances from our homes, putting our safety at risk due to the presence of crocodiles and hipopotamuses. (Participants: FG. Female aged 70, 42 and 25 years old).

'Poor women are vulnerable to rape, harassment, and abductions by troops, police officers, and ship owners when travelling alone' (**Participants: SBC, Male, 18 years old**).

This study examines the various barriers to community empowerment. Participants highlight the critical role of government and academic institutions in facilitating seminars, conferences, and skill training programs for rural women and children in the rural areas of water management and distribution. Additionally, focus group participants stressed the necessity of government support for rural women residing along the banks of the Congo River to establish businesses and enhance tourism, considering their rural circumstances.' *Most women in metropolitan areas have passports and travel to Dubai, China, Nairobi, or Tanzania to purchase goods and services, whereas most women in rural areas do not know how to travel short distances by ship, plane, or automobile to our province's larger towns.* (**Participant: FG, female, aged 18 years old**).

Few Luba women in the Great Katanga area travel overseas for business via ship or plane. It would be great if someone from an academic or government group could teach us about *"To mitigate natural disasters, learners and women are the source of community innovation that should be taught and informed in advance about the new social economic challenges."*

(Participant: SBC. Male aged 15 years old).

Another participant underlines, *"I think it is very important to learn in school about how women can get involved in current commercial business while getting informed on how we can learn and practice the water conservation principles (WCP) for all on the Congo River."* (**Participant: FG. Female aged 16 years old**). The empowerment of individuals significantly influences various aspects of life, including food security, health, self-motivation, and social cohesion⁵⁷. Based on the participants' insights regarding the Congo River and its global economic ramifications, it is recommended that discussions concerning rural issues be conducted in rural settings rather than in larger urban centres. However, consistent with Bronfenbrenner's ecological theory, highlighted that a child's community

⁵⁷ Truong, P. 2024. Exploring the impacts of environmental education programs on the development of personal leadership, empowerment, environmental concern and resilience amongst youth. Article ID Murdoch University.

including their home, school, church, neighborhood, culture, and government can significantly influence their lifelong development⁵⁸. These influences can be both positive and negative. Additionally, Bronfenbrenner noted that a child's interactions within various organizations, particularly in the micro- system, exo-system, macro-system, and chrono-system, can shape their development⁵⁹.

Theme 2: Need for the Congo River's waterway transportation sustainability

To effectively respond to climate change and foster sustainable economic growth, it is. A member from the SBC Group and another one from the FG group highlighted the maritime transport in our area has poor infrastructures of homemade ships, boats and canoes that are often overloaded with goods and people under a Congolese flag. Furthermore, transportation on the Congo River is crucial for fish breeding and population growth in areas where it connects with lakes. Also, the Congo River facilitates the movement of people, goods, and services from one location to another. Nonetheless, the Congo River provides us with a valuable service by producing electricity, even though certain districts are unjustly disconnected from the Inga electrical system when electrical lines pass through their areas.

(Participants: SBC, Male, 15 years old and FG: Female, 14 years)

'As a result, the government water supply in cities is no longer operational since the government is unable to fulfil its obligations to pay public servants 'salary and the take care of the rural community'.

⁵⁸ Lubadi, K. L. 2017. Traditional Practices and Girl Education in Rural Democratic Republic of Congo: Exploring the Voices of Luba Girls. Article IDNelson Mandela Metropolitan University.

⁵⁹ Lamond, Catherine. "Working with children and young people experiencing additional challenges." In *Developing Your Expertise as a SENCo*, pp. 91-103. Routledge, 2025.

(Participants: SBC.Male aged 19 years old; FG, female aged 13 years old).

More often: *'There has been a shift in import methods and goods and service mobility in the Democratic Republic of the Congo since most people have discovered ways to buy cheap goods and machinery in China, resulting in a big but unstable supply chain. The DRC supply chain has built a communal transaction of products both inland and in international.*

(Participants. Females aged 27 and 22 years old).

