Contested Waters: Historical Legacies of Hydropower Dams in the Rufiji Basin, Tanzania, ca. 1960s-2010s

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ABSTRACT

This research investigates the historical evolution, political dynamics, and imagined futures of large-scale hydropower projects in the Global South, revisiting a central theme in development and infrastructure studies. It uses Stiegler's Gorge mega-dam project in Tanzania as a case study to examine the role of large infrastructure in national development, modernisation, and nation-building. Focusing on the dam's protracted and contested development, the study examines how hydropower infrastructure can persist as a powerful socio-political concept across colonial and post-independence periods, despite prolonged delays, ghosting, and the absence of physical construction.

Drawing on extensive archival research in Tanzania, Norway, and Sweden, complemented by key informant interviews with Tanzanian stakeholders and oral histories with local communities upstream and downstream of the Rufiji River, the study analyses the factors that contributed to the project's repeated postponement and eventual revival. Rather than treating delay as failure, the research conceptualises delay as a generative condition through which political visions, planning practices, and development narratives were sustained and reworked over time. The analysis highlights how environmental concerns, financial constraints, shifting aid regimes, and changing political leadership intersected to shape the project's trajectory.

The study is structured around three analytical themes. First, it examines the postcolonial hydropower landscape in Tanzania, illustrating how state actors framed large dams as emblems of national progress and modernity. Second, it explores the role of international and transnational actors and the socio-technical assumptions embedded in hydropower planning and aid relationships. Third, it conceptualises Stiegler's Gorge as a 'delayed future' and an 'episodic ghost', demonstrating how infrastructural visions outlived political cycles and remained socially and politically active through enduring aspirations for energy self-sufficiency and economic transformation.

The findings show that dormant infrastructure projects continue to influence policy debates, shape national development narratives, and re-emerge during moments of ideological or regime change. The eventual revival of the dam, rebranded as the Julius Nyerere Hydropower Project, reflects not merely a continuation of past ambitions but a rearticulation of hydropower within new narratives of energy sovereignty and national pride. The thesis concludes that large-scale dam infrastructure is not simply a technical undertaking, but a contested socio-political construct continually reimagined over time. The study demonstrates how unbuilt infrastructure can function as a bridge between past aspirations and future development trajectories, revealing the cyclical and negotiated nature of infrastructural futures. It thus contributes a historically and geographically grounded post-colonial study that builds on work emphasising the temporality of megaprojects and how "waiting" is reframed as an active, politically charged condition for both citizens and planners.

ZUSAMMENFASSUNG

Diese Studie untersucht die historische Entwicklung, die politischen Dynamiken und die Zukunftsvisionen im Zusammenhang mit groß angelegten Wasserkraftinfrastrukturen in Tansania und greift damit ein zentrales Thema der Entwicklungs- und Infrastrukturforschung wieder auf. Große Staudämme nehmen seit langem einen prominenten Platz in den postkolonialen Entwicklungsvorstellungen ein und symbolisieren Modernisierung, staatliche Leistungsfähigkeit und wirtschaftlichen Wandel. Mit Fokus auf die langwierige und umstrittene Entwicklung des Stiegler's Gorge Dam im Rufiji-Becken untersucht die Studie, wie Wasserkraftinfrastruktur trotz langwieriger Verzögerungen, Verschleppungen und des Ausbleibens der physischen Bauarbeiten als mächtiges soziopolitisches Konzept über die Kolonialzeit und die Zeit nach der Unabhängigkeit hinweg Bestand haben kann.

Auf der Grundlage umfangreicher Archivrecherchen in Tansania, Norwegen und Schweden, ergänzt durch Interviews mit wichtigen Informanten aus Tansania und mündlichen Überlieferungen lokaler Gemeinschaften oberhalb und unterhalb des Rufiji, analysiert die Studie die Faktoren, die zur wiederholten Verschiebung und schließlich zur Wiederaufnahme des Projekts beigetragen haben. Anstatt die Verzögerung als Misserfolg zu betrachten, konzeptualisiert die Forschung die Verzögerung als eine generative Bedingung, durch die politische Visionen, Planungspraktiken und Entwicklungsnarrative im Laufe der Zeit aufrechterhalten und überarbeitet wurden. Die Analyse zeigt, wie Umweltbelange, finanzielle Zwänge, sich wandelnde Hilfsprogramme und wechselnde politische Führungen zusammenwirkten und den Verlauf des Projekts prägten.

Die Studie gliedert sich in drei analytische Themenbereiche. Zunächst untersucht sie die postkoloniale Wasserkraftlandschaft in Tansania und veranschaulicht, wie staatliche Akteure große Staudämme als Symbole für nationalen Fortschritts und Modernität darstellten. Zweitens untersucht sie die Rolle internationaler und transnationaler Akteure sowie die soziotechnischen Annahmen, die in der Wasserkraftplanung und den Hilfsbeziehungen verankert sind. Drittens konzeptualisiert sie Stieglers Gorge als ‘verzögerte Zukunft‘ und ‘episodischen Geist‘ und zeigt, wie infrastrukturelle Visionen politische Zyklen überdauerten und durch anhaltende Bestrebungen nach Energieautarkie und wirtschaftlicher Transformation sozial und politisch aktiv blieben.

Die Ergebnisse zeigen, dass ruhende Infrastrukturprojekte weiterhin politische Debatten beeinflussen, nationale Entwicklungsnarrative prägen und in Zeiten ideologischer oder politischer Umbrüche wieder auftauchen. Die letztendliche Wiederbelebung des Staudamms, der in den Julius Nyerere Hydropower Project umbenannt wurde, spiegelt nicht nur eine Fortsetzung früherer Ambitionen wider, sondern auch eine Neuformulierung der Wasserkraft innerhalb neuer Narrativen von Energiesouveränität und nationalem Stolz. Die These kommt zu dem Schluss, dass groß angelegte Staudammprojekte nicht einfach nur technische Unterfangen sind, sondern umstrittene soziopolitische Konstrukte, die im Laufe der Zeit immer wieder neu gedacht werden. Anhand der Untersuchung der Stiegler-Schlucht zeigt die Studie, wie nicht realisierte Infrastrukturprojekte als Brücke zwischen vergangenen Bestrebungen und zukünftigen Entwicklungspfaden fungieren können, und verdeutlicht damit den zyklischen und verhandelten Charakter der Zukunft von Infrastrukturprojekten. Sie leistet damit einen Beitrag zu einer historisch fundierten postkolonialen Studie, die auf Arbeiten aufbaut, welche die Zeitlichkeit von Megaprojekten betonen und zeigen, wie “Warten” als aktiver, politisch aufgeladener Zustand sowohl für Bürger als auch für Planer neu definiert wird.

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LIST OF ACRONYMS AND ABBREVIATIONS

BRALUP	Bureau of Resource Assessment and Land Use Planning
CCM	Chama Cha Mapinduzi
CRC	Collaborative Research Centre
DARESCO	Dar es Salaam and District Electric Supply Company Limited
DFG	Deutsche Forschungsgemeinschaft
EIA	Environmental Impact Assessment
ECAS	European Conference on African Studies
FAO	Food and Agriculture Organisation of the United Nations
FYDP	Five-Year Development Plan
JETRO	Japan External Trade Organisation
JNHPP	Julius Nyerere Hydropower Project
MOE	Ministry of Energy
MW	Megawatt
NAN	National Archives of Norway
NEMC	National Environmental Management Council
NORAD	Norwegian Agency for Development Cooperation
RUBADA	Rufiji Basin Development Authority
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SIDA	Swedish International Development Cooperation Agency
SNA	Swedish National Archives
TANESCO	Tanzania Electric Supply Company Limited
TANU	Tanganyika African National Union
TAZARA	Tanzania-Zambia Railway Authority

TNA	Tanzania National Archives
TVA	Tennessee Valley Authority
UDSM	University of Dar es Salaam
UNESCO	United Nations Educational, Scientific and Cultural Organisation
URT	United Republic of Tanzania
USAID	United States Agency for International Development
WB	World Bank
WWF	Worldwide Fund for Nature
WWI	World War I
WWII	World War II

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FAO (1960):1

CHAPTER I

INTRODUCTION: DAMS, CONTESTED WATERS AND IMAGINED FUTURES

1.1 Establishing the Study

The historical development of large-scale dam infrastructure in Tanzania's Rufiji Basin has been fraught with controversy, with competing interests and priorities shaping its trajectory since colonial times. While initial plans envisaged a multi-purpose project for flood control, irrigated agriculture and industrialisation, contestations over water use narrowed the focus, prioritising hydropower over other needs. Stakeholder disagreements, feasibility concerns and a changing political and economic landscape further complicated efforts to implement the project. The ambitious scale of the proposed development, coupled with conflicting visions for water allocation, led to its shelving in the mid-1980s, only to be revived in the 2010s.

For centuries, dams have been hailed as vital assets for providing energy and water, yet they can also have detrimental effects on economies, societies, and the environment. Studies show that in the post-World War II era, dams were often seen as symbols of modernisation and development for future making in many countries.[1] Unlike other state-initiated infrastructure projects, large dams reflected the state's technological and economic power embodied in modernist perspectives.[2] As part of an international trend towards renewable energy, many countries in the Global South turned to hydropower dam construction to meet their energy needs while reducing

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1 Detlef Müller-Mahn, "Envisioning African Futures: Development Corridors as a Dreamscapes of Modernity," *Geo Forum* 30, no.40(2019):30; Detlef Müller-Mahn, Kennedy Mkutu, and Eric Kioko, "Megaprojects – Mega Failures? The Politics of Aspiration and the Transformation of Rural Kenya," *The European Journal of Development Research* 33 (2021): 1069-1090; Katrin Bromber, Jeanne Feaux and Katharina Lange, "The Temporal Politics of Big Dams in Africa, the Middle East and Asia: By Way of an Introduction," *Water History* 6 (2015):289-296; Eric Adebayo, Benjamin K. Sovacool and Sara Imperiale, "It's about Dam time: Improving Micro hydro Electrification in Tanzania" *Energy for Sustainable Development* 17, no 4(2013):378-385; Cyrus Schayegh, "Iran's Karaj Dam Affair: Emerging Mass Consumerism, the Politics of Promise, and the Cold War in the Third World," *Comparative Studies in Society and History* 54, no. 3 (2012): 612–43.

2 Maria Kaika, "Dams as Symbols of Modernization: The Urbanization of Nature between Geographical Imagination and Materiality," *Annals of the Association of American Geographers 96* no. 2(2006): 276–301; Eric Swyngedouw, *Liquid Power: Contested Hydro-Modernity's in the 20th C Spain* (Cambridge: MIT Press, 2015); Patrick McCully, *Silenced Rivers: The Ecology and Politics of Large Dams*, (London: Zed Books, 1996):1-2; Thomas Mitchel, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley, CA: University of California Press, 2002): 21.

their environmental impact. In Tanzania, dams and hydropower development initiatives are justifiably seen as possible answers to address electricity shortages, provide water for household use and irrigation-based agriculture, address deforestation, and safeguard biodiversity.[3] However, some of these dams, like other large-scale infrastructure projects, often face scrutiny from various stakeholders, particularly when they experience delays in implementation.[4] Focusing on hydropower development at Stiegler's Gorge[5] in Tanzania's Rufiji River, this thesis examines the concept of delayed hydropower projects through a historical lens, exploring its role as a reflection of Tanzania's development goals. It examines the extent to which this project serves as a conduit for future progress, tracing its evolution from its inception to gain insights into the complexities of large-scale infrastructure projects in developing countries and their impact on national development trajectories.

The idea of harnessing the Rufiji's potential dates back to 1901, when German colonial administrators began exploring the region. Their ambitious plans extended beyond power generation to transform agricultural practices through innovative techniques such as terracing and advanced irrigation systems, and to expand economic infrastructure, particularly railways, to transport resources from the hinterland to the coast.[6] After the First World War, further studies were conducted under the British

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3 Joseph Kapika, and Anton Eberhard, *Power Sector Reform and Regulation in Africa: Lessons from Kenya, Tanzania, Uganda, Zambia, Namibia and Ghana* (Cape Town: HSRC Press, 2013); Olivier Hamerlynck, Stephanie Duvail, Leen Vandepitte, Kassim Kindinda, Wanja-Dorothy Nyingi, Jean- LUC Paul, Pius Yanda, Agrey Boniface Mwakalinga, Yunus Mgaya, and Jos Snoeks, "To Connect or Not to Connect - Floods, Fisheries and Livelihoods in the Lower Rufiji Floodplain Lakes, Tanzania," *Hydrological Sciences Journal* 56 no.8,(2011):1436-1451; Heather Hoag, *Developing the Rivers of East and West Africa: An Environmental History* (London: Bloomsbury, 2013):117; Zacharia Malley, "Linking Environment and Livelihood: Process and Impacts of Hydrological Drought in the Usangu-Mtera Ecosystem, Tanzania," *International Journal of Environment and Sustainable Development* 8 no. 1(2019):72-74, McCully, "Silenced Rivers": 1-2.

4 Yvonne Braun, "Lesotho's White Gold: The Political Ecology of Temporality and the Economy of Anticipation in Resource Extraction and Large Dam Infrastructural Projects," *Journal of Political Ecology*, 27(2020):819-938; Stephanie Duvail, Agrey Boniface Mwakalinga, Ann Eijkelenburg, Olivier Hemerlynck, Kassim Kandinda and Amos Majule, "Jointly Thinking the Post Dam Future: Exchange of Local and Scientific Knowledge on the Lakes of the Lower Rufiji Tanzania," *Hydrological Sciences Journal* 59, no 3-4(2014):713-730.

5 The Stiegler's Gorge Project was later renamed the Julius Nyerere Hydropower Project (JNHPP) during John Magufuli's presidency. This study traces the history before JNHPP.

6 Juhani Koponen, *Development for Exploitation: German Colonial Policies in Mainland Tanzania, 1884–1914* (Münster: LIT, 1995); Kjell J Havnevik, *Tanzania: The Limits to Development from Above*

administration, leading to the design of a unique dam project. The British colonial plans envisaged an irrigation infrastructure with a small reservoir, primarily for flood control and protection of downstream structures. New ideas about river development as a catalyst for colonial economic growth emerged in the late 1940s, followed by more expansive plans in the 1950s. The plans envisaged a large-scale infrastructure project that would transform the entire basin into an artificial environment dedicated to providing irrigation water.[7] Despite the colonial plans to develop Rufiji's potential, the results did not live up to expectations.

After independence, most African countries maintained similar structural approaches to economic growth. Governments continued to focus on large-scale infrastructure projects as part of broader modernisation efforts. According to James Scott, these large-scale engineering initiatives in post-colonial Africa were primarily attempts by authoritarian governments to reshape their environments through technological means.[8] Scott's work went further to criticise the modernist approach as the source of certain types of failure of state projects. Often, state-led or top-down projects fail simply because they may not be appropriate to local circumstances.[9] To some extent, conflicts between immediate and long-term goals, as well as pro-poor and pro-growth attitudes, are challenges to the success of government development interventions. Projects are criticised for their high economic risk, frequent delays, lack of transparency and accountability, and elite status. Government projects are characterised by a particularly high degree of fragility due to their exposure to uncertainties, which they interpret as a predisposition to pursue ever larger projects under economic scales that are at odds with their ambitious goals.[10] This study, however, departs from that argument, arguing instead that these infrastructures failed

(Uppsala: Nordiska Afrika Institutet in cooperation with Mkuki na Nyota Publishers, 1993): 263.

7 Food and Agriculture Organisation (FAO), "The Rufiji Basin Tanganyika: FAO Report to the Government of Tanganyika on the Preliminary Reconnaissance Survey of Rufiji Basin," Expanded Technical Assistance Program no. 1269(II), Hydrology and Water Resources, part I, Computation and Analyses (Rome, 1960): 3-5.

8 James C Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

9 Scott, "Seeing like a State":264.

10 Richard Ballard, and Rubin Margot, "A 'Marshall Plan' for Human Settlements: How Megaprojects Became South Africa's Housing Policy," *Transformation: Critical Perspectives on Southern Africa* 95, no. 1 (2017): 1-31.

primarily because they were heavily influenced by foreign industrial interests, modernisation ambitions, development aid organisations and international financial institutions.

The Arusha Declaration of 1967 marked a major turning point in Tanzania's development trajectory. This landmark document signalled the country's formal embrace of African socialism and set the stage for decades of state-led economic policies.[11] Key aspects of this period include the shift from colonial exploitation to nation-building strategies and the emphasis on state intervention in the economy as a development tool. Socialist agriculture was only one aspect of Nyerere's economic development strategy; industrial development was another. Among key projects during this period was the construction of a dam on the Rufiji River to generate hydroelectric power.[12] This initiative was championed by Mwalimu Nyerere as part of his ambitious modernisation plan outlined in the Second Five-Year Development Plan (FYDP) of 1969-1974. The modernisation plan shifted its focus to emphasise the importance of electricity as a critical driver of industrial growth and national development.[13]

However, with an increased emphasis on socialism and intensified economic development and modernistic strategy in the late 1960s and early 1970s came the era of large dams to generate electricity to power the country's industrialisation. The most notable of these was Stiegler's Gorge project, which had the potential to generate 2100 megawatts of electricity from the Rufiji River.[14] This time, the conception of Stiegler's Gorge project coincided with global interest in hydropower generation. Although initially supported by the socialist government and international donors, the project

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11 United Republic of Tanzania, hereafter URT, The Arusha Declaration: Socialism and Self-Reliance/'in Julius Nyerere, *Freedom and Socialism* (Oxford, 1969):246; Andrew Coulson, *Tanzania: A Political Economy*, 2nd ed. (Oxford: Oxford University Press, 2013):282.

12 May-Britt Öhman, "Taming Exotic Beauties: Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s-1990s," (PhD Diss., KTH Royal Institute of Technology, 2007); Ludwick A Teclaff, *The River Basin in History and Law*, (The Hague, [NL]: Martinus Nijhoff, 1967): 123.

13 URT, Second Five-Year Plan for Economic and Social Development, 1st July 1969-30th June 1974, Vol. I (Dar es Salaam: The Ministry of Planning, 1969): 121.

14 Synne Movik and Jeremy Allouche, "States of Power: Energy Imaginaries and Transnational Assemblages in Norway, Nepal and Tanzania," *Energy Research & Social Science* 67 (2020):2214-6296.

failed to gain momentum.[15] Several studies highlighted the Rufiji River's substantial resource potential, sparking heated debates about constructing a massive dam at the gorge.[16] However, the plans ultimately did not materialise due to unforeseen challenges. Funding and industrial interests aside, the Stiegler's Gorge project was highly controversial, particularly because of its feasibility and environmental and socio-economic impacts.[17] These factors combined to prevent the project from becoming operational until it was revived in 2017.[18]

The evolution of hydropower dams in Tanzania, from large dams to smaller dams and back to large dam infrastructures, is a fascinating story that warrants a historical study. As these projects became increasingly integral to Tanzania's development history, they offered valuable insights into the country's development trajectory and future prospects. Key aspects of this phenomenon include the shift in focus from large-scale dams in the 1960s and 1970s to smaller initiatives in the 1980s and 1990s and a subsequent return to larger dam infrastructures in the 2010s; the interplay between local stakeholders and international actors in shaping hydropower development; and the potential of these projects to serve as a bridge between Tanzania's past experiences and its future aspirations. Given the importance of hydropower in Tanzania's modern landscape, historians would benefit from examining these developments through a critical lens, exploring how they reflect broader trends in national development and global energy politics.

The current study operates within the broader field of history of science and technology, adopting a unique approach that emphasises the perspectives of national and local communities on visions of the future and their impact on people's lives over

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15 Movik & Allouche, "States of Power,": 2214-6296.