This demonstrates that maritime transport important is lacking the vital infrastructure to improve the DRC economy. Therefore, the absence of the government in this domain has hampered the private enterprises' efforts to serve the population. For example,⁶⁰ the access to electricity allows you to use electric pumps for irrigation, which can boost agricultural productivity and water availability. Arguably, it has been said that the absence of infrastructure is a significant impediment to Africa's economic growth, competitiveness in global markets, and attainment of development goals such as poverty reduction⁶¹. In terms of livelihood, the Congo River and its tributaries are a blessing to the Congo Basin's people, providing a variety of economic, ecological, environmental, and cultural services. For millennia, humans have relied on resources derived from the Congo Basin's forests and waterways to sustain themselves⁶². If the current DRC government have failed to fulfil its duty of Water transport management, addition it has also failed its citizens by not supplying water to rural areas people⁶³.

⁶⁰ Nguea, S. M. (2024). Uncovering the linkage between sustainable development goals for access

⁶¹ Opoku, Alex, Peter Guthrie, Yaning Qiao, Moohammed Wasim Yahia, and Kwabena Opoku-Ntim. "The role of infrastructure in achieving the Sustainable Development Goals in Sub-Saharan Africa (SSA)." In *The Elgar companion to the built environment and the Sustainable Development Goals*, pp. 404-419. Edward Elgar Publishing, 2024.

⁶² Inogwabini, B. I. 2020. The changing water cycle: Freshwater in the Congo. *Wiley Interdisciplinary Reviews: Water*, 7 (2): e1410.

⁶³ Seatzu, F. 2024. Human Rights Denied. In: *Proceedings of Hungarian Yearbook of International Law and European Law 2024*. Nomos Verlagsgesellschaft mbH & Co. KG, 283-304.

Theme 3: Importance of Congo River for agriculture and water supply and sustainability (Fig.3)

'Locals constructed a system to transfer water from the Congo River to the Lakes for a variety of reasons. There are several drawn water channels for fishing, short-cutting between the Congo River and the lakes, and agricultural activities. (SBC Participant. (participants. Females aged 35,26 and 21 years old, FG. Female aged 32 years old).

The drawing (Figure 1) is part of a sad memory about poor families' desire to maintain our natural environment for the benefit of future generations. Is it because we were not taught and attracted to LO information throughout our schooling? (Participants: SBC. Male aged 16 years old, SBC. Male aged 16 years old and SBC. Male aged 17 years).

According to reports, *'The government-managed water supply in Bukama City is currently at a standstill, with no water flowing through the taps. In our village, women are required to collect drinking water from the Congo River daily, despite the contamination of the water from the disposal of human waste and household refuse.*

(Participants: SBC.Male Male, aged 18 years old and FG. Female aged 18 years old).

Local decisions to make channels for fishing reasons have been supported and water resource management relies heavily on local knowledge and traditional methods⁶⁴. Moreover, men's and women's behaviour can affect climate change. Men and women interact with and utilize forests in distinct ways, which may result in differing experiences and impacts from climate change and Reducing Emissions from Deforestation and Forest Degradation (REDD) policies (Brown 2011). Participants adhere to the idea that Efforts to enhance access to power, water, and sanitation are frequently linked since they are critical components of sustainable development (Nguea,2024).

⁶⁴ Graham, N. A., Chabanet, P., Evans, R. D., Jennings, S., Letourneur, Y., Aaron MacNeil, M., McClanahan, T. R., Öhman, M. C., Polunin, N. V. and Wilson, S. K. 2011. Extinction vulnerability of coral reef fishes. *Ecology Letters*, 14 (4): 341-348.

Theme 4. The Congo River's role in facilitating fishing in DRC.

Unemployed Congolese living along river edges in their cities and villages survive on small-scale fishing and hunting (except in the Park reserves) for free without buying a license. According to Participants an FG member, *'there is a fishing catastrophe on the Congo River due to lack of government setting up fish production and consumption system for the most consumed and rare fish'*.

Participants: FG. Female aged 28 years old and 25 years old).

'The government official negligence of the nature and lack of fishery protection system have caused discrepancies in rare species that tend to extinction and disappearance due to their scarcity'. **Participants: FG. Female aged 18 years old, FG Female 25 years old and SBC Male, aged 34 years old).**

In the same vein: *Why are fish referred to as Vodo fish, while many individuals frequently catch this species, the other varieties are limited in number and generally smaller in size. I am concerned that the other species may be at risk of extinction.*

(Female, 30 years of age, participants FG).

Government officials have emphasized the importance of adhering to legal regulations when declaring the closure of fishing activities in lakes.

'However, corruption erupts here and there where some officials accept payments to overlook these regulations. As a result, non-compliance with the law has negatively impacted fish availability. **(Participants FG, Female aged 45 years old and SBC Male aged 17 years old).**

From the respondents' point of view:

However, water transport is owned by the Congolese who are using their locally made canoes and ships. River users rely on river transport to reach

markets, resources, and essential services⁶⁵. Respondent asserts that there is a fishing catastrophe on the Congo River due to a lack of government setting up fish production and consumption system for the most consumed and rare fish which tend to extinction due to poor management. Nowadays, climate change has a negative convex relationship between fish species locally vulnerable to climate change and fisheries exploitation suggesting that the entire community is vulnerable on the many reefs where both stressors coexist⁶⁶. The Congo Basin inhabitants vulnerable on the many reefs because on the one hand officials are accepting money for corruption, allowing others to disobey the law, therefore a quantity of fish is scarce. On the other⁶⁷ most the fishermen use the smallest disinfected mosquito nets to catch even the very smallest new-born fish to extinct the many species in the region. Therefore, for the local and global environment future protection changes in the political landscape should include the youth at all costs. Therefore, earlier on that with the spread of Western institutions across the world three hundred years ago the physical earth's peoples have been gradually threatened⁶⁸.

Theme 5. The Congo river's role and global Economic (Fig.2)

The Congo River's continental position has influenced the political economic and social patterns of many Africans around the DRC. Participants arguably propound that: *'On the absence of the government's absence into the ground of public administration and the support of business in the Congo River watershed's business is functioning in a beheaded chicken pace'*. (Participants FG. Female aged 21 years).

Other participants also emphasise that:

'It would be indispensable that the government fight the overloading of ships that often end up killing many people every year through shipwrecks.'

⁶⁵ Trigg, M. A., Tshimanga, R. M., Ndomba, P. M., Mtalo, F., Hughes, D. A., Mushi, C. A., Bola, G. B., Kabuya, P. M., Carr, A. B. and Bernhofen, M. 2022. Putting river users at the heart of hydraulics and morphology research in the Congo Basin. *Congo Basin Hydrology, Climate, and Biogeochemistry: A Foundation for the Future*, Article ID: 541-554.

⁶⁶ Idem.

⁶⁷ Ibid.

⁶⁸ Steger, Manfred B. "Introducing Globalization Theories: A Concise Overview for Students." (2025).

(Participants: SBC. Male aged 30, SBC Male aged 23 and SBC. Male aged 18 years old).

‘Why are we watching small business dealers’ harassment and increase of the uncontrolled price of both local and imported goods? **(Participants: FG. Female aged 51 years).**

Meanwhile, *‘The Congo River water has missed the train of 21st-century development because it is not used sparingly by the DRC. Instead, their watershed should be used for a magnificent water race with canoe paddling competition to uplift the economy of the province, it is just flowing day and night for nothing.’* **(Participants: SBC. Male aged 33 years).**

The Congo River’s absence of *‘swimming, and ships competition every year using canoes, boats and ships racing from Bukama to Kindu, Ubundu to Kisangani, and down to the Atlantic Ocean. The Congo River is just an old property that needs creativity for global businesses.* **(Participants: FG. Female aged 25 and SBC Male aged 18 years old).**

Participants in this discussion highlight that economic factors and supportive policies have become significant motivators for assimilation⁶⁹. Respondents indicate that *‘even today, women travelling alone for business purposes often face harassment from security personnel, peers, or boatowners. This experience can deter women from engaging in business activities along the Congo River and the surrounding lakes. It is recommended that the government enhance waterway security and promote various recreational activities such as canoeing, swimming, and boating competitions on an annual basis, with events proposed to take place*

from Bukama to Kindu, Ubundu to Kisangani, and ultimately to the Atlantic Ocean. However, it is important to acknowledge that travelling by boat remains hazardous due to various navigational challenges⁶⁹.