16 Terje Oestigaard, Atakilte Beyene, and Helga Ögmundardóttir, eds., *From Aswan to Stiegler's Gorge: Small Stories about Big Dams,* Current African Issues 66 (Uppsala: Nordiska Afrikainstitutet, 2019):105-116; Barnaby Dye, and Joerg Hartmann, The True Cost of Power: The Facts and Risks of Building the Stiegler's Gorge Hydropower Dam in the Selous Game Reserve, Tanzania (Gland: Switzerland, World Wildlife Fund for Nature,2017); Rolf Baldus, "Stiegler's Hydroelectric Dam," in *Wild Heart of Africa: The Selous Game Reserve in Tanzania*, edited by Rolf Baldus (Johannesburg: Rowland Ward Publications, 2009).

17 Heather J. Hoag and May-Britt Öhman, "Turning Water into Power: Debates over the Development of Tanzania's Rufiji River Basin, 1945-1985," *Technology, Water and Culture* 49, no. 3 (2008): 624-651.

18 Barnaby Dye, "Dam Building by the Illiberal Modernisers: Ideological Drivers for Rwanda and Tanzania's Megawatt Mission," *Critical African Studies* 14, no. 3 (2022): 231-249.

time. It focuses on the social construction of technological and scientific artefacts and statements, and the analysis of how these artefacts and statements influence society, examined through a dual lens as carriers of values and political ideologies, and as products shaped by societal values and power structures.[19] A key premise of this study is that technological artefacts are inherently imbued with values and intentions, rather than being neutral entities. As a result, they have significant political impacts on society. This approach recognises that the development and implementation of dams are deeply intertwined with technology, social dynamics and political agendas. By examining these relationships, this thesis aims to provide insights into how visions of the future shape people's livelihoods and how technological advances reflect and influence societal structures over time.[20] Most state-led projects designed are politically motivated with the intention of favouring particular interests.

Similarly, Gabrielle Hecht, in her analysis of the Post-War French development of nuclear technology, used the concept of the political design of technology to mean that political values are built into a particular design by engineers. The analysis also takes into account the idea of political regimes, suggesting that there may be a conflict between the political ideologies of different groups of designers, and more generally, the whole idea that the creation of technological artefacts is a way of fostering a sense of national identity.[21] Against this backdrop, my study examines the extent to which the original plans for Stiegler's Gorge Dam were modified before it became operational, the actors behind the changes, and the contexts in which they acted in the development of such a project.

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19 Wiebe E. Bijker, Thomas Parke Hughes and Trevor Pinch (eds). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, (Cambridge, Mass: MIT Press, 2012); Hans K Klein, & Daniel Lee Kleinman, "The Social Construction of Technology: Structural Considerations," *Science, Technology, & Human Values* 27, no.1(2002): 28–52; Sheila Jasanoff and Sang-Hyun Kim, "Sociotechnical Imaginaries and National Energy Policies," *Science as Culture* 22, no. 2 (2013): 189-196.

20 Langdon Winner, Do Artifacts Have Politics? In *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, (Chicago: University of Chicago Press, 1986):19-39.

21 Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade*, (Cambridge, Mass: MIT Press, 2012): xx, 451.

1.2 Situating the Current Study

To provide a comprehensive framework for examining a history of hydropower development in Tanzania's Rufiji Basin and assessing Stiegler's Dam's potential as a bridge to the future, it is essential to establish a solid foundation in relevant literature. Before outlining the specific objectives of this study, I have found it useful to first present the existing studies that inform and relate to my investigation. This contextualisation introduces the broader scholarly landscape surrounding the topic and highlights the significance of this particular study within the field. It is important to note that this initial review does not encompass all relevant studies. More specialised and focused studies are presented in the theoretical chapter and other sections of this thesis, providing a deeper dive into the specific aspects of dams and hydropower development that are central to this investigation. To start with, scholars have extensively explored how dams are perceived and represented in different cultural contexts, including literary works, media representations, and artistic expressions. This scholarly inquiry has led to a deep understanding of the symbolic significance of dams for societal values, aspirations, and conflicts[22], extending beyond their physical presence to examine their impact on modern society. These structures serve not only as functional water management tools but also as manifestations of collective desires and fears.[23] However, despite this extensive examination of dams in different contexts, one aspect remains understudied: the long-term impacts of unbuilt or delayed dam projects.

Dams are a special category of infrastructure in that they require extensive planning and preparation before construction begins. They are particularly expensive undertakings that inevitably have a significant environmental impact, often accompanied by social consequences. As Harvey and Knox have noted, dam projects are prone to what they call the 'enchantment' of infrastructure, an aspect that stems from several factors, including the imagination of desirable futures, the promise of

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22 Kaika, "Dams as Symbols of Modernization,":276-301; Dye, "Dam Building by the Illiberal Modernisers,": 231-149; Cecilia Llamosas, & Benjamin Sovacool, "The Future of Hydropower? A Systematic Review of the Drivers, Benefits and Governance Dynamics of Transboundary Dams,". *Renewable and Sustainable Energy Reviews* 137(2021):110-415.

23 Warner Burke, *Organizational change: Theory and practice* (5th ed.), (Thousand Oaks, CA: Sage,2018).

development, a kind of wishful thinking and fictional expectations.[24] In this context, the temporality of megaproject development plays an important role. Unlike typical projects with defined start and end points, large dams often have long planning and construction phases. This extended period of delay and uncertainty allows the dam to gradually take shape in the minds of planners and the public. For communities at the proposed site, the dam can become an integral part of an imagined future, associated with hopes, promises, fears and anxieties - even if little physical progress is visible at the actual site. This imaginative process seems paradoxical given that the dam is not yet a tangible object, there is nothing visible at the site, yet people already feel its presence and act accordingly.[25]

Throughout the twentieth century, dams have been seen as 'dreamscapes of modernity' that acknowledge the value of controlled rivers as the basis for economic transformation, making them social technical imaginaries and how this influences spatial development in Africa.[26] These imaginaries act as a bridge between the abstract realm of technological possibilities and the concrete realities of social, political and economic life. In doing so, they consider that these projects are seen as future-making through the mobilisation of power in the politics of aspiration.[27] Building dams often face unexpected obstacles, causing deviations from the original plans, delays, and cost overrides. Such projects are often highly controversial, as politicians and investors (mis)use them for their ends, making them subject to false promises, corruption and the enforcement of patronage.[28]

Evidence from various case studies demonstrates that dam projects in countries such as Ghana, Egypt, Ethiopia, Turkey, Turkistan, China, and Japan are negotiated using temporal politics. This approach indicates that the programs and strategies

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24 Penny Harvey, and Hannah Knox, "The Enchantments of Infrastructure," *Mobilities* 7, no.4(2012):521-536.

25 Jens Beckert, *Imagined Futures: Fictional Expectations and Capitalist Dynamics* (Harvard University Press, 2016), *JSTOR*, http://www.jstor.org/stable/j.ctvjnrvrw. Accessed 10 Jan. 2025.

26 Müller-Mahn, "Envisioning African Futures,":115:156-159; Christopher D Gore, *Electricity in Africa: The Politics of Transformation in Uganda*. NED-New edition, (Boydell & Brewer, 2017):12-26.

27 Movik, & Allouche, "States of Power,":2214-6296.

28 Bent Flyvbjerg, "Policy and Planning for Large Infrastructure Projects: Problems, Causes, Cures. *Environment and Planning B: planning and design* 34(2007): 578-597.

implemented are designed to address political concerns rather than prioritise the interests of the larger public. This outcome stems from how governments utilise models of development to consolidate power and advance political objectives.[29] These studies show that plans that address political concerns tend to focus on the next political election rather than the next generation, are sometimes designed to benefit those in power, and are therefore temporary and limited in scope. This suggests that delayed infrastructure can be seen as a result of the tension between the material and imaginative dimensions of projects, with the latter taking precedence in shaping the direction and pace of infrastructure development.[30]

Scholars have associated the failure of dams with significant ecological pressures, accidents and technological failures. These large-scale engineering projects often lead to resettlement, primarily affecting local populations living near the dam sites.[31] Most dams are built for hydropower generation, which primarily benefits urban dwellers. This results in economic and environmental burdens on local communities, isolating them from their immediate natural resources. The construction of dams oftentimes results in the widespread displacement of indigenous peoples, as illustrated by the case of the Gwembe Tonga following the Kariba Dam project.[32] However, studies on failed infrastructure projects portray the emergence of protraction in various ways, situating it between past and future, existing in a liminal space between reality and fantasy. This phenomenon encompasses delayed construction projects, abandoned works, and unbuilt or unfinished initiatives.[33] These infrastructures may remain

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29 Katrin Bromber, Jeanne Féaux, & Katharina Lange, "The Temporal Politics of Big Dams in Africa, the Middle East, and Asia: By Way of an Introduction" *Water Hist* 6, no 4(2015):289–296.

30 Müller-Mahn, Mkutu, and Kioko, "Megaprojects—Mega failures?":1069–1090; Martin J Williams, "The Political Economy of Unfinished Development Projects: Corruption, Clientelism, or Collective Choice?" *American Political Science Review* 111, no. 4 (2017):705–723.

31 Marcus Nüsser, Technological Hydroscapes in Asia: The Large Dams Debate Reconsidered, In *Large Dams in Asia.* Advances in Asian Human-Environmental Research, (Springer, Dordrecht,2014). https://doi.org/10.1007/978-94-007-2798-4_1.

32 Elizabeth Colson, *The Social Consequences of Resettlement: The Impact of the Kariba Resettlement Upon the Gwembe Tonga*, (Manchester: Manchester University Press, 1971). Thayer Scudder, River Basin Projects in Africa: *Conservation Vs. Development, Environment*, 31 no.2(1989):4-32; Bill Derman, Balancing the Waters: Development and Hydro politics in Contemporary Zimbabwe, in *Water, Culture and Power: Local Struggles in Global Context*, (Washington, D.C, 1998).

33 Johannes Theodor Aalders, Jan Bachmann, Per Knutsson, and Benard Musembi Kilaka, "The Making and Unmaking of a Maga-Project. Contesting Temporalities Along the LAPSSET Corridor in Kenya," *Antipode* 53, no.5(2021):1273-1293; Ashley Carse, and David Kneas,

dormant for extended periods, but they can also reawaken.[34] These projects are often perceived as harmful because they create uncertainty, instability and higher construction costs; they are not simply physical absences but have social, economic and emotional impacts on the communities whose futures are tied to them. Understanding how these infrastructure-related futures unfold requires a closer look at their complex histories, the challenges and unfulfilled promises of development, and their temporalities.

The larger body of literature suggests that dams have been viewed quite differently in global development discourses. In the 1960s, large dams were seen as symbols of modernity and drivers of state-led transformation.[35] In the 1980s, neoliberal policies favoured small and medium dams and private sector involvement[36], in what Schumacher's famous book calls 'Small is beautiful' as an impassioned critique of the 'bigger is better' ideology and a plea for small-scale, appropriate technologies as a means of improving livelihoods and empowering people in rural areas, particularly in the Global South.[37] Accordingly, the 1990s and the beginning of the new millennium saw a reduction in the number of new large dams being built. This reflected criticism of large, expensive, top-down infrastructure projects.[38] This was the result of an investigation into the performance and problems of dam development by the World Commission on Dams, which eventually convinced funding agencies such as the World Bank to withdraw from these activities.[39]

"Unbuilt and Unfinished – The Temporalities of Infrastructure," *Environment and Society* 10, no.1(2019):9-28; Bent Flyvbjerg, Nills Bruzelius, and Werner Rothengatter, *Megaprojects and Risk: An Anatomy of Ambition*, (Cambridge: Cambridge University Press,2003).

34 Marta Zaniolo, Matteo Giuliani, Scott Sinclair, Paolo Burlando, and Andrea Castelletti, "When Timing Matters—Misdesigned Dam Filling Impacts Hydropower Sustainability," *Nature Communications* 12, no. 1(2021): 3056. 10.1038.

35 Kaika, "Dams as Symbols of Modernization,": 276-301; Marcus Nüsser, "Political Ecology of Large Dams: A Critical Review," *Petermanns Geographische Mitteilungen* 147 no.1(2003):20-27; McCully, "Silenced Rivers,"; Scott, "Seeing like a State."

36 Christine, Zarfl, Alexander E. Lumsdon, Jürgen Berlekamp, Laura Tydecks, and Klement Tockner, "A Global Boom in Hydropower Dam Construction, "*Aquatic Sciences* 77 (2015): 161-170.

37 Ernst Friedrich Schumacher, *Small is Beautiful: A Study of Economics as if People Mattered* (London: Blond and Briggs, 1973).

38 Christopher Schulz and William M. Adams, "Debating Dams: The World Commission on Dams 20 Years On," *Wiley Interdisciplinary Reviews: Water* 6, no. 5 (2019): 1-19.

39 Thayer Ted Scudder, *The Future of Large Dams: Dealing with Social, Environmental, Institutional and Political Costs*, (London: Routledge, 2012); Schulz & Adams, "Debating Dams".

Nevertheless, large dams have recently experienced renewed global attention, primarily driven by governments showcasing state power and the resurgence of high modernist development ideology.[40] This global discourse surrounding the rise and fall of large dams, along with their recent resurgence, provides the backdrop for understanding dam-building politics in Tanzania and the phenomenon of 'delayed futures'. These delayed future initiatives, characterised by lengthy planning and construction phases, have received relatively little attention in the academic literature. This oversight highlights an opportunity for further research into the complex dynamics surrounding these ambitious yet often stalled infrastructure projects.

The Stiegler's Gorge Dam project in Tanzania's Rufiji Basin is a spectacular example of a delayed future project, not only because of its size and national importance but also because of the extremely long period that has elapsed between the initial idea and the start of construction works. The dam has been subjected to political debate and planning initiatives since colonial times, driven by changing development ideologies and priorities regarding agricultural production, flood control, electrification and industrialisation. Despite Tanzania's ever-increasing demand for water and energy, the project idea remained more or less dormant for more than a century, with nothing to be seen at the proposed dam site until 2020, when construction works started.[41] Projects like Stiegler's Gorge raise questions about how we imagine the future, both locally and nationally, and how these plans are received and implemented. The current study looks at the initial conception, repeated postponement and ultimate revival of Stiegler's Gorge project. Now almost complete, the dam represents the realisation of long-standing national aspirations. Yet as it emerges, questions persist:

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40 Barnaby Dye, "The Politics of Dam Resurgence: High Modernist State Building and the Emerging Powers in Africa"(PhD dissertation, University of Oxford, 2018). Dye, "Dam Building by the Illiberal Modernisers," 231-149; Christopher Sneddon, *Concrete Revolution: Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (Chicago: University of Chicago Press, 2019).

41 Rolf Baldus, "Stiegler's Hydroelectric Dam," in *Wild Heart of Africa: The Selous Game Reserve in Tanzania*, edited by Rolf Baldus (Johannesburg: Rowland Ward Publications, 2009); Heather J. Hoag and May-Britt Öhman, "Turning Water into Power: Debates over the Development of Tanzania's Rufiji River Basin, 1945-1985," *Technology, Water and Culture* 49, no. 3 (2008): 644; Havnevik, "Tanzania: The Limits of Development,"; Raphael Mwalyosi, "Resource Potentials of the Rufiji River Basin, Tanzania," *AMBIO* 19, no.1(1990):16-20; Christine Noe, "The Berlin Curse in Tanzania:(Re) Making of the Selous World Heritage Property," *South African Geographical Journal Suid-Afrikaanse Geografiese Tydskrif* 101, no.3(2019): 379-398.

Does this near-complete dam reflect the socialist-era aspirations of the 1960s or has its meaning been transformed by shifting political priorities, environmental and developmental paradigms? This study examines the historical, political and socio-environmental dimensions of hydropower development in Tanzania, with a focus on the delayed implementation and subsequent revival of Stiegler's Gorge Dam. It explores the project's historical context, the reasons behind its repeated postponement and its evolving role in shaping the country's future development. By examining the lengthy delay and subsequent swift implementation, the study sheds light on the intricate relationship between infrastructural dormancy, planning failures, and the enduring power of national vision. Specifically, the study sought to;

- Trace the historical evolution of hydropower planning and implementation in Tanzania since independence.
- Analyse the role of transnational and local actors in shaping the design, delay, and eventual revival of Stiegler's Gorge Dam.
- Explore how local communities perceive and respond to the prolonged delays and changing narratives surrounding the project, and how these perceptions shape their understanding of development and national futures.

The empirical findings of this study are organised into three substantive chapters, each addressing one of the central research questions. The chapters reflect the progression of the investigation, moving from national-level planning and policy to transnational influences and finally to local perspectives. These guiding questions shape the methodology, direct the analysis and interpretation of findings, and inform the conclusions drawn from the study.

- How have hydropower initiatives in Tanzania been historically planned, debated, and implemented since independence?
- What roles have transnational and local stakeholders played in shaping the trajectory, delay, and revival of Stiegler's Gorge Dam project?
- How do local communities perceive the delays and revival of Stiegler's Gorge Dam, and what do their experiences reveal about the social and emotional impacts of unbuilt or dormant infrastructure?

1.3 Scope of the Study

This study focuses on the historical evolution, political dynamics, and socio-environmental implications of large-scale hydropower development in Tanzania, using Stiegler's Gorge Dam project as a central case study. Geographically, the research is anchored in the Rufiji Basin, an area of strategic importance due to its ecological significance and developmental potential. The study also engages with transnational spaces, reflecting the influence of international actors in shaping Tanzania's hydropower agenda through development cooperation and technical assistance.

Temporally, the study spans from the early post-independence period in the 1960s to the project's revival in the 2010s. This broad timeframe allows for a critical examination of continuities and shifts in planning ideologies, political regimes, and development discourses. The research addresses both historical and contemporary dimensions, offering a long-term perspective on how infrastructure projects move between dormancy and realisation.

Thematically, the study draws on interdisciplinary approaches from political economy, critical infrastructure studies, travelling ideas and the concept of socio-technical imaginaries to analyse how infrastructure is conceptualised, contested, and materialised over time. It explores the intersections of politics, development aid, environmental governance, and local perceptions, highlighting the role of both global and grassroots actors in shaping infrastructural futures.

The study is based on qualitative data, including extensive archival research in Tanzania, Norway, and Sweden, as well as interviews with policymakers, engineers, and community members. This multi-scalar and multi-sited approach enables a nuanced understanding of the project's layered history and evolving significance.

1.4 Relevance of the Study

This study offers a distinctive contribution to scholarship on hydropower development and mega infrastructure in postcolonial Africa. It foregrounds the politics of delayed futures by examining Stiegler's Gorge Dam project in Tanzania, which was stalled for a long time but has recently been revived. Although an extensive

body of literature on dams, modernity, and international planning exists, much of it focuses on completed projects and their immediate impacts. This research shifts the analytical lens to the temporal and affective dimensions of infrastructural postponement. It demonstrates that long-unbuilt and suspended projects are neither inert nor irrelevant but remain socially and politically significant through the hopes, contestations, and narratives they generate over time.

What distinguishes this study is its explicit engagement with theories of future-making and the role of infrastructure as a site of both anticipation and uncertainty. By tracing Stiegler's Gorge Dam project from its inception since colonial times to its resurgence in the 2010s, the study reveals how infrastructural delay can become a form of governance, influencing not only development planning but also collective conceptions of national progress and sovereignty. This future-oriented approach enables a deeper understanding of how infrastructures, even in their absence, act as vessels for ideological investment and contested visions of development.

Equally important is the study's focus on local responses to the dam. Moving beyond elite discourses and state-centred planning, the research centres on the voices, expectations, and lived experiences of the communities around the site and further downstream. It examines how local actors navigate, reinterpret, or resist the dam's repeated returns and how their engagement with the project challenges linear narratives of technological progress. In doing so, the study highlights the complex interplay between global development agendas, national ideologies, and grassroots perspectives.

By combining historical analysis with insights from political economy and socio-technical imaginaries, this dissertation intervenes in broader debates on infrastructure and temporality. It contributes a novel, historically grounded perspective on how infrastructures in Africa are not only built or abandoned but continuously imagined, deferred, and revived, shaping the politics of waiting and the struggle over alternative futures.

1.5 Chapter Summaries

Following the introduction, Chapter Two details the theoretical frameworks and methodological approach of the study. It draws on political economy/ecology, socio-technical imaginaries, and the concept of travelling ideas to critically examine how dam infrastructures are embedded in political, environmental, and ideological contexts. The chapter also discusses methodological strategies, including archival research and oral histories, used to explore the historical development and contested nature of Stiegler's Gorge project.

Chapter Three situates the study within the broader geographical and historical context of the Rufiji Basin. It explores early colonial interventions, the emergence of dams and hydropower planning, and the role of international organisations such as the FAO in envisioning the basin's development. This chapter highlights how the basin was conceptualised as a space of potential and transformation, setting the stage for the postcolonial dam-building agenda.

Chapter Four traces the evolution of hydropower policy and infrastructure in Tanzania from the 1960s to the mid-1990s. It analyses how state actors linked large dams to national development, sovereignty, and modernisation, often with support from international donors. The chapter also examines the tensions between inherited colonial frameworks and emerging postcolonial ambitions, revealing how infrastructural projects were shaped by ideological, economic, and institutional shifts.

Chapter Five focuses on Stiegler's Gorge Dam in the global arena, examining transnational negotiations, donor politics, and development aid dynamics from the 1970s onwards. It explores the role of actors such as NORAD and RUBADA and discusses how global development models were adapted or resisted within the Tanzanian context. The chapter also considers how failed or delayed projects generate learning processes and feed into future infrastructural visions.

Chapter Six introduces the concept of "delayed futures" to understand the prolonged dormancy and eventual revival of Stiegler's Gorge project. It explores the political, economic, and environmental factors behind the project's non-materialisation in the 1980s and its resurgence in the 2010s. The chapter also draws on fieldwork data to

examine how local communities interpret and experience the dam's revival, offering insight into the emotional and social dimensions of long-awaited infrastructure.

Chapter Seven concludes the study by synthesising its main arguments and contributions. It reflects on the temporal politics of infrastructure in postcolonial contexts and how history, memory, and imagination shape development trajectories. The chapter reaffirms that unbuilt or delayed projects are not simply failures but part of a broader infrastructural process that continues to shape national visions and local realities.

CHAPTER II

THEORETICAL ORIENTATIONS AND METHODOLOGY

2.1 Introduction

Building on the discussion in the previous chapter, which introduces and situates this study within the broader literature on contested waters and futures in dam development, this chapter presents the theoretical framework for analysing Stiegler's Gorge Dam in Tanzania's Rufiji Basin. While dams have long been associated with progress, authority and control, often framed as engines of economic growth, energy security and modernisation[42], such large-scale infrastructure projects are never purely technical undertakings.[43] Rather, they are deeply embedded in political, social and environmental contexts. This chapter introduces three key theoretical perspectives that help unpack the complexities of Stiegler's Gorge Dam: political economy/ecology, socio-technical imaginaries, and travelling ideas. These frameworks provide valuable perspectives through which to examine the power dynamics, discursive constructions and transnational influences that shape the project. Political economy/ecology provides a means of analysing how power operates in infrastructural governance, asking who benefits from the dam and who bears its costs. This perspective reveals the unequal distribution of resources, risks and decision-making authority, and highlights the socio-environmental consequences of large infrastructure projects. Socio-technical imaginaries explore how different actors imagine dams and hydropower as tools for development, investment or geopolitical strategy. These imaginaries shape national policies and public perceptions, legitimising or contesting hydropower development in ways that go beyond technical considerations. Finally, travelling ideas trace how global policies, technologies, and discourses influence national and local strategies. This approach highlights how international norms, financial incentives and technological expertise travel, reinforcing or challenging existing power structures. By integrating these perspectives, this chapter situates Stiegler's Gorge Dam within broader debates

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42 Katie Meehan, Naho Mirumachi, Alex Loftus, and Majed Akhter, *Water: A critical introduction*. (John Wiley & Sons, 2023).

43 Katrin Bromber, Jeanne Féaux de la Croix, and Katharina Lange. "The temporal Politics of Big Dams in Africa, the Middle East, and Asia: By Way of an Introduction." *Water History* 6 (2014): 289-296.

about hydropower, infrastructure and contested futures. More than just a physical structure, the dam emerges as a site of global aspirations, local struggles and environmental tensions.[44] The following sections elaborate on these theoretical concepts and their relevance to this investigation.

2.1.1 Political Economy / Ecology

The political economy/ecology perspective offers a powerful framework for analysing how power, capital, and competing development imaginaries shape large-scale infrastructure projects, such as hydropower dams. Far from being neutral or purely technical interventions, these projects are deeply political and historically situated. As scholars have shown, infrastructure is shaped not only by political and economic structures but also serves to reproduce them, often reinforcing existing inequalities.[45] Political economy emphasises the co-constitution of politics and the economy, how state institutions, policy frameworks, and development agendas are moulded by economic interests, and how economic processes are themselves driven by political imperatives.[46] This relationship extends to policymaking. Such infrastructures embody competing interests, economic ideologies and visions of national progress, and often reflect the priorities of political elites, international financiers and external investors more than those of local communities.[47] Political ecology extends this analysis by situating these dynamics within broader ecological systems and spatial contexts, showing how struggles over infrastructure are also struggles over access to land, water, and environmental resources.[48] In this view, infrastructure is not only about economic growth or service delivery, but a material expression of power relations that shape socio-environmental outcomes.

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44 Adam Barbara, and Chris Groves. *Future matters: Action, knowledge, Ethics*. 3, (Brill, 2007).

45 Erik Swyngedouw. "The Political Economy and Political Ecology of the Hydro-Social Cycle." *Journal of Contemporary Water Research and Education* 142,1 (2009): 56–60; David Harvey. *Spaces of Global Capitalism: Towards a Theory of Uneven Geographical Development*. London: Verso, 2006:85 120.

46 Seth Schindler, and Jonathan Dodson. "The Political Economy of Infrastructure Development in the Global South." In *The Routledge Handbook on the Political Economy of Infrastructure*, edited by Andreas Antoniades and Jan Mohan, (London: Routledge, 2022): 19–35.

47 Maria Kaika. *City of Flows: Modernity, Nature, and the City*. (New York: Routledge,2005).

48 Paul Robbins. *Political Ecology: A Critical Introduction*. 2nd ed. Chichester: (Wiley-Blackwell, 2012): 3–36, 95–120.

The political economy approach foregrounds the structural relationships between the state, market actors, and affected populations. It highlights how these relationships are mediated through institutions, discourses, and physical interventions.[49] Infrastructure projects, especially those as large and protracted as Stiegler's Gorge Dam, exemplify these entanglements. They are rarely just about delivering energy or water; they are also about producing state legitimacy, territorial control, and narratives of modernity.[50] Often, these infrastructures reflect the priorities of political elites, international financial institutions, and external investors more than those of affected communities, who are frequently excluded from meaningful participation in planning and decision-making and from shaping how power is exercised through material interventions in the environment.[51]

The Stiegler's Gorge Dam's long history of delay reveals much about the shifting political economy not only of colonial but also of postcolonial Tanzania. In the post-colonial era, the dam was framed as a symbol of self-reliance and national development during the socialist period. However, its prolonged dormancy, shaped by shifting donor relations, fiscal constraints, environmental resistance, and governance transitions, reflects the entanglement of infrastructure planning with broader political and economic transformations. From its socialist inception to its neoliberal deferral and nationalist revival under President John Magufuli, the process has involved different configurations of actors, capital, and legitimacy. This contributes to what Swyngedouw calls the *depoliticisation* of infrastructure: presenting inherently political decisions as merely technical or necessary, thereby obscuring questions of equity, justice, and agency. Political ecology pushes back against this tendency by re-politicising infrastructure, making visible the uneven distribution of its benefits and burdens, and the contested visions of the future that it enacts.[52]

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49 Anand, Nikhil, Akhil Gupta, and Hannah Appel, eds. *The Promise of Infrastructure*. (Durham, NC: Duke University Press, 2018).

50 Charis Enns. "Mobilising Research on Africa's Development Corridors." *Geoforum* 88, 2018: 105–108; Brian Larkin. "The Politics and Poetics of Infrastructure." *Annual Review of Anthropology* 42, 2013: 327–343.

51 Timothy Mitchell. 2002. *Rule of Experts: Egypt, Techno-Politics, Modernity*. (Berkeley: University of California Press, 2002).

52 Erik Swyngedouw. "Techno natural Revolutions: The Scalar Politics of Franco's Hydro-Social Dream for Spain, 1939–1975." *Transactions of the Institute of British Geographers* 32,1 (2007): 9–28.

Infrastructures such as Stiegler's Gorge are not merely material; they are also ideological and symbolic. The dam epitomises how state-led development projects are mobilised to assert sovereignty, demonstrate capacity, and attract foreign investment, often using the language of progress and modernisation.[53] However, these narratives often obscure the uneven impacts of such projects on ecosystems, heritage landscapes such as the Selous Game Reserve, and the distribution of benefits across class and regional lines. The construction of Stiegler's Dam within a protected area avoids the issue of human resettlement. As we shall see in chapter six, however, the interplay between technology, environmental and wildlife considerations, and power relations remains crucial.

Historical legacies are central to this analysis. Infrastructures in postcolonial Africa often trace their genealogies back to colonial regimes, which used transport, energy, and water systems to extract resources, secure territories, and institutionalise racial and spatial inequalities.[54] As many scholars have argued, the logics of extraction, territorialisation, and elite-centric planning continue to inform contemporary infrastructure development across the continent. Dams, railways, and roads built today often reinforce older geographies of exclusion, even when cloaked in new developmental rhetorics.[55] The case of Stiegler's Gorge Dam exemplifies these dynamics. Its delayed implementation highlights the tensions between global environmental regimes (e.g., UNESCO protections), state developmental agendas, and international financing structures. The dam's recent revival occurred under a populist-nationalist administration that sought to reassert Tanzanian control over its development path, despite international concern over biodiversity and transparency. Such political-economic contestations highlight how infrastructure is both a site and an instrument of governance.

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53 Ghosh, Debojyoti. *Making Infrastructure Visible: Infrastructure and State Power in Africa*. (London: Routledge, 2020).

54 Mitchell, Rule of Experts.

55 Enns, "Mobilising Research on Africa's Development Corridors: 105–108; Ghosh, "Making Infrastructure Visible"; Larkin, The Politics and Poetics of Infrastructure": 327–343.

Furthermore, infrastructures such as dams cannot be fully understood without examining the temporalities they engender.[56] Long delays, rescaling, and revival are not failures but rather part of the process through which political legitimacy, public expectations, and elite interests are recalibrated. As infrastructure scholar Carse puts it, infrastructures "generate politics by promising futures." These futures are shaped not only by engineering plans and budgets, but by the imaginative work of the state and the discursive frameworks of development.[57] Political economy/ecology studies future-making by analysing how power dynamics, economic forces and historical contexts shape competing visions of delayed projects such as Stiegler's Gorge.[58] It considers how economic interests, institutional arrangements, and historical trajectories converge in the creation, dissolution, and reconstruction of megaprojects. It also prompts critical reflection on the futures envisaged, financed, and constructed, and on the environmental and social costs. While the perspective provides valuable insights into the material and social consequences of infrastructure, it tends to focus less on how societies envision technological futures. To complement this perspective, this study incorporates socio-technical imaginaries, highlighting how the dam was originally framed as a socialist modernist solution. By bringing these approaches together, the analysis captures both the contested realities and the aspirational narratives that shape the project's trajectory.

2.1.2 Socio-Technical Imaginaries

Socio-technical imaginaries refer to collective visions of how society should function, shaped by science and technology.[59] They are not just ideas, but shared narratives that influence policymaking, technological development and infrastructure planning. Introduced in 2009, the concept was developed to understand the role of imagining the technological future as a crucial constructive element in social life. The theoretical foundations of the concept are rooted in the history of philosophy and sociology.

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56 Ashley Carse and David Kneas. "Unbuilt and unfinished: The temporalities of infrastructure." *Environment and Society* 10, no. 1 (2019): 9-28.

57 Ashley Carse. "Nature as Infrastructure: Making and Managing the Panama Canal Watershed." *Social Studies of Science* 42,4 (2012): 539–563.

58 Barbara Adam, and Chris Groves, *Future matters: Action, knowledge, Ethics*. Vol. 3. Brill, 2007.

59 Sheila Jasanoff, and Sang-Hyun Kim, (eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, (Chicago: University of Chicago Press, 2019).

Beginning with the Weberian perspective, which assumes that social actors subjectively interpret how things are connected, the concept is deeply embedded in interpretive sociology.[60] Imaginaries are well established in interpretive social theory and serve as a technical term for collective beliefs about how society should function.[61] These imaginaries, closely linked to the physical dimensions of infrastructure and resources, offer a perspective that allows us to question the assumed permanence of spatial relationships and to consider questions of national identity. They emerge from a complex interplay of institutions, principles, values and aspirations, and influence perceptions of the most effective sources and models of governance for promoting development.[62] According to Cheteau et al., the concept of socio-technical imaginaries is built upon visions of desirable futures conceived and manifested through investments in wholly ordered and interconnected arrangements of people and things, characters and plots, and space and time that link diverse socio-technical configurations to a single, broader collective narrative context.[63] In the case of Stiegler's Gorge, the dam was originally conceived as a socialist-modernist solution to economic development, reflecting a socio-technical imaginary that saw large-scale infrastructure as essential to national progress. Using socio-technical imaginaries, this study analyses the evolving perceptions surrounding the project to help us understand how it was imagined at local, national and international levels. The framework also helps us understand how delays in implementation affected the imagination of Tanzanian society in the post-1980s and pre-2017 period. The revival of the project in 2017 marks the return of an imagination first formed in the 1960s. However, its completion raises a critical question: Is this the same vision, or has the project been reimagined with different promises and expectations? The original plans were embedded in the FAO's development aspirations set out in the late 1950s, tied to a specific vision of modernisation and national progress. In contrast, their contemporary revival exists in a different historical and economic

60 Sheila Jasanoff, & Kim, Sang-Hyun, "Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea," *Minerva, 47* no.2(2009), 119–146.

61 Sheila Jasanoff, and Sang-Hyun Kim, "Sociotechnical Imaginaries and National Energy Policies," *Science as culture* 22, no. 2 (2013): 189-196.

62 Gavin Bridge, Begüm Özkaynak, and Ethemcan Turhan, "Energy Infrastructure and the Fate of the Nation: Introduction to Special Issue," *Energy research & social science* 41 (2018): 1-11.

63 Zoé Chateau, Patrick Devine-Wright, and Jane Wills, "Integrating Sociotechnical and Spatial Imaginaries in Researching Energy Futures," *Energy Research & Social Science* 80 (2021): 102-207.

context, influenced by new technological possibilities, environmental concerns and shifting geopolitical dynamics. This raises broader questions about how past futures, particularly those imagined but unrealised visions of development, interact with present realities and evolving future promises.

2.1.3 Travelling Ideas

The travelling ideas perspective examines how concepts, technologies and policies move across regions and contexts and how they are adapted, transformed or resisted in the process.[64] Western models of hydropower development have been exported to Africa, often through international agencies such as the World Bank, making them superior to the destination. However, these models are not always directly applicable and can be reshaped by local realities, including political opposition or environmental concerns. Hornidge et al. connect this framework to epistemic mobilities, highlighting how adaptation policies are modified locally rather than merely transferred.[65] This perspective is particularly important in large-scale projects like dam construction, where diverse knowledge systems, engineering, environmental, and socio-economic factors intersect. In the case of Stiegler's Gorge, the idea of large dams as drivers of modernisation travelled from Europe and America to Tanzania. However, its implementation was delayed and contested due to environmental concerns and shifting political priorities, demonstrating how ideas evolve as they travel. The underlying assumption is that the travelling concept tends to diffuse, moving from a high level to a low level of concentration, and that it can also travel in both directions. During colonialism, for example, European ideas of science and technology were introduced to Africa as a travelling concept and spread through international bodies such as the FAO, through feasibility studies, and via international consulting companies and experts, mostly from the West, thus making the concept superior at the destination.[66] The development of infrastructure that relies heavily on high technology, such as large

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64 Andrea Behrends, Sung-Joon Park, and Richard Rottenburg, *Travelling Models in African Conflict Management: Translating Technologies of Social Ordering*, Vol. 13. Brill, 2014:1.

65 Anna-Katharina Hornidge, Herbeck, Johannes, Siriwardane-de Zoysa, Roshanka, and Flitner, Michael, "Epistemic Mobilities: Following Sea-Level Change Adaptation Practices in Southeast Asian Cities," *American Behavioral Scientist* 64, no. 10(2020): 1497–1511.

66 Jonas Van der Straeten, "Transmitting Development: Global Networks and Local Grids in the Electrification of East Africa, 1906-1970," PhD Thesis, Technische Universität Darmstadt, 2017.

dams, illustrates this trend. During the colonial period, the colonial powers began to transfer technology to the colonies rather than local inventions.[67] This idea influenced development in the post-colonial states, especially those that had studied specific national styles of power system growth. They focused on technological, economic, and institutional issues, as well as the role of national and multinational capital investment in infrastructure growth.[68]

From the 1960s to the 1980s, the technological ideas were shaped by socio-economic, political and economic factors, such as flows of finance, electrical equipment, materials, skills and knowledge between donor countries (the inventors of technologies) and recipient countries (the users of technologies), which affected implementation and operation from the 1980s onwards. Thomas Hughes' work '*Networks of Power*', drawn from the analysis of electrification in the global North and South, shows that technology transfer and development begin with technological inventions and innovations by experts, which develop to a certain level before they can be transferred to other places. Once transferred, technologies experience growth, gain 'technological momentum' and involve complex management structures, financial capital and expertise - they become large technical systems. Hughes' central idea is that transferred ideas are not only technically determined but also shaped by a variety of socioeconomic, environmental and technological factors.[69]

Drawing on Behrends et al., the travelling ideas perspective is useful in this case for exploring projects, particularly how these ideas originated, the actors involved, and the regimes of translation. The outcome of the translation process is not accidental but reflects the visions and interests of the dominant actors and whether or not they ultimately achieve the intended goals.[70] In the new environment, often perceived as modern, the travelling ideas are seen as a catalyst for change. Therefore, delays in the realisation of dams and hydropower schemes can be seen as a manifestation of the

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67 Ronen Shamir, "Electricity and Empire in 1920s Palestine under British Rule," *Journal for the History of Science, Technology and Medicine* 25, (2016): 451-480; Van der Straeten, "Transmitting Development"; Jonas Van der Straeten , "Capital Grids: A Global History of Electricity in East Africa,"(New York: Palgrave Macmillan, forthcoming): 169-188.

68 Shamir, "Electricity and Empire in 1920s,": 451-480.

69 Thomas Hughes, *Networks of Power: Electrification in Western society, 1880-1930*, (JHU Press, 1993): 1.

70 Behrends & Rottenburg, "Travelling Models":1-20.

tensions and frictions that arise when global ideas are adapted to local contexts.[71] In the case of Stiegler's Gorge, the situation is not only explained against the backdrop of the political context but also of global debates, taking into consideration the multiple, often conflicting ideas about development, conservation and the international power structure, leading to a prolonged gestation period. The scale and potential impacts of the project have made it a focal point for debates about the future of Tanzania's energy sector and its implications for the country's development trajectory.