⁶⁹ ibid

Figure 1: Nature Conservation



Figure 2. The Congo Basin



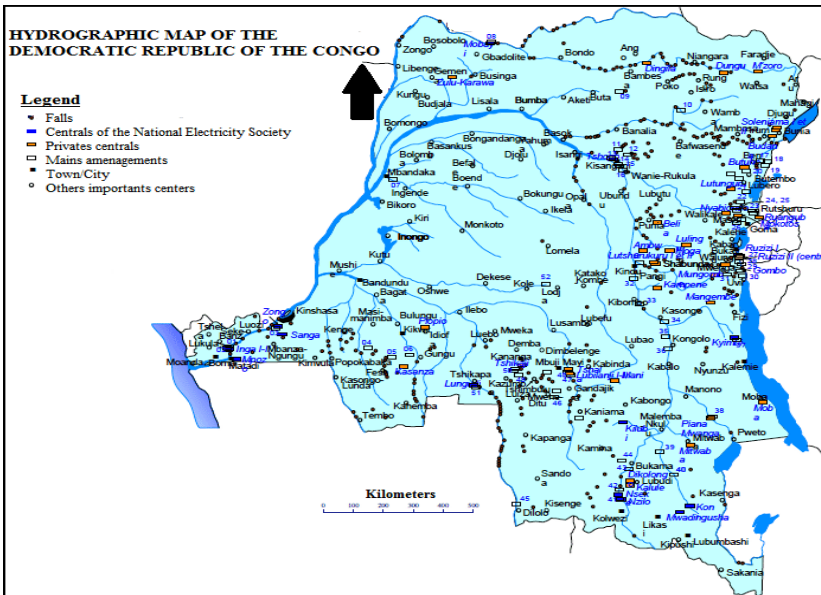
Photo WWF2020

Figure 3. Timber from the DRC forestry business to China.



photo: Getty Image2028

Figure 4: The Democratic Republic of Congo Hydrology Map



Map by Huts F. and January, A., 2008

7.0 LIMITATION

Certain taxes reflect the varying degrees of public control in different sectors within the Democratic Republic of the Congo. There are significant concerns in poorly supervised rivers and lakes. Researchers predicted that precise demographic data, such as education levels from students in specific schools, would enable effective involvement in studies involving active participants in organizational management, including educators and religious leaders.

Consequently, this study emphasized the perspectives of general learners and women regarding their intentions and actual participation. However, it is important to note that the online format of interviews hindered effective communication among participants, as personal interactions with the researcher were not feasible. Moreover, researchers did not adequately account for the diversity of students from various schools, including those

from all-female institutions in different villages. Participants conveyed essential information and provided deeper insights into human experiences and personal behaviour toward humanity and the environment (see **Fig. 2: Nature Conservation**). The focus of the study was on the impact of moral education on students at selected secondary schools in Durban, specifically Bechet High School and its learners in KwaZulu- Natal, as expressed by one respondent:

Participants conveyed essential information and provided deeper insights into human experiences and personal behaviour toward humanity and the environment (see **Fig. 2: Nature Conservation**). The focus of the study was on the impact of moral education on students at selected secondary schools in Durban, specifically Bechet High School and its learners in KwaZulu- Natal, as expressed by one respondent:

“This Drawing is part of suffering memory regarding poor family will to protect our natural environment for the benefit of the upcoming generation. Is it because along our schooling we have not been taught and being drawn into LO knowledge and information mainly in school and home concerning the impact nature conservation the climate change while it should a full curriculum dealing of climate change and what we should do learners.”

Figure 2: The nature conservation teaching and learning as a must for school children’s curriculum (Learning Outcome 1: Health Promotion).