The concept of travelling ideas serves as a guide to explore how the vision for the dam emerged within international development discourses and took shape in national and local contexts. This approach examines the tension between state promises and people's expectations for the future, highlighting the fluid and contested nature of development goals. It also considers the dynamics of project planning and the roles of different actors in postcolonial Tanzania. The framework is particularly well-suited to the study of African infrastructure development, given the influence of transnational agencies and the tendency of Western countries to shape and support development programmes in Africa and the Global South. Many infrastructure projects in these regions are influenced by travelling models, inspired by global science and technology discourses that shape how development is conceptualised and implemented. For instance, the main objective of the Swedish development assistance to Tanzania during the 1960s was to export 'Swedish hydropower construction technology' to Tanzania.[72] The role of technology transfer here is scripted in the production of objectivity in development, and the travelling ideas are understood as an analytical representation of Western technology and expertise, created as an apparatus of intervention to shape the course of development in the South.[73] The ideas of infrastructural development inscribed in travelling models are always objectified and combined with material technologies to put them into practice and transfer them to new locations.

As the travelling ideas concept is reciprocal, it can also travel within a region to different parts of it. In this case, the study also focuses on the role of local actors and institutions

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71 Said, Edward W, *The World, the Text, and the Critic,* (Harvard UP, 1983).

72 Öhman, "Taming Exotic Beauties"

73 Richard Rottenburg, *Far-Fetched Facts: A Parable of Development Aid*. (Cambridge: MIT Press,2007).

in exchanging ideas to develop hydropower programmes in Tanzania. For local people, the project represents a contested future, a symbol of progress for some and a threat to livelihoods and ecosystems for others. This is reflected in the mixed reactions of local communities, shaped by their different experiences, expectations and concerns. While some see it as a path to development, others fear environmental degradation and loss of livelihoods. Nevertheless, the application of travelling ideas, particularly in Africa, has consistently shown that an implementation gap and a mismatch between planning and execution are inevitable. In addition, such projects often face resistance, reflecting the complex socio-economic and environmental issues surrounding their development.

This is because no matter how well-prepared public policies are when they are put into practice, there are always differences between expectations and reality. This refers to differences between the official aims and objectives of the idea and those resulting from the tactics and methods employed by actors at different levels.[74] The gap between policy expectations and real-world implementation resonates with socio-technical imaginaries, the collectively held visions of desirable futures that shape technological and policy decisions. These imaginaries influence how governments, organisations and communities conceive of large-scale projects such as hydropower development, often framing them as symbols of progress and modernisation. However, when these projects are implemented, unforeseen challenges, local resistance and environmental concerns create discrepancies between the imagined future and actual outcomes. This disconnect highlights how socio-technical imaginaries, while powerful in shaping policy narratives, often struggle to fully account for the complexity of real-world social, political and environmental contexts.

In their study, Jean Pierre et al. have used the travelling of ideas to examine how these ideas are being used in African countries to improve aspects of health systems. The same interventions are confronted with implementation contexts that have led to distortions, fragmentation, drift and diversion, often caused by various actors. Accordingly, a more effective strategy would be to support innovations arising from

74 John W. Thomas, and Merilee S. Grindle, "After the Decision: Implementing Policy Reforms in Developing Countries," *World Development* 18, no. 8 (1990): 1163-1181.

local systems rather than relying solely on Western models.[75] Thus, this serves as a reason for adopting multiple frameworks in this study. Essentially, the travelling development model sheds light on the impact of science and technology transfer and power dynamics, both local and global, and lessons learnt in shaping state-led initiatives in Tanzania from the 1960s onwards.

Interestingly, Stiegler's Gorge project presents a notion of 'reverse travel ideas' that is directly linked to history and shows how lessons learned from unsuccessful initiatives can shape future endeavours. This concept challenges traditional thinking by suggesting that development models involve two-way communication rather than one-way transmission and emphasises the crucial role of careful planning, pragmatic goal setting and learning from past experiences in international development projects. In adopting this perspective, Chapter Five highlights the importance of two-way exchange in development processes. It emphasises that successful projects are often the result of careful consideration of past lessons, leading to more informed decisions in future endeavours.

While socio-technical imaginaries illustrate how national aspirations for modernity influence dam projects by framing them as symbols of progress, these imaginaries are not static; they are shaped by external influences that can be understood through the travel of ideas. The interplay among environmental constraints, governance, and aspirations for modernity creates a complex landscape in which global development models and local realities collide. Their synergy becomes apparent when examining how environmental concerns influence the very narratives of progress that justify large-scale infrastructure. As global models of development interact with local contexts, these tensions may contribute to the delays as experienced at Stiegler's Gorge Dam. Building on this analysis, the following section offers a detailed theoretical exploration of themes related to delayed dam projects in the context of future-making.

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75 Olivier de Sardan, Jean-Pierre, Aïssa Diarra, and Mahaman Moha, "Travelling Models and the Challenge of Pragmatic Contexts and Practical Norms: The Case of Maternal Health," *Health Research Policy and Systems* 15 (2017): 71-87.

2.2 Future-Making and How it Relates to History

Canina et al. explore future thinking as a strategic approach to anticipate changes and shape a desirable future scenarios.[76] In this context, future-making involves the procedures and customs by which societies, governments, and individuals proactively create visions of the future. This process is deeply connected to history, as planning for the future often draws on the historical events and stories that shape a community's perception of progress and contemporary life. Voros' work outlines fundamental assumptions about the nature of the future. The first assumption is that the future cannot be predicted with certainty. This principle opens up the idea that numerous potential alternative futures could unfold. The second assumption is that the future is inherently uncertain because it emerges from current processes that are fundamentally unpredictable. The last assumption is that the future is shaped by the choices made, including our actions, decisions, behaviour, apathy and neglect.[77] These elements can affect us either positively or negatively. Past choices inform the future. However, the future is not singular. Henchey categorised futures into four types: possible futures, which are scenarios that could happen; plausible futures, which are those that could occur based on current knowledge; probable futures, which are expected to happen; and preferred futures, which are defined as scenarios that people would prefer.[78] Looking into the future also means we have to look at the past to identify which factors in this past—our history—help us to better understand the future.[79] This process is inherently linked to history, as the anticipation of the future is often rooted in the historical experiences and narratives that shape a society's understanding of development and modernity.[80] This is particularly relevant to how we see the past in Stiegler's Gorge project as a promised future that did not materialise at one time, but is relevant to the future.

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76 M R Canina, Carmen Bruno, and E Monestier, "Futures Thinking," In *The Palgrave Encyclopedia of the Possible*, (Palgrave Macmillan, Cham., 2022):1-7.

77 Joseph Voros, "A Primer on Futures Studies, Foresight and the Use of Scenarios," *Prospect: The Foresight Bulletin* 6, no. 1 (2001): 1-8.

78 Norman Henchey, "Making Sense of Future Studies,". *Alternatives: Perspectives on Society, Technology and Environment*, *7* no.2 (1978), 24-27.

79 Henchey, "Making Sense of Future Studies"

80 Barbara Adam, and Chris Groves, *Future Matters: Action, Knowledge, Ethics*. Vol. 3, (Brill, 2007).

The concept of shaping the future often uses terms such as 'envision', 'imagine', 'picture' and 'foresee'. Fascinatingly, these terms converge on the idea of tangibility - something that can be perceived visually, whether it's an image or a vision.[81] Müller-Mahn draws a parallel between this and the tangible realisation of infrastructure projects.[82] Related to delayed hydropower development in Tanzania, planning for the future was a major preoccupation of the newly independent socialist state of Tanzania in the 1960s. It was a period of thinking about the future, but a terrain of planning that can only be summarised as uncertainty, largely conducted by trial and error.[83] Future-making was conceived through development plans, but it also meant being in constant reference to what colonial rule had established. This study draws on these scenarios to relate the past plans and anticipation of the future as an extension of historical goals for national development.[84] However, the relationship between hydropower schemes and futures is complex. On the one hand, these projects, particularly in post-colonial contexts, have been imbued with the promise of transforming nations by overcoming the legacies of underdevelopment and dependency. These projects are often framed as pivotal moments that enable a nation to leap into a more prosperous and technologically advanced future[85], while on the other hand, they have also been associated with uncertainties, especially when they take a long time to become operational.[86]

The Stiegler's Gorge project, envisioned as a cornerstone of Tanzania's development strategy, exemplifies this historical trajectory, in which the past informs and justifies

81 Zoe Prosser, and Dev Santini Basra, "Futures Thinking: A Mindset, Not a Method: Embedding Futures Thinking within Design Practices," *Touchpoint: The Journal of Service Design* 10, no. 2 (2018).

82 Detlef Müller-Mahn, "Envisioning African Futures: Development Corridors as Dreamscapes of Modernity," *Geoforum* 115(2020):156-159.

83 Andrew Coulson, *Tanzania: A Political Economy*, (Oxford: Oxford University Press, 2013); Göran Hydén, *Beyond Ujamaa in Tanzania: Underdevelopment and an Uncaptured Peasantry*, (Berkeley: University of California Press, 1980); John Iliffe, *A Modern History of Tanganyika*, (Cambridge: Cambridge University Press, 1979).

84 Scott, "Seeing Like a State"; McCully. "Silenced Rivers."

85 Andrew Dillon, and Ram Fishman, "Dams: Effects of Hydrological Infrastructure on Development," *Annual Review of Resource Economics* 11, no. 1 (2019): 125-148.

86 Mike Mentis, "Managing Project Risks and Uncertainties," *Forest Ecosystems* 2, no. 1 (2015):2.

future ambitions.[87] Against this background, my research views this initiative as a battleground for shaping the future, where competing stakeholders vie for dominance in determining how resources are distributed and used—a concept Appadurai calls 'future-making'.[88] History plays a crucial role in shaping the future, especially by acknowledging past setbacks, postponements, and interruptions. Such historical events shape the anticipation and scepticism of future initiatives. The Stiegler's Gorge project, whose recurring delays and disputes aren't just current obstacles; they are intimately linked to Tanzania's broader historical narrative of grand development endeavours often encountering analogous obstacles. As a result, the making of the future in this scenario emerges as a dynamic exchange in which the past and future are in constant dialogue, influencing and redefining one another.

2.3 Interpretations and Delays of Future Making

'Delayed futures' refer to the phenomenon whereby the realisation of expected futures may be postponed due to various technical, financial, political and environmental challenges. The delay in these futures can lead to a reconfiguration of expectations and a renegotiation of what the future holds.[89] Rather than a straightforward path to a fixed future, delayed futures imply a more uncertain and contingent process. This uncertainty can lead to a sense of frustration, disillusionment or even apathy among stakeholders, as the expected benefits of the project seem perpetually out of reach.[90] Delayed futures also create spaces for alternative visions of the future to emerge, challenging the dominant narratives of development and progress that often accompany large infrastructure projects.[91]

The repeated postponement of Stiegler's Gorge project not only undermines the credibility of the promises made but also raises questions about the envisioned future's viability and desirability. This delay might have led to a reassessment of priorities, with

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87 Pedersen, Rasmus Hundsbaek, and Japhace Poncian, "The Political Economy of Energy Transitions in Africa: Coalitions, Politics and Power in Tanzania," *Energy Research & Social Science* 117 (2024): 103712.

88 Arjun Appadurai, *The Future as Cultural Fact: Essays on the Global Condition*, (Verso Books,2013).

89 Tamás Kristóf, "Development Tendencies and Turning Points of Futures Studies," *European Journal of Futures Research* 12, no. 1 (2024): 28(1), 45-60.

90 Appadurai, "The Future as Cultural Fact":179-198.

91 Kristóf, "Development Tendencies":45-60.

alternative futures or development approaches considered, reflecting the fluid and contested nature of future-making in practice. The delays in this particular project have significant implications for how we understand the process of future-making. Rather than seeing delays as mere obstacles to be overcome, they can be understood as moments of negotiation and contestation in which different actors work to shape the future in their favour. Delays also highlight the importance of considering the temporal dimension of infrastructure development. Shaping the future means dealing with uncertainties, contingencies and the constant adjustment of plans and visions. The repeated setbacks in implementing Stiegler's Gorge forced the stakeholders to regularly re-evaluate their strategies and goals, making the process of shaping the future dynamic and adaptive.

In describing Stiegler's Gorge project as a 'delayed future', my research draws on the ideas of Jasanoff and Kim, particularly their concept of dreamscapes of modernity. This term refers to how visions of the future are shaped by societal hopes, fears and expectations, often influenced by technological and infrastructural projects. Using this framework, my work links Stiegler's Gorge project to the broader idea that such large-scale initiatives are embedded in a complex interplay of extended timelines, shifting ambitions and evolving societal dreams. In addition, it incorporates perspectives from Müller-Mahn's examination of the impact of these dreamscapes on spatial development in the Global South, particularly Africa.[92] Socio-technical imaginaries serve as a bridge between the abstract realm of technological possibilities and the concrete realities of social, political and economic life, encompassing both the imaginative and the normative aspects. How societies dream of what is possible through science and technology, and the normative aspects. How these dreams are translated into visions for social, political and technological change. Sociotechnical imaginaries link political economy and travel models. In political economy, socio-technical imaginaries show how collective visions of technological progress shape environmental policy, often favouring corporate solutions and reinforcing power dynamics. Similarly, in travelling

92 Sheila Jasanoff, and Sang-Hyung Kim, *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power,* (Chicago and London: University of Chicago Press, 2015); Detlef Müller-Mahn, "Envisioning African Futures: Development Corridors as Dreamscapes of Modernity," *Geoforum* 115(2020):156-159.

models, these imaginaries influence how policies, technologies and governance frameworks are adopted or contested in new contexts. Viewing Stiegler's Gorge dam through the lens of sociotechnical imaginaries allows us to see the project not just as a physical structure but as something that haunts the place with technological ambition, unfulfilled dreams and uncertainties. Moreover, sociotechnical imaginaries can also account for moments of rupture within and divergence between infrastructure projects by emphasising the importance of imaginative labour and shared cultural resources alongside material infrastructures and social practices.[93] This suggests that the delayed implementation of infrastructure projects may be due to the conflict between the tangible aspects and the visionary goals of these initiatives, with the vision often dictating the course and pace of infrastructure development.

Studies on ruined, abandoned, or failed infrastructure projects highlight the concept of delayed futures with different connotations. These projects exist in a liminal space, caught between the past and the present, embodying a reality that is neither entirely real nor unreal. They represent delayed or abandoned constructions, unbuilt or unfinished projects, suspended in a state of perpetual anticipation.[94] They might stay dormant for an extended period, but also unexpectedly become active again.[95] In the case of the Stiegler's Gorge initiative, the delayed future aspect is evident in extended timelines, shifting deadlines and unfulfilled promises that characterise such large-scale infrastructure projects. The project emphasises the importance of considering the temporal aspect of infrastructure development. Shaping the future involves uncertainty, contingency and the constant revision of plans and visions, rather than following a linear path. Repeated delays in the project forced participants to continually reassess their strategies and objectives, resulting in a dynamic and fluid process of

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93 Synne Movik and Jeremy Allouche, "States of Power: Energy Imaginaries and Transnational Assemblages in Norway, Nepal and Tanzania," *Energy Research & Social Science* 67 (2020): 1-11.

94 Warner Burke, *Organisational Change: Theory and practice* (5th ed.), (Thousand Oaks, CA: Sage, 2018); Bent Flyvbjerg, "Policy and Planning for Large Infrastructure Projects: Problems, Causes, Cures," *Environment and Planning B: Planning and Design*. 34(2007): 578-597; Detlef Müller-Mahn, Kennedy Mkutu, and Eric Kioko, "Megaprojects—Mega Failures? The Politics of Aspiration and the Transformation of Rural Kenya," *European Journal of Development Res* 33(2021):1069–1090.

95 Marta Zaniolo, Matteo Giuliani, Scott Sinclair, Paolo Burlando, and Andrea Castelletti, "When Timing Matters—Misdesigned Dam Filling Impacts Hydropower Sustainability," *Nature Communications* 12, no. 1 (2021): 3056.

shaping the future. Consequently, broader geopolitical and financial constraints delay future-making through infrastructuring. A thorough examination of the project as a 'delayed future' scenario is presented in Chapter Six of this thesis.

2.4 Dams as Symbols of Promised Futures, Progress and Modernity

Dams are historical symbols of state-led initiatives to harness natural resources for national development. Kaika's work highlights the symbolism of dams, emphasising their contribution to the modernisation process, particularly in terms of the subjugation of urban nature and the interplay between nature and the urban environment.[96] Similarly, Miescher provides insight into how large-scale dams became central to decolonisation efforts in Africa, and how they reflected and shaped political agendas, international relations and local expectations during the Cold War era.[97] These structures represent modernity and technological progress, and they drive state-led transformation to improve living conditions.[98] As powerful symbols of modernisation, progress and the promise of a better future, dams embody the complex interplay between geographical imaginaries and material practices.

According to McCully, dams are seen not only as engineering marvels but also as iconic representations of humans' ability to control and shape nature for economic development.[99] The construction of dams is thus an important factor in the modernisation strategy aimed at electricity generation, agricultural intensification and urbanisation.[100] For a long time, dams have had significant symbolic significance. A prime example is the Marathon Dam, built in the 1920s to irrigate Athens. This dam not only represented Athens' efforts to modernise but also embodied the wider Greek initiative to harness and control the forces of nature. Its construction marked the introduction of American investment and labour methods to Greece and heralded a

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96 Maria Kaika, "Dams as Symbols of Modernisation: The Urbanisation of Nature Between Geographical Imagination and Materiality," *Annals of the Association of American Geographers* 96 no.2(2006): 276-301.

97 Stephan, Miescher F. "Nkrumah's Baby": The Akosombo Dam and the dream of development in Ghana, 1952–1966. *Water History* 6 (2014): 341-366.

98 Scott, "Seeing Like a State"

99 McCully, "Silenced Rivers"

100 May-Britt Öhman, Taming Exotic Beauties: Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s - 1990s. School of Architecture and the Built Environment (ABE), Philosophy and History of Technology, History of Science, Technology and Environment, 2007.

new phase in the commercial interactions between the United States and Greece.[101] As symbols, dams carry the weight of a promised future - a future where energy shortages are eliminated, economic activity flourishes, and the country is firmly on the development path. These projects are often presented as monumental achievements, a testament to the government's commitment to development and its ability to transform the nation. The case of the Stiegler's Gorge project in this study is relevant as a symbol of modernisation; it was framed as a critical initiative to provide reliable energy, stimulate economic growth, and take Tanzania to a new level of industrialisation and modernity. However, the relationship between dams and the future is complex. The symbolic power of dams also makes them sites of intense scrutiny and contestation. When these projects are delayed, their role as symbols of progress is called into question. The gap between promise and reality widens, creating uncertainty.[102] The long delays in realising Stiegler's Gorge project led some to question whether it could deliver the promised future or whether it is an unfulfilled dream of progress, a "continued haunting".

2.5 Contested Futures and the Performativity of 'Spectacular' Technologies

The concept of 'contested futures' encapsulates the diversity of visions of the future held by different groups. These different perspectives often clash, driven by different interests, values and power dynamics. As a result, debates and conflicts arise over which envisioned future would ultimately materialise.[103] The process of shaping the future is inherently contentious, particularly in large-scale technological projects such as dams. Different stakeholders, including governments, local actors, environmentalists and international organisations, often hold conflicting views on the future direction of such initiatives.[104] Dams, as striking technological feats, embody specific visions of the future through their design, function and the socio-economic

101 Kaika, "Dams as Symbols of Modernisation"

102 Mentis, "Managing Project Risks"

103 Nik Brown, and Brian Rappert, *Contested futures: A Sociology of Prospective Techno-Science*, (Routledge, 2017).

104 Erik Swyngedouw, *Liquid power: Contested Hydro-Modernities in Twentieth Century Spain*, (MIT Press, 2015).

changes they bring about.[105] However, the effectiveness of these technologies in achieving their intended purpose is not guaranteed, rather depends on factors such as successful implementation, ongoing support and the resolution of any conflicts that may arise.