Teaching and learning Life Orientation is part of the South African education system that coexists among others for the promotion of outcomes-based education (OBE) and the Further Education sector as designed by the Department of Basic Education⁷⁰. The significance of the LO curriculum marked a turning point in educational inclusion and system innovation after the dawn of South Africa’s democracy in 1994. Therefore, for the future protection of the environment—both locally and globally—changes in the political landscape should include youth at all costs.

Giddens argued that with the spread of Western institutions across the world over the past three centuries, the physical earth and its peoples have

⁷⁰ Department of Basic Education. *Curriculum and Assessment Policy Statement (CAPS)*, 2011.

been increasingly threatened⁷¹. The destruction of earth's resources has a negative impact on humanity, not only in terms of ecological degradation but also on global social, political, and economic systems.

8.0 RECOMMENDATION FOR FUTURE RESEARCH

The Democratic Republic of the Congo (DRC) possesses significant long-term economic potential that could aid in mitigating the impacts of climate change, preserving endangered species, managing water scarcity, and alleviating poverty. Broader ethnographic research exploring ethical education across diverse populations, including both school-aged children and adults, is necessary. Urgent academic attention should be directed toward environmental concerns and the broader implications of climate change within the DRC and other Southern African Development Community (SADC) nations. This study recommends that the DRC government and relevant stakeholders critically evaluate current practices and regulations related to fishing security within the Congo Rivers and the lakes, species conservation, energy and water resource management, and economic development. The Congo River represents a vital resource with considerable potential for water utilization and the development of modern infrastructure. Opportunities include ports and maritime infrastructures development, land and water transportation systems utilizing advanced modern ships, canoe and boats including the enhancement of communication and maritime security systems extending from Kolwezi to the Atlantic Ocean. Beyond the existing INGA hydroelectric facility, the Congo River has the capacity to generate additional hydropower capable of serving the entire country and neighbouring regions. It is also important for DRC strengthening the fishing industry by increasing marine species and modernizing fishing practices could pave the way for a more industrialized fisheries sector. Additionally, promoting activities such as competitive canoe racing both locally and internationally may serve as an avenue to boost tourism and stimulate economic growth in the three major regions along the Congo River for the regional development. Regional collaboration among SADC member states and neighbouring countries is essential for developing comprehensive and sustainable strategies to address ongoing

⁷¹ Giddens, A. *Runaway World: How Globalisation is Reshaping our Lives*, Routledge, 2000, p. 12.

challenges, including peace and security after decades of conflict, as well as issues related to water security and energy production—particularly concerning the INGA hydroelectric projects that is trailing for building the additional hydraulic power. There is also a pressing need to promote diverse and multidisciplinary research efforts to fully understand the environmental, social, and economic dimensions of the Congo River, many of which remain insufficiently explored. Ultimately, the DRC should actively involve both public and academic research communities in advancing the management of forests, water resources, and environmentally sustainable trade practices throughout the Congo Basin. A coordinated and collaborative approach will help establish effective governance frameworks, protect vital ecosystems, and contribute significantly to regional and global sustainability objectives.

9.0 CONCLUSION

The findings show that many rural participants in the Democratic Republic of Congo are unaware of the importance of climate change, as well as the negative effects of drought and flooding on the ecosystem and daily life. This highlights the significance of including major subjects linked to nature protection and climate change into educational curricula at both the university and higher education levels. Such integration enables students to do self-directed research and seek knowledge beyond the specified materials. Future research should include a broader and more diverse population, including schoolchildren and adults, to improve knowledge of ethical problems in environmental management from an anthropological perspective. Furthermore, ethical concerns about ecosystems and the difficulties brought by climate change should be addressed in the context of the DRC, South Africa, and other SADC member states. This research also underlines the significance of collaboration between the DRC government and relevant stakeholders in assessing the safety of fishing practices, enforcing species conservation legislation, and developing standards for energy and water delivery. Enhanced cooperation between SADC nations and adjacent countries is required to build comprehensive policies addressing crucial concerns such as peace, water security, and energy development, particularly in relation to the DRC diverse rich unprotected natural resources, such as the hydrology, fauna, flora and the INGA hydroelectric project.