For decades, there have been many contestations over resources and resource use in what can be seen as a wave of modernity. This can be linked to development pathways and how multiple interests can be contested and negotiated in land-related issues.[106] Within the context of modernisation, critiques and activism have emerged about how projects are implemented. Such projects are signs of modernity in the Global South and carry with them many travelling ideas about modernity and state expectations to improve the well-being of their people. In this context, there are several projects such as dams, some of which have been 'delayed futures' since they were first planned and are spread across. [107] The Stiegler's Gorge project is an example of the modernisation drive that characterises development discourses across Africa. Its long gestation period adds complexity to its effectiveness. As the expected future remains unfulfilled, the dam's role as a symbol of progress weakens. The extended timelines and unfulfilled expectations open the door for alternative narratives and visions to gain traction, potentially leading to a reimagining of the future that the project was supposed to deliver.

Moreover, contestations can be seen in terms of 'contested imaginations' that manifest intended and unintended outcomes.[108] Tanzania's socialist government envisioned water as a driver of socio-economic development, prioritising irrigated agriculture, flood control and hydropower generation to support industrial growth. This socialist vision was central to the debates and disputes over water resources in the Rufiji Basin.

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105 Andreas N. Angelakis, Alper Baba, Mohammad Valipour, Jörg Dietrich, Elahe Fallah-Mehdipour, Jens Krasilnikoff, Esra Bilgic et al, "Water Dams: From Ancient to Present Times and into the Future," *Water* 16, no. 13 (2024): 1889.9

106 Johannes Theodor Aalders, "Building on the Ruins of Empire: The Uganda Railway and the LAPSSET Corridor in Kenya," *Third World Quarterly* 42no.5(2021): 996-1013.

107 Jessica Thorn, Diego Juffe Bignoli, Ben Mwangi, and Robert A. Marchant "The African Development Corridors Database: A New Tool to Assess the Impacts of Infrastructure Investments," *Scientific data* 9, no. 1 (2022): 679.

108 Sheila Jasanoff, Future Imperfect: Science, Technology, and the Imaginations of Modernity', in Jasanoff, S., and Kim, S. (eds), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (Chicago, IL;2015).

While TANESCO consistently framed the project in technological terms, international donors such as NORAD saw hydropower primarily as a means of technology transfer and knowledge sharing. The approach was in line with Norwegian consulting firms' interest in working overseas and potentially expanding their global reach. This scenario aligns with travelling ideas, as the expansion of Norwegian consulting firms reflects diffusion models in which expertise spreads across regions driven by economic opportunities. However, opposition from environmentalists and interest groups introduces frictions, akin to barriers in spatial interaction models, that restrict movement. In addition, environmental impacts on downstream users reflect network effects, whereby disturbances in one area affect interconnected systems. Taken together, these elements illustrate how travelling models can describe not only physical movement but also the flow of knowledge, resistance and unintended consequences in global projects.

When Stiegler's Dam was revived, and construction began, supporters argued that this new development would alleviate the country's electricity shortages. However, the move is likely to exacerbate existing tensions over water use in the Rufiji Basin. The Rufiji Basin already supports multiple uses, including agriculture (mainly irrigation); domestic livestock; wildlife conservation in national parks and game reserves; and the existing hydroelectric power stations at Mtera and Kidatu. The construction of the dam will require redefining these existing uses to accommodate the new power station, potentially disrupting the delicate balance of water allocation in the region. Together, the frameworks presented provide a holistic understanding of why the project faced significant delays and controversy and emphasise that development is not just a technical process, but a deeply political and ideological one. The conceptual framework below synthesises these theories, positioning Stiegler’s Gorge Dam not only as a physical or technical project but also as a multi-scalar, socio-political, and imaginative construct, constantly shaped by overlapping global ideologies, local political economies, and socially embedded visions of the future.

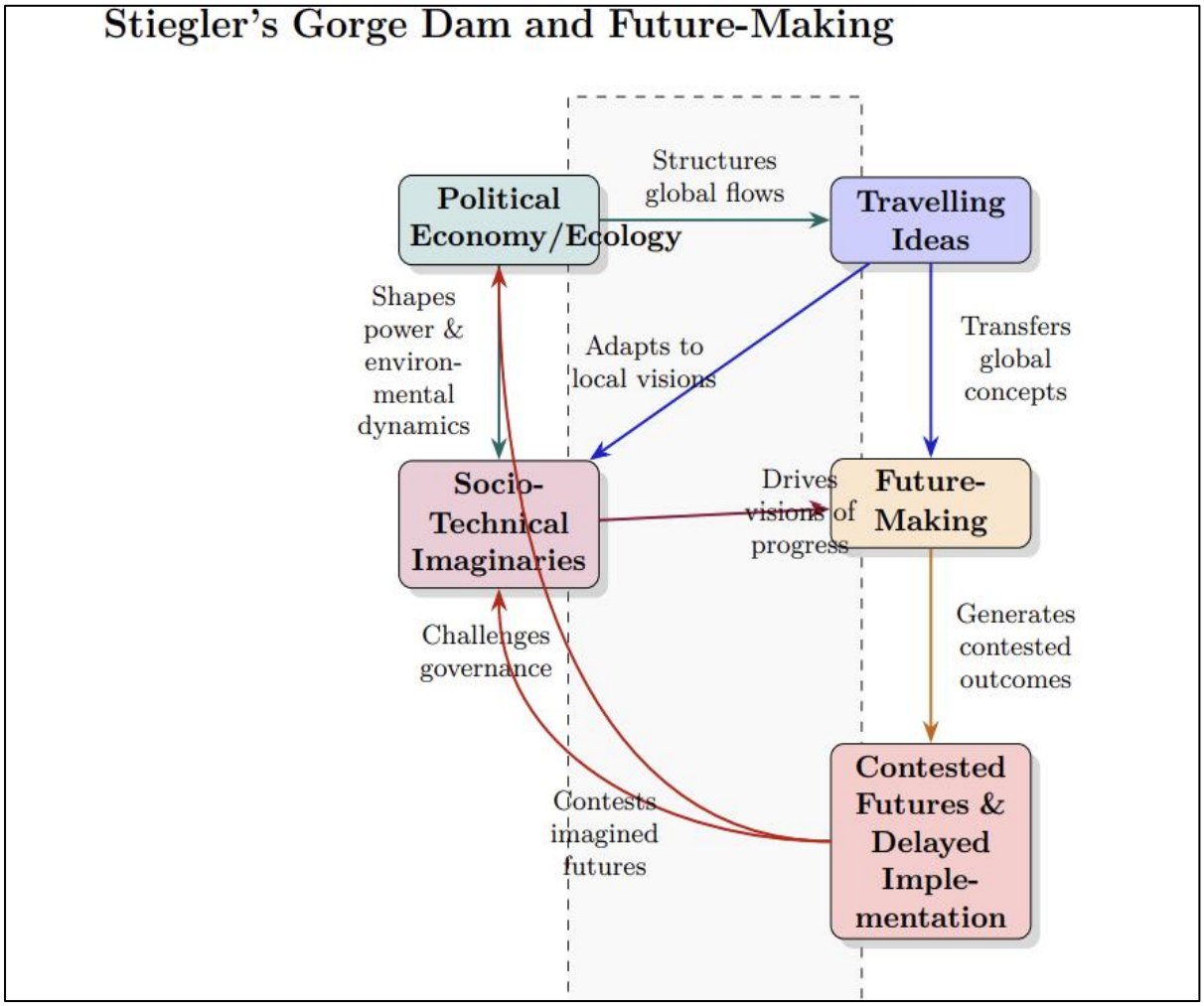

Figure 2: Conceptual and analytical framework

As we shall see in chapters five and six, this thesis places this controversial endeavour in historical context by comparing it with the first major survey of the basin, carried out in the late 1950s. The foregoing analysis shows that large-scale infrastructure projects in Africa, such as Stiegler's Gorge, are deeply political, shaped by power dynamics, socio-technical imaginaries and systemic governance issues. Delays may stem from weak institutions, financing challenges and stakeholder conflicts, underscoring the need for transparent governance, participatory decision-making and diversified financing mechanisms. Importantly, policymakers need to prioritise adaptive planning, regional cooperation and sustainable development approaches that balance economic progress with environmental and social responsibility. Rather than replicating Western models, African countries should develop localised strategies that integrate

technological innovation, risk management and inclusive policy frameworks. By reframing delays as opportunities for refinement rather than failures, governments can cultivate dynamic, efficient and equitable development that is consistent with both historical lessons and future aspirations.

2.6 Methodology

This study adopts a qualitative historical methodology, grounded primarily in archival research, oral histories and key informant interviews. Qualitative research is a form of social inquiry that focuses on how people interpret and make sense of their experiences and the world they live in. It looks at specific events and issues to gain a deeper understanding of their meaning and significance.[109] As noted by Neumann,[110] qualitative methods are best used for problems requiring in-depth insight and understanding, especially when dealing with explanatory concepts. This method aimed to gain in-depth insights into the attitudes, experiences, and interests of the various stakeholders involved in the development of Stiegler's Gorge Dam project. It pays particular attention to how these factors shaped perceptions of the project's future over time.

Primary sources were drawn from a range of national and international archives. These include the Tanzania National Archives (TNA) in Dar es Salaam, the National Records Centre (NRC) in Dodoma, the East Africana Section of the University of Dar es Salaam's main library (EAF-UDSM), the Swedish National Archives (SNA) in Stockholm, and the National Archives of Norway (NAN) in Oslo. These repositories yielded colonial and postcolonial government records, technical assessments, planning documents, parliamentary debates, correspondence, and project feasibility studies relevant to the Rufiji Basin and hydropower development more broadly. Additionally, documentation was consulted at the CCM Library in Dodoma, offering insights into the Tanzanian government's internal discussions on infrastructure and development policy.

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109 Sharan B. Merriam, and Elizabeth J. Tisdell, *Qualitative research: A Guide to Design and Implementation*, (John Wiley & Sons, 2015):5-15; Alan Bryman, *Social Research Methods*, 4th Edition, (Oxford: Oxford University Press,2012): 408

110 Lawrence Neumann, *Social Research Methods: Qualitative and Quantitative Approaches*, (New York: Pearson Education Inc, 2006).

Recent records and reports were also accessed through online databases and institutional websites. In addition to archival sources, semi-structured interviews were conducted with a range of stakeholders, including Tanzanian government officials, politicians, former employees of Norwegian consulting firms involved in the project, and residents of Kisaki village in Morogoro Rural District and of Rufiji further downstream in the basin, drawing on lived experiences. Kisaki was selected as a focal site for its geographical location, which encompasses populations from both upstream and downstream communities along the Rufiji River. This diversity provided a valuable lens through which to examine local understandings of the project and its prolonged delays.

While the Tanzanian archives yielded important insights, especially from the colonial and early independence periods, some limitations were encountered. Key files were often missing or inaccessible due to cataloguing issues, access restrictions, and the thirty-year rule.[111] These gaps were partly addressed by turning to international archives and specialised institutional libraries, such as those of the SNA in Stockholm, Sweden and the NAN in Oslo, Norway. This was because most of Tanzania's post-colonial energy infrastructure projects were co-financed by Nordic countries such as Sweden, Norway, and Finland, as well as the World Bank. The files contained official regulations, correspondence, reports, policies, aid relations and financing agreements for the construction of hydropower plants in Tanzania. The files also contained funding and organisational brochures, publications, pictures, newspapers, and other aspects of energy development that provided contextual and practical information on the development of Tanzania's hydropower programmes after independence. This information filled the gaps in the TNA and CCM library and what I had missed in the NRC.

111 The 'thirty-year rule' allows public access to certain government records held in national archives after 30 years after their creation. Originating in the UK and other Commonwealth countries, this practice balances transparency with security. While most records become accessible, exceptions apply if their release would harm the country's image, security, or foreign relations.

Figure 3: Archival research in progress in the National Archives

The EAF-UDSM also provided important colonial and postcolonial primary written sources on the development of the project and Rufiji Basin. The resource room contained materials such as survey reports, environmental impact assessment reports, TANESCO journals and annual reports, circulars, policy documents, secretariat files, as well as district and provincial books that offered clues on the plans for hydropower development in the colonial and early postcolonial periods. News reports and letters to the editor from newspapers such as the Daily News, Tanganyika Standard, Citizen, Uhuru and African Focus were also reviewed.

In addition to the primary research, the investigation was extended to include consultations with various government agencies. These included: TANESCO, the now defunct RUBADA, IRA, several local research institutions, and online private archives. This aimed to obtain a comprehensive overview of the evolving trends, objectives and policies related to constructing hydropower dams across Tanzania. It is important to note that RUBADA ceased operations in 2015, resulting in the transfer of its staff to the Ministry of Agriculture. This transition created challenges in accessing the agency's library resources. Despite these obstacles, a selection of RUBADA's documents was successfully retrieved in EAF-UDSM and the NAN. Through these various channels, a wealth of information on the initial studies aimed at developing the Rufiji Basin was gathered. These include the strategic planning behind dam building initiatives, relevant policy documents, details of the individuals and organisations involved in these processes, internal communication memos, financial statements and photographic

evidence. This comprehensive approach ensured a thorough understanding of the subject matter and facilitated a well-rounded analysis of the trends, objectives and policies shaping the implementation of hydropower dams in Tanzania.

It was necessary to explore all these sources to obtain unique and specialised information on dams and hydropower development in Tanzania. These sources were crucial and of historical significance as they provided transparency of findings over time. This made it possible to identify the earliest studies, and different stakeholders' engagements and to trace changes and continuities over time. The use of these archival sources played a pivotal role in shaping this thesis by addressing the research questions: How have hydropower initiatives in Tanzania been planned, debated, and implemented since independence? In what ways have transnational and local stakeholders influenced the trajectory of Stiegler's Gorge project, and how do local communities perceive the delays and revival of the dam, and what do their experiences reveal about the social and emotional impacts of unbuilt or dormant infrastructure? In-depth discussions of these questions are found in the empirical chapters four, five and six of this thesis.

Moreover, the evidence for the arguments and conclusions presented in this thesis extends beyond archival sources alone. Historians specialising in the history of technology have even proposed the creation of alternative archives. This proposal aims to challenge traditional narratives of technological invention and empower marginalised groups, including technology users, to share their first-hand experiences.[112] This perspective arises because the primary research for this thesis relied heavily on written documentation. Historians have rightly observed that conventional archives contain predominantly the accounts of engineers, inventors, promoters, and government policies and strategies. As a result, the narratives of ordinary technology users often go unheard, leading to a lack of representation of everyday uses and consumer-driven initiatives within the archival record. This omission contributes to a

112 Gesa E. Kirsch, and Liz Rohan, "Introduction: The Role of Serendipity, Family Connections, and Cultural Memory in Historical Research," *Beyond the Archives: Research as a Lived Process* (2008): 1-9; Alejandra Osorio Tarazora, David Drengk, and Animesh Chatterjee, "Rethinking Global History of Technology from Alternative Archives," *TG Technikgeschichte* 88, no. 2 (2021): 202-206.

bias that favours institutional perspectives and top-down technological viewpoints. Recognising this limitation, the second phase of my research began with a particular focus on collecting data through oral histories.

Oral history interviews were used to enrich the historical record and to provide context for interpreting policy and planning documents. Historically, oral histories have served as important channels for the transmission of cultural knowledge across generations. They continue to play an important role in preserving memories of pre-colonial, colonial and post-independence periods. This approach is in line with Jan Vansina's insights on the critical role of oral sources in African historical studies.[113] Interviews were conducted with retired engineers, former government officials, academics, and residents familiar with the Stiegler's Gorge project. These testimonies helped to clarify the institutional logic behind major decisions and to capture long-term perceptions of the project's delays and prospects. The interviews were semi-structured and guided by themes developed during the archival research phase. Interview data were used cautiously and cross-referenced with written sources where possible. Also, significant information was obtained from potential people during the official congress and trade fairs, especially through interaction with representatives from government institutions responsible for the energy sector and plenary sessions.

Figure 4: Field interviews with local people in Kisaki village and experts in Dar es Salaam

The interviews were conducted to a point of saturation. A point of saturation means that no new information was discovered during the interview process and that further

113 Jan Vansina, *Oral Tradition as History: A Study in the Historical Methodology*, (New Jersey: Aldine Transaction,2009).

data collection would produce similar results and serve to confirm emerging themes and conclusions. This was the point at which enough data to achieve the aim of this research was collected. The interview medium was Kiswahili, which was later translated into English. Finally, a phase of data analysis. According to Merriam and Tisdell, data analysis involves the stages of transcription, analysis and control.[114] Accordingly, the archival data were analysed based on the themes in the specific objectives, and all interviews were transcribed. The interviews were transcribed with the assistance of a research assistant in Tanzania. In addition, the names of the interviewees were anonymised due to their explicit wishes or the assumption that the publication of names could be harmful.[115]

All collected materials were subject to thematic analysis, guided by the key research questions of the study. For each interview, analysis was conducted after transcription and supported by archival data to conclude the research.[116] Thus, triangulation of archival documentation and oral testimony helped ensure a rigorous and nuanced reconstruction of the project's long history. This methodological approach enables the study to examine the dam not simply as an engineering feat, but as a historically contingent development project shaped by competing visions, institutional inertia, and international political economy.

Lastly, follow-up research was conducted in Tanzania after data collection and analysis to ensure the validity and reliability of the study findings. This process helps prevent selection bias, accurately estimates long-term outcomes, and allows for proper evaluation of study credibility. The findings of this study were presented at international conferences, which led to peer-reviewed articles and subsequent chapters in this thesis.

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114 Sharan B. Merriam, and Elizabeth J. Tisdell, *Qualitative Research: A Guide to Design and Implementation*, (John Wiley & Sons, 2015).

115 James W. Drisko, & Tina Maschi, 'Qualitative Content Analysis', *Content Analysis*, Pocket Guides to Social Work Research Methods, (New York, 2015; online edition, Oxford Academic, 19 Nov. 2015), https://doi.org/10.1093/acprof:oso/9780190215491.003.0004, accessed 28 Aug. 2024.

116 Kathryn Roulston, "Using Archival Data to Examine Interview Methods: The Case of the Former slave project." *International Journal of Qualitative Methods* 18 (2019):1-13.

Figure 5: Plenary discussions on the energy sector in Tanzania and Dissemination Findings at the ECAS conference, Cologne, 2023

The following chapter explores the historical and geographical focus of my research. It examines the historical backdrop of colonial influence on the planning of hydropower initiatives in the Rufiji Basin and situates the Stiegler's Gorge initiative. It also addresses the relevance of geography to understanding the spatial dimension of future-making and the continued relevance of project planning in the post-colonial era.

CHAPTER III

IMAGINING THE RUFIJI BASIN: GEOGRAPHICAL SPACE, HISTORY AND THE MAKING OF FUTURES

3.1 Introduction

The Rufiji River Basin is a key location for understanding the evolving ideas about development in Tanzania. Long before it became central to debates about dams and hydropower, the region was subject to colonial ambitions and competing ideas about its resource potential. This chapter provides an introductory overview of the area, examining it both as a physical geography and as a space shaped by shifting visions, those projected by colonial powers, international agencies and postcolonial planners. Understanding the nature of the environment in which such interactions took place provides not only the basis for what happened but also clues as to why and how things happened in a particular way and in a particular area. Geography and history are crucial components in analysing the changes and continuities in human social, cultural and economic life that shape what people expect from their livelihoods.[117]

Early encounters between foreign explorers and the interior of modern-day Tanzania laid the groundwork for later interventions. The German and British colonial administrations introduced ambitious development schemes aimed at transforming the landscape; these were influenced by their respective priorities, ranging from extractive economies to irrigation agriculture. These early efforts were often shaped by incomplete knowledge, technological limitations and the desire to impose external development models. Post-World War II planning, particularly the work of the Food and Agriculture Organisation (FAO), redefined the Rufiji Basin as a site of potential for integrated development. The dam building became one of the central focuses, though it was also linked to broader goals such as flood control, agricultural transformation, and economic modernisation. Over time, however, the original multi-purpose

117 Bethuel Ogot, & John A Kieran, (eds.), Zamani: A Survey of East African History (Nairobi: East African Publishing House, 1969): 22 – 47, See also Maximillian Julius Chuhila, Coming Down the Mountain: A History of Land Use Change in Kilimanjaro, ca. 1920-2000s, PhD Thesis, (University of Warwick, 2016): 39-40.

development initiative became narrowly focused on energy production, reshaped by foreign technical expertise, shifting national goals and global development trends.

This chapter thus traces the evolution of the Rufiji Basin from a contested colonial frontier to a modern site of national aspiration. In doing so, it provides context for understanding how hydropower development, particularly the Stiegler's Gorge project, became emblematic of Tanzania's broader engagement with infrastructure-led modernity and the politics of future-making.

3.2 Geographical Background of the Rufiji Basin

The Rufiji Basin, located in southeastern Tanzania, is the country's largest and most ecologically diverse river system, covering about 68,500 square miles, or about 20% of the country's total area. Hydrological records up to 1966 showed an average annual flow of about 25 million acre-feet at Stiegler's Gorge, 156 miles from the river's mouth, with a hydroelectric potential of at least 1 million kilowatts, none of which was developed during the colonial period. In addition, records indicated about 1.6 million acres of land suitable for both dry and irrigated farming, of which only about 10,000 acres were known to be irrigated. Other resources, such as minerals, forests, fish and wildlife, were considered lesser resources.[118] Geographically, the basin lies between latitudes 50°35' and 10°45' south and longitudes 33°05' and 39°02' east and is drained by the Rufiji River and its associated tributaries before flowing into the Indian Ocean.[119]

The basin is divided into three distinct areas. First, at its highest point, several rivers from the Usangu plains converge to form the Great Ruaha River. This major watercourse crosses the Pawaga Plains before joining the Rufiji River. Notably, the Rufiji is Tanzania's largest river, occupying almost half (47%) of the basin's area and contributing about 15% of its total water flow.[120] Second, the Kilombero River plays an important role in the Rufiji River system, contributing significantly to its total flow. Specifically, it accounts for 20% of the river's catchment area and provides 62% of its

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118 The United States Agency for International Development (USAID), "Rufiji Basin: Land and 'water Resource Development Plan and Potential," 1967: 2.

119 Britannica, T. Editors of Encyclopedia, "Rufiji River" (Encyclopedia Britannica,(2024, May 5). https://www.britannica.com/place/Rufiji-River.

120 Samson Stephen Mwitalemi, Sameh Ahmed Kantoush, and Binh Quang Nguyen, "Effects of Cascading Dams on Streamflow within the Downstream Areas of the Rufiji River Basin in Tanzania," *Hydrology* 11 no. 5 (2024): 69.

annual flow.[121] In contrast, the Luwengu River covers 15% of the Rufiji basin and contributes 18% of its total flow. Historical records indicate that floods along the Rufiji River were a serious threat to human safety before 1926. [122] The river's high altitude and extensive drainage network were key factors in the development of hydropower infrastructure during the colonial period. These characteristics enabled the generation of large volumes of water and strong currents, making the Rufiji Basin an attractive location for irrigation-based agriculture, navigation and hydropower generation, although hydropower was not a major issue during the colonial period.[123]

Third, the Rufiji River, approximately 230 kilometres upstream of its mouth on the Indian Ocean, flows through a remarkable geological formation known as Stiegler's Gorge. The specific region in both Morogoro and Pwani (Coast) serves as my study area, as shown in Figure 2. The gorge is approximately 8 kilometres long and 100 metres deep, with a riverbed slope of 25 metres. These characteristics made the site particularly attractive to colonial powers for potential hydroelectric power generation and flood regulation. The entire Rufiji delta (approximately 1,400 km2, with 550 km2 of mangrove forests), coastal areas south of the delta, the island of Mafia, and the shallow coastal waters, islands, and coral reefs in between are all part of the site.[124] The Rufiji River Basin has long been considered the most promising area for future land and water resource development.[125]

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121 Offoro N. Kimambo, Winfred Mbungu, Goodluck D. Massawe, Amina A. Hamad, and Elly J. Ligate, "Rapid Environmental Flow Assessment for Sustainable Water Resource Management in Tanzania's Lower Rufiji River Basin: A scoping Review, *Environment* 9 no. 11 (2023):2405-8440.

122 A.H Savile, "A study of Recent Alterations in the Flood Regimes of Three Important Rivers in Tanganyika," *The East African Agricultural Journal* 11, no. 2 (1945): 69-74.

123 TNA, Hereafter, Tanzania National Archive, 274/15/30/111, "Preliminary Survey of Rufiji and Great Ruaha Basins." Department of Water Development to Member for Agriculture and Natural Resources, 19th December 1950.

124 NAN, Hereafter, The National Archives of Norway, 0003-TAN 012; RUBADA, Identification Study on the Ecological Impacts of the Stigler's Gorge Power and Food Control Development, Report Prepared by the Euroconsult and Delft Hydraulic Laboratory, Vol; III,(Netherlands, 1980).

125 USAID, "Rufiji Basin": 2-3.

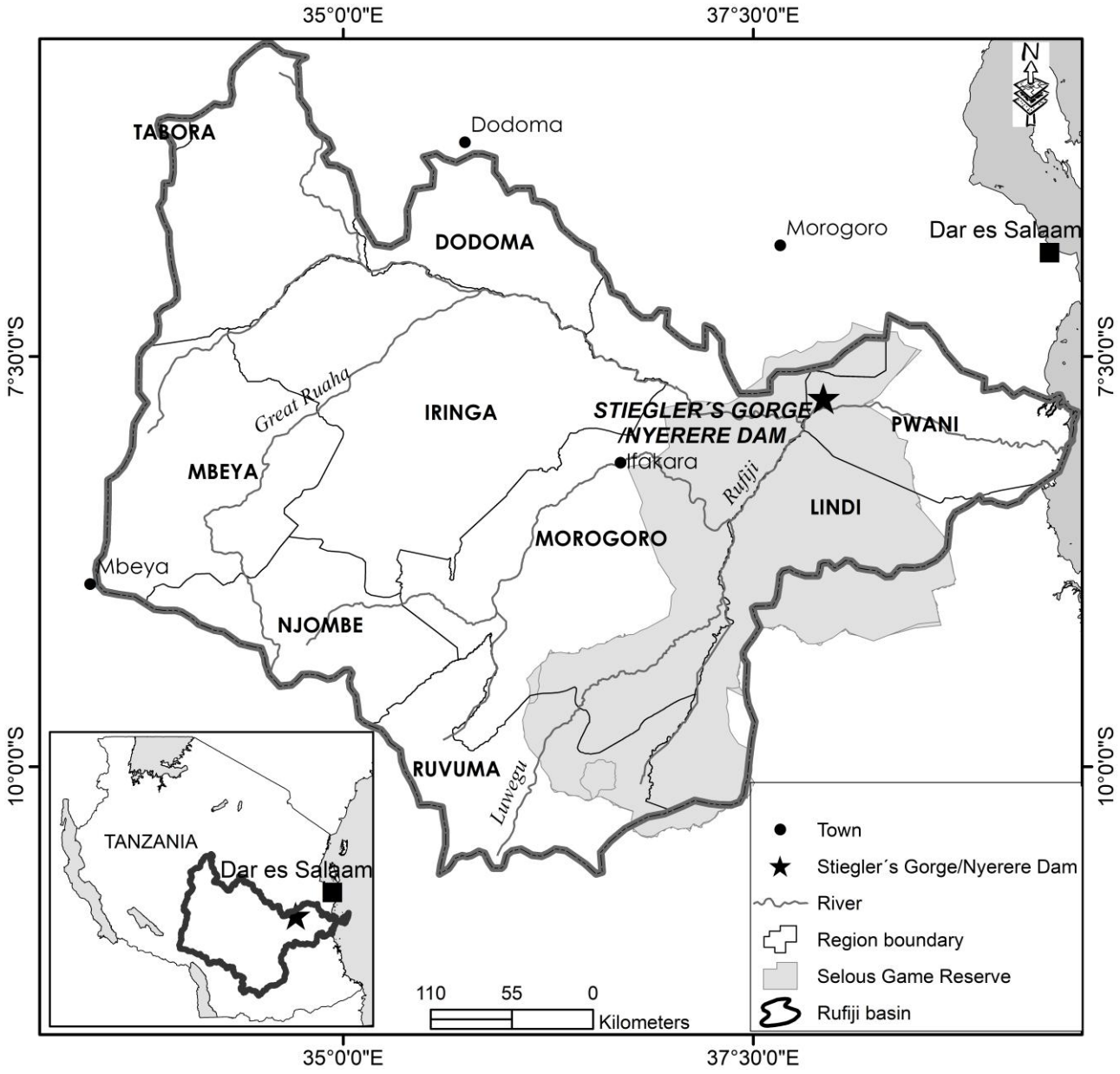

Figure 6: Map showing the location of Stiegler's Gorge, Rufiji Basin, Tanzania

Demographically, the first census in 1948 showed a population of around 7.4 million. An astonishing 97% of the population lived in rural areas, highlighting the country's largely agrarian society at the time. Approximately 100,000 people lived downstream of the Rufiji Gorge, suggesting potential economic opportunities in this region. Low-income levels and high poverty rates characterised much of the population. The annual population growth rate from 1948 to 1957 averaged only 1.4%, indicating slow demographic expansion during this period. After 1957, population growth slowed significantly, averaging 0.2% per annum, reflecting broader societal factors influencing

reproductive trends.[126] High levels of tsetse flies and sleeping sickness led to significant emigration. Importantly, colonial economic policies also fuelled competition for land and encouraged emigration. Population growth in the area suggests that expansion into new frontiers was inevitable. Understanding these dynamics therefore helps explain development interventions in the floodplains and surrounding areas.

The Rufiji Basin covers ten regions in mainland Tanzania, including Morogoro, Coast, Dodoma, Iringa, Mbeya, Ruvuma, Mtwara, Lindi, Singida and Tabora. Outside of protected areas, the basin remains largely uninhabited, with concentrations of people in urban centres such as Morogoro and Iringa. The heart of the Rufiji Basin is home to people from many ethnic groups, such as the Wasangu, Pogoro, Hehe, Ndamba, Ndingo, Zaramo, Matumbi, Ndengereko, Sukuma, Maasai and over forty others, all of whom benefit from and are influenced by the river and its surrounding floodplains.[127] The term 'Rufiji' goes beyond the river itself to encompass the people whose lives, livelihoods and experiences are shaped by its presence. Historical studies emphasise the importance of the population of the Rufiji Basin, shaped by recurrent waves of migration from various parts of East Africa. Until the early nineteenth century, East African communities experienced frequent migrations, settlements and resettlements.[128] This period was characterised by advances in technology, animal domestication and soil cultivation techniques. While cultivators searched for suitable agricultural land, pastoralists sought water sources and grazing land. As a result, the Rufiji Basin presents a complex tapestry of diverse ethnic groups, cultures and political structures, all of which depend on the Rufiji River. [129]

For the people of Rufiji, the river is both a blessing and a threat. It provides essential water for agriculture, supports one of Tanzania's most fertile plains and inland

126 TNA 274/15/30/111, Preliminary Survey of Rufiji and Great Ruaha Basins. Department of Water Development to Member for Agriculture and Natural Resources, 19th December 1950; Maria Snoussi, Johnson Kitheka, Yohanna Shaghude, Alioune Kane, Russell Arthurton, Martin Le Tissier, and Hassan Virji, "Downstream and Coastal Impacts of Damming and Water Abstraction in Africa," *Environmental Management* 39 (2007): 587-600.

127 "Powering Progress: Potential of the Rufiji Basin Water Board as Heart of Tanzania Hydropower," *The Guardian*, June 17th, 2024.

128 "The Peoples of the West", from the Weilue by Yu Huan, Translated by Hill, John E. (University of Washington, September 2004), Retrieved 2022-12-18.

129 TNA 61/45/D/1/556, District Annual Report, 31st March 1931.

fisheries, and sustains tourism and a globally significant ecosystem. While the Rufiji River provides many economic benefits, its high variability and potential for flooding pose significant development challenges.[130] Beyond its practical uses as a water source, the Rufiji has deep spiritual significance. A former NORAD employee who worked at Stiegler's Gorge shared a fascinating insight: locals believe the river harbours 'malevolent spirits'. To mitigate these perceived dangers, locals perform rituals in which a goat or sheep is slaughtered before certain activities to appease the supernatural forces of the river.[131] However, local communities traditionally adapted to periodic flooding by modifying housing and agriculture to cope with it. There is a rich tradition of understanding and adapting to the river's cycles, including the establishment of early warning systems to alert people downstream when water releases occur. Large dams planned on the river were meant to potentially facilitate irrigation-based agriculture and control flooding, rather than trigger disasters.[132]

The climate of the Rufiji Basin oscillates between tropical humidity and temperate conditions, with rainfall playing a crucial role in shaping the ecosystem and water resources. Coastal areas experience tropical humidity, with maximum daytime temperatures of around 39°C. In contrast, the southern highlands, particularly around Iringa and Mbeya, have temperate conditions, with daily maximum temperatures averaging around 23°C. Rainfall patterns vary considerably across the basin. Some areas of Iringa receive around 250mm of rainfall annually, while mountainous regions on the eastern slopes of the Udzungwa Mountains can receive over 1800mm.[133] Historically, the climate cycles in the basin typically consist of two wet seasons. The long rains occur between February/March and May/June, while the short rains begin in October/November.[134] However, annual rainfall varies widely across the area, with inland areas generally receiving significantly less rainfall than coastal areas.

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130 Stéphanie Duvail, and Olivier Hamerlynck, "The Rufiji River Flood: Plague or Blessing?" *International journal of biometeorology* 52 (2007): 33-42.

131 Interview, Kisaki village, Morogoro Rural, 10th April 2024.

132 Duvail, and Hamerlynck, "The Rufiji River Flood":33-42.

133 Christian Siderius, Robel Geressu, Martin C. Todd, Seshagiri Rao Kolusu, Julien J. Harou, Japhet J. Kashaigili, and Declan Conway, "High Stakes Decisions under Uncertainty: Dams, Development and Climate Change in the Rufiji River Basin," in *Climate Risk in Africa: Adaptation and Resilience* (Palgrave Macmillan, 2021): 93-113.

134 Tanganyika Notes and Records, 5 (1938): 56.

Reliable and adequate rainfall supports most crop production. The distribution of rainfall in the catchment area, which includes the Great Ruaha, Luwegu and Kilombero Rivers, determines the quality, timing and duration of the annual floods.[135] The main flood season usually begins in February and ends sometime in May. The nature of the floods has been unpredictable since colonial times, due to a complex relationship between people and development in the area. In addition, water availability was a critical factor in the development of hydropower in the region during the colonial period.[136]

The Rufiji Basin encompasses a diverse landscape characterised by wooded grasslands, riverine woodlands and thicket habitats. This ecosystem is dominated by *acacia*, *terminalia* and *combretia* tree species and perennial grasses. The terrain transitions to denser riverine vegetation as it approaches the watercourse. Historically, the basin's lush grasslands attracted pastoralist groups such as the Maasai, Sukuma and Datoga. These nomadic communities migrated to the region in search of good grazing and reliable water sources.[137] During the British colonial period, government policies encouraged further settlement of pastoralists and agropastoral in the area. Improved veterinary services facilitated increased livestock numbers and agricultural development.[138] The basin's fertile soils and favourable climate enabled local farmers to grow cash crops such as maize, cassava and beans. These crops served as a vital source of food for the population and were exported to other areas of the country. The abundance of grazing land supported a thriving livestock industry, with many residents relying on animal husbandry for their livelihood.[139]

The Rufiji Basin was not only a haven for diverse wildlife but also a catalyst for the local hunting industry and colonial interests. Its grasslands played a key role in the economic

135 Siderius, "High Stakes Decisions Under Uncertainty":93-113.

136 Audun Sandberg, Socio-economic Survey of Lower Rufiji Flood Plain: Part 1; Rufiji Delta Agricultural System, Research Paper No. 34, (Bureau of Resource Assessment and Land Use Planning, University of Dar es Salaam, 1974).

137 R. Barker, "The Delta of the Rufiji River," *Tanganyika Notes and Records* 2 (1936): 1-6.

138 Paschal Lucas Luwanda, "Potentials and Constraints of Kilombero Valley among Agro Pastoralists Community," (PhD diss., Sokoine University of Agriculture, 2008): 4-6.

139 Han Bantje, The Rufiji Agricultural System: Impact of Rainfall, Floods, and Settlement, (Bureau of Resource Assessment and Land Use Planning (BRALUP), Dar es Salaam. Research Paper No. 62, 1979).

development of the region during the colonial era.[140] With the arrival of settlers and the expansion of various economic activities, the area's abundance of natural resources made it a major contributor to the colonial economy, but this period of growth brought both benefits and challenges. While economic progress flourished, the expansion of settlements and economic activities in the Rufiji Basin grasslands during the colonial era led to environmental degradation and conflicts over land and resources.[141] The expansion of settlement and economic activities in the grasslands of the Rufiji Basin during the colonial period had both positive and negative effects on the area's development potential. While it brought economic growth, the consequences of environmental degradation and conflicts over land and resources created a challenging landscape for sustainable development.[142]

Population issues and their economic activities are central to understanding people's perceptions, expectations and later dissatisfaction with the delayed project. For the local people, the dam was an important step towards agricultural development and relief from the human suffering caused by flooding. However, some communities feared that the dam at Stiegler's Gorge would cause economic disruption, particularly the loss of livelihoods based on natural resources. Culturally, traditional lifestyles and practices could be affected by the dam's changes. The delay of the project therefore raised concerns that frustration may grow if the promised improvements or benefits are not realised within the expected timeframe.

The primary aim of this section is to provide a comprehensive overview of the basin as a whole, examining how development has been conceptualised and how people's imagined futures have been influenced by government intervention. Initially, expansion into this and other upstream and downstream areas was gradual through seasonal occupation. Subsequently, more substantial settlements emerged and continue to the present day, as detailed in subsequent chapters of this thesis.

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140 TNA 257/AN/ 19/06/A/92, Extract from Tanganyika Unofficial Members' Organisation, 27th July 1954. See also, Duvail, & Hamerlynck, "The Rufiji River Flood":52:33.

141 TNA 274/15/30/111, "Preliminary Survey of Rufiji and Great Ruaha Basins".

142 Christopher A. Conte, "Colonial Science and Ecological Change: Tanzania's Mlalo Basin, 1888–1946," *Environmental History* 4, no. 2 (1999): 220-244.

3.3 Historical Background and Stiegler's Gorge

In 1885, Germany declared the mainland of modern-day Tanzania, "Deutsch Ost Afrika," a sphere of influence under the German East Africa Company. This was followed by the agreements of 1886 and 1890 between Germany and Britain that defined East Africa. After the defeat of the Central Powers in the First World War, which led to Germany's loss of its colonies, German East Africa was divided to form three modern-day territories: Rwanda and Burundi under Belgian rule and mainland Tanzania under British rule. The territory became a League of Nations mandate under British administration in 1919, to be administered on behalf of the League, and the actual occupation occurred in 1920.[143] The official name of the country became Tanganyika Territory.[144] The German and British colonial administrations laid the foundations for many of the country's infrastructure projects.

The German administration aimed to transform German East Africa into a major economic colony by investing heavily in transport infrastructure, particularly railways, and in cultivating cash crops and establishing plantations.[145] However, their aggressive *mise-en-valeur* policy, characterised by escalating taxation and forced cultivation of export crops, provoked widespread resistance among the local population. This culminated in the devastating Maji Maji War (1905–1907), resulting in the deaths of around 300,000 people, primarily in the south of the colony. Subsequently, the Germans lost interest in the Rufiji Basin and the surrounding area in the south, which was a key centre of the uprising. The region was left depopulated and economically devastated, and no further agrarian investments were made there.[146]

It was not until after the First World War, under the British League of Nations mandate, that 'colonial development' became the new catchword of the 1920s. Further investments were made to justify the colonial administration of the Tanganyika

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143 John Iliffe, *Tanganyika under German Rule, 1905-1912*, (Cambridge: Cambridge University Press,1969):32.

144 United Republic of Tanzania, "Tanzania: Report on the Fifty Years of Independence,"(Dar es Salaam, 2011):14.

145 Coulson, "Tanzania"; Iliffe, "A Modern History of Tanganyika"

146 See Heike Schmidt, "(Re)Negotiating Marginality: The Maji Maji War and Its Aftermath in Southwestern Tanzania, ca. 1905-1916," *International Journal of African Historical Studies* 43, no. 1 (2010): 27–62

territory.[147] Stiegler's Gorge, in the heart of the Rufiji Basin, was identified as a potential site for large-scale infrastructure. At its heart is the story of Franz Stiegler, a German-born civil engineer who left an indelible mark on East African geography. Born circa 1878 in Dießen, a picturesque village on the shores of Ammersee in southern Germany, Stiegler emigrated to Deutsch-Ost Afrika in 1905, taking him far beyond his homeland. Stiegler's career led him to become a surveyor in February 1907. In July 1907, he camped at the Pangani Rapids on the Rufiji River – the place which now bears his name. He soon rose to prominence as the leader of the Rufiji Expedition to explore the river and the surrounding areas, to carry out trigonometric and hydrological surveys, in particular to measure the flow and level of the water.

The colonial administration wanted to assess the navigability of the Rufiji and Kilombero (Ulanga) Rivers. On February 17, 1908, Stiegler camped eight kilometres away from Mberera Mountain,[148] but fate had other plans for the young engineer. An account published in the *Deutsch Ostafrikanische Zeitung* on 11 April 1908 describes the tragic events that unfolded: "The elephant ... immediately attacked and threw a man to the side. Seized by the elephant and thrown into the air ... death was instantaneous." Despite his untimely death, Stiegler left a lasting legacy. His body was taken to the village of *Lugongeka* and buried, marking the end of an adventurous life cut short. The place where Stiegler met his fate is about 100 kilometres to the southwest, upstream of the gorge later named after him. His name lives on through the geographical feature he discovered, which serves as the basis of this study's site.

147 Ulrike Lindner, "The Transfer of European Social Policy Concepts to Tropical Africa, 1900-50: The Example of Maternal and Child Welfare," *Journal of Global History* 9, no. 2 (2014): 208–231.

148 Accessed from Rolf Baldus private archive, http://www.wildlife-baldus.com/

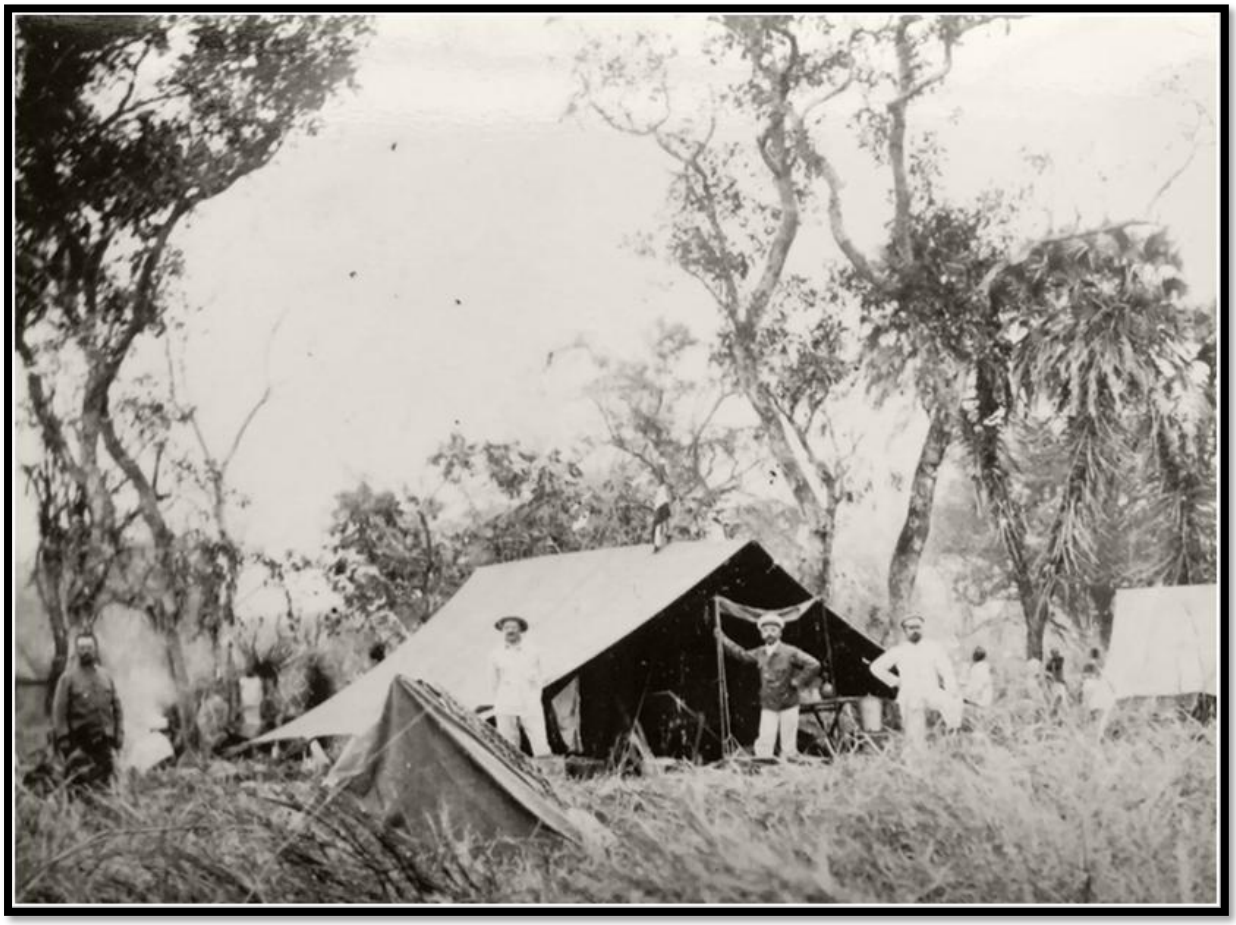

Figure 7: Franz Stiegler in camp, Pangani Rapids, Rufiji River, 1907

Source: Rolf D. Baldus

According to Baldus, there is no record of who named the gorge after Franz Stiegler or when; the German and later British colonial governments continued to call the place Pangani Rapids, and the name Stiegler's Gorge was first mentioned in the 1950s.[149]

The story of Stiegler's Gorge illustrates the changing priorities of development in the Rufiji Basin during the colonial period. Although the German administration intended to develop the area as part of their wider economic strategy for German East Africa, these plans were first thwarted by the Maji Maji War and then by the outbreak of the First World War. Ultimately, this resulted in Germany losing the territory. Consequently, projects in the Rufiji region, including the Stiegler's Gorge Dam, were left unrealised. The British, who inherited control of the territory under a League of

149 Rolf Baldus, "Stiegler's Hydroelectric Dam," in *Wild Heart of Africa: The Selous Game Reserve in Tanzania*, edited by Rolf Baldus (Johannesburg: Rowland Ward Publications, 2009)

Nations mandate, later revisited the idea and initiated feasibility studies, as we shall see in the following sections.

3.4 The Selous Game Reserve

The Selous Game Reserve, one of the largest protected wildlife areas in Africa, plays a central role in the historical and political geography of the Rufiji Basin.[150] While other reserves and national parks such as Ruaha, Mikumi and Udzungwa might have similar ecological importance, the Selous' unique combination of size, UNESCO designation, and its conservation potential and challenges make it particularly critical in the context of the Stiegler's Gorge Dam project.[151] In 1896, the area was designated as a protected area by the Governor of German East Africa, Hermann von Wissmann, and it became a hunting reserve in 1905.[152] It is important to note, however, that this protection did not extend to the human population living in the area. During the 'Majimaji' rebellion in 1905, the reserve underwent a major transformation. It was specifically reorganised as a hunting reserve for the exclusive use of the European elite.[153] This decision reflected the priorities of the colonial powers and their disregard for the local population. This part of the reserve has long been used for game viewing and photographic tourism, while most of the southern part has been used for sport hunting and remains the best sport hunting area to date. The Germans established conservation laws in the reserve to protect resources such as wildlife and forests from encroachment by people, especially Africans in surrounding communities. They controlled the area and made it favourable for European hunters. [154]

The outbreak of the First World War dramatically changed the reserve's purpose once again. The area became a battleground between British and German forces, highlighting its strategic importance during the conflict. After the war, control of the colony changed hands. The British took over as a protectorate and renamed the reserve

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150 UNESCO/NC/CLT/WHC/OC/19/61:A Report on State of Conservation of Selous Game Reserve World Heritage Property (N 199), 30th January 2020.

151 Christine Noe, "The Berlin Curse in Tanzania:(Re) Making of the Selous World Heritage Property," *South African Geographical Journal= Suid-Afrikaanse Geografiese Tydskrif* 101, no. 3 (2019): 379-398.

152 TNA, 599/GD/8/R/6, Correspondence General.

153 Baldus, "Stiegler's Hydroelectric Dam"

154 Iliffe, "A Modern History of Tanganyika": 271; United Republic of Tanzania, hereafter URT, The Wildlife Policy of Tanzania, (Dar es Salaam: The Ministry of Natural Resources, 1998).

after Frederick C Selous, an English big game hunter who had lost his life fighting the Germans.

Selous was not only a skilled hunter but also a close friend and occasional business partner of Cecil Rhodes. Together, they played a major role in establishing the colony of Rhodesia, now known as Zimbabwe. Interestingly, Selous organised hunting expeditions for US President Theodore Roosevelt.[155]

Figure 8: Frederick Courtenay Selous (1851-1917), after whom the Selous Game Reserve is named.
Source: Rolf Baldus Private archive

[155] John Guille Millais, Life of Frederick Courtenay Selous, DSO: Capt. 25th Royal Fusiliers, (London: Longmans, Green, 1918):215.

The Selous Game Reserve was formally gazetted by the British colonial administration in 1922, setting the stage for subsequent boundary expansions between 1936 and 1947. These expansions were partly justified by the growing elephant population and the perceived need to combat the tsetse fly, a carrier of sleeping sickness, through depopulation of the area.[156] The colonial government centralised authority over the Selous Reserve to strengthen its control over the wildlife sector and align it with its interests. This move was part of a wider strategy to assert control over natural resources. At the same time, local communities were forcibly removed from their ancestral lands. This eviction was justified under the guise of conservation efforts, ostensibly aimed at preserving nature and wildlife resources.[157] These rules sought to establish Wildlife Conservation Areas (WCAs), also known as game reserves, or hunting reserves, to regulate the exploitation of wild animals.

The German colonial enterprise considered basin expansion and conservation as important economic undertakings to enhance tourism.[158] As the British did, they treated the area strategically for economic gain. As the British took over the Tanganyika colony in 1919, they consolidated the wildlife resources, among others, by establishing the Kisaki and Muhoro hunting reserves in 1922.[159] This was followed by a further expansion in 1928 to the northeast, covering an area of some 6500 square kilometres and extending to the Kilombero floodplain. The conservation regulations implemented in this region significantly impacted the approach to development, particularly regarding infrastructure projects within designated conservation zones. In addition, the presence of the Selous Game Reserve and other reserves and national parks made the area one of the most popular tourist destinations, thanks to its high

156 Noe, "The Berlin Curse in Tanzania":379-398. See also, Roderick P. Neumann, "Africa's 'Last Wilderness': Reordering Space for Political and Economic Control in Colonial Tanzania," *Africa* 71, no. 4 (2001): 641-665; Michael Lyons, African Trypanosomiasis, in Kenneth F. Kiple (Ed.). *The Cambridge World History of Human Disease*, (Cambridge: Cambridge University Press 197 (1993): 9-23.

157 Adili Y. Zella, "The Management of Wildlife Resources in Protected Areas: a Case Study of South-Eastern Sector of Selous Game Reserve Ecosystem," *Journal of Environmental Science, Toxicology and Food Technology* 10 no.12,(2016): 12-36.

158 Patrick Meroka, and Tobias Haller, "Government Wildlife, Unfulfilled Promises and Business: Lessons from Participatory Conservation in the Selous Game Reserve, Tanzania," in *People, Protected Areas and Global Change. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South* 3 (2008):184.

159 Noe, "The Berlin Curse"

wildlife concentration. The development of these destinations made it difficult for any development intervention other than tourism.

The story of the Selous Game Reserve is therefore deeply relevant to this thesis. It encapsulates the long-standing conflicts between conservation and development, a theme that is central to the contested legacy of the Stiegler's Gorge Dam. The reserve is not merely a backdrop but a politically charged landscape in which visions of national modernity and ecological stewardship collide. As this thesis explores the politics of delay and revival in Tanzania's hydropower planning in chapter six, the Selous Game Reserve serves as a powerful case study in how infrastructure projects intersect with environmental narratives, international pressures, and local realities. Its contested status underscores the broader argument of this research: that infrastructure, especially when delayed or dormant, is not inert but actively reshaped by overlapping socio-political, environmental, and historical forces.

3.5 Colonial Development Interventions in the Rufiji Basin

Africa's development strategies have evolved over decades and encompass a wide range of goals, including improved living standards, economic expansion, industrialisation and poverty alleviation. During the colonial period, European powers adopted a paternalistic approach, believing that through careful planning and technological advances, they could effectively manage colonies and reap economic benefits.[160] This mindset led to the provision of loans for infrastructure development projects such as roads, railways and power stations in various territories. Extensive feasibility studies were also carried out in potential areas to promote growth in sectors such as agriculture, shipping and hydropower. These efforts were aimed at unlocking Africa's vast resources and potential.[161] The Rufiji Basin, rich in natural resources and development opportunities, was not overlooked in this broader African development

[160] Norman Long, *An Introduction to the Sociology of Rural Development*, (London: Tavistock Publications Limited, 1977).

[161] James Ferguson, Anti-politics machine: Development, Depoliticization, and Bureaucratic Power in Lesotho, (University of Minnesota Press, 1994):15; Amy LS Staples, "The Birth of Development: How the World Bank, Food and Agriculture Organization and the World Health Organization Changed the World, 1945–1965," New Studies in US Foreign Relations, (Kent, Ohio: Kent State University Press. 2006). Pp. xvi, 349.

narrative. The German colonial powers, having gained control of German East Africa, saw significant opportunities for initiatives centred on the Rufiji Basin.[162]

From the late nineteenth century, the agricultural potential of the Rufiji Basin attracted the attention of European visitors. The economic growth of this region was not only the goal of the colonial state and foreign experts; the Rufiji people also shared a dream of development with the outsiders who visited the basin.[163] The British Tanganyika's colonial administrators attempted to initiate various development projects in the basin, creating a nexus in which competing environmental ideologies were expressed and shaped by Rufiji's ecology.[164]

The Rufiji Basin has historically supported a variety of economic activities that have contributed to both local and national prosperity. Over the past two decades, however, these economic activities and associated human interventions have significantly impacted the region's ecological integrity. [165] Studies have shown that the people of the Rufiji Basin are hardworking and engaged in a variety of activities. The agricultural system in the basin has evolved gradually, encompassing both irrigated and rainfed farming methods. This evolution was shaped by the interplay of natural, environmental and anthropogenic factors throughout history.[166] Natural factors affecting agriculture include rainfall patterns, floods and droughts. Ecological factors include phenomena such as locust invasions, pest infestations, weed growth and similar environmental elements. Anthropogenic factors include demographic shifts, political decisions, lifestyle changes and other human influences. Traditionally, the agricultural system in the area relied primarily on manual labour using hand hoes. However, colonial planners in Tanganyika believed that introducing mechanised farming would address Rufiji's agricultural challenges. As a result, the Rufiji Mechanised Cultivation Scheme

162 Duvail & HomeLink . "The Rufiji River Flood":30-33.

163 Tanganyika Notes and Records, 5 (1938): 56

164 Alexander M. Telford, Report on the Development of Rufiji and Kilombero Valley, (Government of Tanganyika, London, 1929):1-2.

165 Duvail & Hamerlynck, "The Rufiji River Flood," 52:33.

166 Raphael Mwalyosi, "Resource Potentials of the Rufiji Basin, Tanzania," *Ambio* 19 no.1(1990):16-20.

was implemented to reduce reliance on manual labour by providing comprehensive tractor-ploughing services. [167]

The Lower Rufiji catchment has consistently shown considerable agricultural potential, historically.[168] This assessment aligns with the findings of colonial-era surveys, which highlighted the region's high agricultural potential. Long before colonial intervention, local communities had developed sophisticated environmental knowledge and agrarian skills. These indigenous practices enabled them to effectively cultivate different crops and transform the environment into productive agricultural land. The region was known for its rich agricultural production, including staple crops such as beans, maize, rice and sesame. Livestock farming also flourished, with goats, sheep, and cattle raised in significant numbers. This agricultural wealth led to extensive trade networks. Food and livestock products were regularly exported to Zanzibar, with occasional shipments reaching as far as India. These export activities dominated the regional economy for much of the 19th century.[169]

Most villages produced agricultural products beyond subsistence levels, generating surpluses for export beyond tribal boundaries in pre-colonial times.[170] Over time, the old pattern changed dramatically, and despite the decline in farming, various studies indicate that it remains the main occupation of many households in the Rufiji Basin.[171] Farmers in the floodplains are responding by diversifying production, having developed a system that uses both the wet and dry seasons to protect themselves from

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167 TNA 274 1 1/37/1, The Rufiji Mechanized Cultivation Scheme Annual Report, 1952:1.

168 Emmanuel R. Mbiha, and Ephraim MM Senkondo, "A Socio-economic Profile of the Rufiji Floodplain and Delta," *Environmental Management and Biodiversity Conservation of Forests, Woodlands, and Wetlands of the Rufiji Delta and Floodplain. Technical Report* 6 (2001); Alison Cook, "Land use Recommendations for Rufiji District," (BRALUP Research Report No. 11, University of Dar es Salaam, 1974); Euroconsult (1980a), Identification study on the Ecological Impacts of the Stiegler's Gorge Power and Flood Control Project, Part I, Summary, background and approach to the study; Euroconsult. (1980b). Identification Study on the Ecological Impacts of the Stiegler's Gorge Power and Flood Control project, Part II, Methodology, Definition of Impact Area and Resources Inventory; NAN, TAN 002-RUBADA, Promotion and Regulation of Economic Activities in the Rufiji Basin, Typescript, 1983:15.

169 Telford, "Development of Rufiji and Kilombero Valley":1-5.

170 FAO, "The Rufiji Basin, Tanganyika,":14.

171 Caroline Ochieng, "Research Master Plan for the Rufiji Floodplain and Delta 2003–2013," Rufiji Environment Management Project Technical Report 28 (2002); Bantje, "The Rufiji Agricultural System,".

high or insufficient floods and low rainfall. Farmers use their knowledge to select from over thirty varieties of rice to suit the local micro-environment. [172]

The agricultural system in the catchment changed significantly over time. Originally, it relied heavily on the natural interplay between rainfall and river flooding. However, this dynamic relationship evolved, leading to shifts in settlement patterns and land use. Many households moved from the wet lowlands of the river valley to drier upland areas. [173] This migration away from the floodplain was primarily a precautionary measure to protect against potential flooding. These movements signalled potential expansion into lower-pressure areas and foreshadowed future competition for resources in the lowlands. The corridor between the Usangu plains and the Kilombero valley became particularly vulnerable to population expansion. As opportunities to occupy and exploit land resources in other areas remained limited, people sought to settle in this region.[174] However, it would be inaccurate to assume that resource concerns were the sole driver of this movement. Instead, people were likely influenced by a complex interplay of social, economic and environmental factors. The British colonial period witnessed significant changes in land-use policy. The Corridor area was earmarked for large-scale irrigated farming by white settlers and hydroelectric power generation.[175] This led to conflicting demands on the land, pitting settlers' interests against those of African farmers and pastoralists.[176]

In terms of hydropower development, the early 20th century marked the beginning of colonial involvement in electricity generation in Tanganyika. This period saw significant changes in the energy landscape of the region. Until the early 1930s, electricity in Tanganyika was mainly generated by small, isolated systems and

172 TNA: Tanganyika Notes and Records, "Mlau Cultivation in the Rufiji Valley", 5, 1938:56.

173 A.R. Hogan, R. X. L. Nandi, M. O. Mtiga, E. B. Chirwa, P. Kilonzo, and J. Peter, Selection of Pilot Villages: A Report on the Rapid Appraisal Methodology Used and the Selections Made, Together with Eleven Individual Village Profiles. No. 2. *REMP Technical Report*, 1999; Y.S Kajia, "Assessment of the Effects of Rice Farming in the Mangrove Forest of the Rufiji Delta (Mainland Tanzania)," (MSc. Thesis in Ecological Marine Management, Faculty of Science, Free University of Brussels,2000).

174 TNA: Tanganyika Notes and Records, "Mlau Cultivation in the Rufiji Valley,":5.

175 Heather J. Hoag, "Designing the Delta: A History of Water and Development in the Lower Rufiji River Basin, Tanzania, 1945–1985," (PhD Thesis, Boston University, 2003).

176 Han Bantje, "Floods and Famines: A Study of Food Shortages in Rufiji District," *BRALUP Research Paper* 63, (University of Dar es Salaam, 1980).

hydropower plants. Under German influence, a private German company played a crucial role in this initial phase by installing the first wood-fired steam turbines for power generation.[177] When the British took control, hydropower was one of their priorities. However, it wasn't until the 1930s that significant efforts were made to explore the potential for increasing productivity and profitability in the colonial extractive industries. Because of the importance attached to electricity, by 1928 it was recognised as the most efficient source of power for machinery on plantations, particularly those producing sisal - the colony's main export.[178] In response to this need, Tanganyika's first hydroelectric power station was commissioned at Pangani Falls in 1936. This plant supplied the local sisal industry via an extensive 400km transmission system. Despite these developments, the country's total installed electrical capacity remained relatively low at just 29 megawatts until 1955.[179]

In the 1930s, British engineers and planners called on the British imperial government to support the development of hydropower in the colonies to boost and harness abundant resources.[180] Several options were available, and the Rufiji Basin was not left behind, as it was a land endowed with numerous potential, including hydropower. Thus, several potential dam sites were identified and studied, including Stiegler's Gorge as a source of renewable energy to support increased agricultural production and industrial development, and as a desirable choice for achieving economic growth in the territory.

The colonial administration implemented measures to protect forest resources in the Rufiji Basin, recognising their importance as sources of water, timber and building materials. These forests had considerable commercial value, both locally and for export. Forestry emerged as a major economic activity in the basin, initiated by colonial

177 Elias Reginald Kirey, War Memories in British Tanganyika: Imperial Rivalries, Commemorations and Heroism, 1920–1960s, In *Memories of German Colonialism in Tanzania*, (Berlin, Boston: De Gruyter Oldenbourg, 2023): 23-60.

178 Egerton, F. P. *Report on Electricity Supplies in Tanganyika*, (Government Press, 1954); Hoag, "Designing the Delta".

179 TNA /Acc. 5. 31/8, Electricity Supply General, 1950-1960; Mchome, "Blackout Blues":37-38.

180 Jonas Van der Straeten, and Ute Hasenöhrl, "Connecting the Empire: New Research Perspectives on Infrastructures and the Environment in the (Post) Colonial World," *NTM* 24, no. 4 (2016): 355-391.

administrators. [181] This focus on forestry was closely linked to broader plans for regional development: the Stiegler's Gorge Dam was part of a wider strategy to exploit the region's forestry potential. A reliable timber supply was essential for the construction of the dam and infrastructure development. To ensure the long-term availability of timber resources, the colonial administration established forest reserves. This initiative aimed to promote sustainable forestry practices in the region.[182]

Earlier explorations done by William Beardall in the 1880s about the Rufiji River on behalf of the Sultan of Zanzibar, described the floodplains as very fertile, producing excellent crops such as rice.[183] James Elton, the British Consul in Mozambique, also described the area as a land of plenty and its beautiful landscapes as the gardens of Africa.[184] Such reports sparked the Germans' interest in further exploration of the Rufiji Basin. In 1901, Stiegler, a German engineer, led an expedition to the Rufiji basin's gorge to investigate potential infrastructure development. The German East African government was so impressed by the area's potential that it established rubber and cotton plantations, used the Rufiji River for transport, and carried out a series of technical surveys of the Rufiji Basin. The German administration was more concerned with the navigational possibilities of the Rufiji River and irrigation farming.[185] However, a railroad was more economical, diverting their attention from river transport and the possibility of irrigated agriculture and hydroelectric power generation.[186] As navigation was only possible on the lower reaches of the Rufiji River, the surveys showed that rail transport would be more advantageous, and on a limited

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181 Carl Christiansson, & Johan Ashuvud, "Heavy Industry in a Rural Tropical Ecosystems," *Ambio*,14(1985):122-133.

182 NAN, TAN 002: RUBADA, Promotion and Regulation of Development Activities in the Rufiji Basin, 1983:15; FAO, "The Rufiji Basin, Tanganyika":4; NAN, TAN 002: RUBADA, Promotion and Regulation of Development Activities in the Rufiji Basin, 1983:15.

183 TNA "Travel Accounts"-James Elton, Travel and Research among the Lakes and Mountains of Eastern and Central Africa, London, 1879:97.

184 TNA, Royal Geographical Society, "Obituary: HB Cottenll," *Geographical Journal*, (1925):86-87.

185 More detailed adventures of the past which show clearly how familiar the Germans were with this area during the First World War, are richly presented by Miller Charles, *Battle for the Bundu; The First World War in East Africa, 1918-1986*, (New York: Macmillan, 1974).

186 USAID, "Rufiji River Basin Reconnaissance Appraisal: Land and Water Resource Development Plans and Potentials, Report to the Government of the United Republic of Tanzania from USAID and Bureau of Reclamation, United States Department of Interior," (1967): 52-53; Clement Gilman, "Reconnaissance of Hydrology of Tanganyika Territory in its Geographical Settings," *Water Consultant Report*, no. 6 (Dar es salaam, 1943):97; Havnevik, "Tanzania":263.

scale, upstream on the Kilombero River. However, the German East Africa administration did not build a railway in the region, and the dam and power station projects became a dead horse when they lost the territory after defeat in the First World War.[187] As we shall see in chapter three, these initial development plans for the region laid the foundation for later post-colonial development interventions, particularly in hydropower development.

After the war, the transfer of Tanganyika's rule to Great Britain under the mandate of the League of Nations halted investigations of the Rufiji Basin. According to Kirey, during the Mandate-Trusteeship period, the Germans locked horns with the British in fostering hegemonic memories of war and colonialism in Tanganyika. While the Germans hoped to restore the status quo and possibly regain their lost territory, the British struggled to establish their political position in Tanganyika.[188] In the late 1920s, the colonial administration contracted Alexander Telford[189] who began the next major study of the Rufiji Basin and the Kilombero Valley in 1928/29.[190] Telford's report, among other things, included the river cross-section that he took at several sites at sea level. He also estimated that the Rufiji Basin had a potential of 364,000 acres suitable for agricultural development without irrigation, particularly in the Kilombero and lower Rufiji rivers for cotton, maize and rice farming. The report placed greater emphasis on the relationship between land use and social practices in the basin.[191]

Telford's report challenged the prevailing narratives about the basin's farmers, revealing a more nuanced reality. Contrary to earlier accounts, which characterised these agricultural workers as indolent, Telford's findings suggested that they were labour-intensive. He suggested that perceived laziness might be due to health problems, such as hookworm infection, rather than inherent characteristics. [192] Telford made significant discoveries about the region's agricultural practices through extensive

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187 Kjell Havnevik, The Dam that was Never Built: The Stiegler's Gorge in Tanzania, in *From Aswan to Stiegler's Gorge Project in Tanzania*: *Small Stories About Large Dam*s, (The Nordic Africa Institute,2019): 81-83.

188 Kirey, "German War Memories in British Tanganyika":23-60.

189 Telford was an irrigation engineer and chief of the Sudan Plantations Syndicate.

190 Telford, "Development of Rufiji and Kilombero Valley":1-4.

191 Telford, "Development of Rufiji and Kilombero Valley"4-5.

192 Valentin Y. Mudimbe, *The Invention of Africa: Gnosis, Philosophy, and the Order of Knowledge*, (Indiana University Press, 1988).

fieldwork, including interviews with local communities and first-hand observation. His research showed that irrigated farming was unnecessary in this particular basin. The area's natural wetland environment, coupled with sufficient rainfall, enabled successful crop production without artificial water management systems. [193]

In 1940, a water expert to the British Tanganyika colonial government, Clement Gillman[194], conducted another survey of the Rufiji. Gillman was an important figure in Tanganyika, and his work in the Rufiji Basin was also significant for hydropower development. Gillman headed the survey that recommended the Rufiji Basin for hydroelectric development. He was the senior district engineer of the Tanganyika Railways at the time and was promoted to chief engineer after the survey. In 1905, Gillman was appointed assistant engineer on the construction of the Central Railway in *Deutsch-Ostafrika*. After retiring from the Tanganyika Railway in 1937, he was appointed Water Consultant and produced extensive hydrological reports on Tanganyika's water systems.[195] The team of experts involved in the Rufiji Basin Survey addressed some site-specific concerns, particularly the perceived problem of flooding in the Rufiji Basin, and recommended that development activities in the area be deferred until after a large dam had been built in the gorge. The advice was to switch from irrigation development to hydroelectric power generation.

Among other things, the study's conclusions revealed that little was known about the flows of the Rufiji River and others. Despite this, the study warned the government that the river does not lend itself to substantial irrigation or navigation systems that would justify the costs of estimating their flows.[196] The report made a direct link between water and economic development. Furthermore, the report hinged on the construction of costly works like those begun along the Nile River. Gilman was opposed to irrigation schemes but optimistic about the basin's potential for hydropower generation, taking agricultural water use and sedimentation into account.

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193 Telford, "Development of Rufiji and Kilombero Valley":18.

194 Clement Gillman was the former chief engineer of Tanganyika railway and territorial water consultant during the British period.

195 Brian Hoyle, *Gillman of Tanganyika, 1882–1946: The Life and Work of a Pioneer Geographer*, (Hampshire: UK, 1987).

196 Hoyle, "Gillman of Tanganyika,"; FAO, "The Rufiji Basin Tanganyika":4- 5.

In contrast to previous studies, Gilman's study specifically raised three points. One suggested that the differences between high and low stream flows in the river were so great that power schemes would have to rely on small amounts of water in the low season, unless very expensive, entirely unjustifiable projects for storing a portion of the high water were built. Two, Gilman believed that the large amount of silt and sand carried by rivers required the construction of sand traps to prevent turbine damage. Three, Gilman observed that human misuse of highland vegetation resulted in increased flood runoff, lowering the permanent river discharge.[197] From the findings of this study, it appears that it did not reference the key Marshland study on agricultural cultivation in the lower Rufiji Valley or the report by Telford of 1929.[198] The advice from this study delayed systematic observation of river flows throughout Tanganyika.[199] This is because the report indicated that the main rivers of the territory, including Rufiji, were not susceptible to major developments such as irrigation.

Overall, Telford and Gillman found that colonial engineers and planners made efforts to understand the hydrology and geography of the Rufiji Basin, although they provided little data. They did, however, provide insights into how they interacted with the basin's environment and local people. While Telford's survey focused on the basin's environment and people, and analysed future development in terms of the population's needs, Gilman's report encompassed all of Tanganyika's water resources, with the Rufiji Basin as part of a larger area.[200] The original view of the basin was challenged following a major survey of the Rufiji River in the 1950s. This extensive research project not only re-evaluated the basin but also identified Stiegler's Gorge as the optimal site for hydroelectric power generation due to the availability of a large water flow.

Furthermore, Gillman played an instrumental role in shaping the early development planning of the Rufiji Basin. His vision of transforming the area into a productive economic zone through infrastructure investment, particularly in irrigation and navigation, reflected the broader imperial goal of extracting value from colonial

197 Gillman, "Reconnaissance": 97-99.
198 Gillman, "Reconnaissance"; Marshland: 55–59.
199 FAO, "The Rufiji Basin Tanganyika": 45.
200 Tanzania Notes and Records, "The Geology of the Rufiji District, including Small Portion of the Northern Kilwa District (Matumbi Hills), vol 16. 19, (1943): 7-29.

territories. However, what makes Gillman's case particularly noteworthy is that he was able to continue his career in Tanganyika under British administration after the First World War, despite his German background. This continuity was highly unusual, given the political sensitivities of the time and the widespread dismissal of German personnel from colonial service. His retention not only highlights his exceptional technical expertise but also demonstrates how colonial infrastructure planning could sometimes transcend national allegiances in pursuit of developmental goals.

3.6 FAO and the Making of Futures

By the 1950s, the colonial administration in Tanganyika had taken steps to develop Rufiji's water resources by agreeing on the most effective way to exploit the basin's potential. Mtera was recommended as a dam site in the Ruaha cluster, Stiegler's Gorge in the Rufiji cluster and Kidatu in the Kilombero cluster.[201] Several other hydropower options were available in other parts of the country, including the Ruvu River and Hale in the Pangani Basin.[202] This was also the time when the need to connect Dar es Salaam to reliable hydropower sources became more evident as the electricity demand in the city grew.[203] Further initiatives were undertaken in Stiegler's project. The preliminary surveys continued, aimed at developing a basin-wide development plan that included mapping, an examination of a potential dam site, and the establishment of hydrometric gauging stations throughout the basin. They were to submit a proposal for an exploratory survey that had been sent to the Minister of Natural Resources by the Director of Tanganyika's Department of Water Development. [204] This was a six-month exploratory survey of the Rufiji Basin, the first step towards a comprehensive development plan for the area. However, due to funding constraints, the British Governor of Tanganyika invited FAO to conduct a reconnaissance survey of the potential for developing the basin. [205]

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201 The World Bank: "Appraisal of the Kidatu Hydroelectric Project of Tanzania Electric Supply Company Ltd. Tanzania." The World Bank; Washington, DC, 1970. FAO, "The Rufiji basin, Tanganyika":14.

202 TNA, Tanganyika: A Review of its Resources and their Development (Tanganyika Government, (1955): 706-716.

203 Mchome, "Blackout Blues":60.

204 TNA 274/15/30/111, "Preliminary Survey of Rufiji and Great Ruaha Basins," Department of Water Development to Member for Agriculture and Natural Resources, 19 December 1950.

205 FAO, "The Rufiji Basin Tanganyika":22-23.

In 1952, Sir Edward Twining, then Governor of Tanganyika, presented an initiative to the Director-General of the newly established FAO of the United Nations. The proposal aimed to explore possible development programmes for managing water resources in a specific basin. The following year, the FAO commissioned Captain Nicholas Simansky, formerly of the Sudan Irrigation Department, to undertake a comprehensive study. His mandate was to investigate and assess the feasibility and potential value of various development strategies for conserving and utilising existing water resources in the basin.[206]

Captain Simansky's first visit to the region marked the beginning of a sustained effort that continued throughout the survey period. As team leader of the FAO team responsible for assessing the Rufiji Basin, Captain Simansky played a pivotal role in the endeavour. His correspondence with the Director of the Rufiji Basin Geological Survey provides valuable insight into the project's development. In his letter, he noted;

> *"Concerning the assistance given by the Geological Survey in the survey of the Rufiji Basin, the examination of the dam sites will be most valuable and should, as suggested, be undertaken as soon as conditions permit, even if the main part of the survey is delayed. The current plan is for the survey team to arrive in groups, but we have not yet heard from the Minister that our proposals have been approved. If there is any further delay, it may be necessary to postpone part or all of the survey until 1955. Details of the financial assistance that the Survey Funds will be able to provide will also be forwarded once the scheme has been approved by the Secretary of State.*[207]

The need to develop the area for hydropower was considered important and required follow-up. This was because neither the terms of reference for the preliminary study nor the subsequent Rufiji Basin Survey mentioned hydropower generation. Again, according to the FAO report, all the studies were entirely concerned with the possibilities of water control for better land use, and a small dam for electricity generation as a minor aspect.[208] By 1954, however, the need for a dam at Stiegler's Gorge was accepted as a necessary step in developing irrigation in the area, particularly for flood control.[209] Despite the basin's hydropower potential, the British wanted to build

206 FAO, "The Rufiji Basin, Tanganyika":4.

207 TNA 43697/3/29, Letter from the Member for Agriculture and Natural Resources to the Director of Geological Survey of the Rufiji Basin, Dar es Salaam, 16 June 1954.

208 FAO, "Rufiji Basin Tanganyika":4.

209 FAO, "Rufiji Basin Tanganyika":14.

a boulder dam, although the vision was so limited that it might not be more than 450 feet high. Electricity would be a by-product, however, and could be used to produce fertiliser for local use and export as a by-product of irrigation.[210]

During the survey, available funds supported a topographic survey of potential dam sites in the Rufiji Basin. The photogrammetric team carried out aerial surveys of the basin to investigate the dam sites thoroughly. In addition to investigating the most promising dam sites in the basin, which had been identified during the preliminary survey in 1953, the team focused on eighteen other dam sites. The Rufiji Basin was investigated primarily through topographical and geological studies of the Stiegler's Gorge dam site, with little attention paid to downstream areas. As the study progressed, more discussion focused on the revenue-generation potential of the Stiegler's Gorge dam.[211] It was estimated that a dam with a capacity of about 6.4 million acre-feet would cost 10 or 50 million euros per acre of irrigable land.

However, Captain Simansky envisioned a much larger dam, capable of holding 18.5 million acre-feet and producing 450 megawatts of electricity. The feasibility of building a large dam depended on the existence of a viable market for the electricity generated. This electricity would be sold primarily to generate revenue for the Tanganyika Colony. The income from these sales was crucial as it would enable the colony to implement other proposed initiatives. Consequently, the Stiegler's Gorge dam was no longer seen as a means of controlling flooding in the region, but rather as a means of harnessing water to electrify East Africa. This suggestion to postpone all development plans until the dam could be built stuck with development planners and was passed on to Tanzanian planners in the 1960s.[212]

The FAO report hints that "the reservoirs studied in this report are used for flood control and irrigation, but the generation of hydroelectric power complements the reservoir studies, as water flowing from a higher to a lower elevation always represents a potential source of hydroelectric power."[213] This meant that the possibility of building

210 TNA 532/15/30/368 Letter to Lance from W. Steele, August 5, 1954.
211 FAO, "Rufiji Basin Tanganyika":75.
212 FAO, "Rufiji Basin Tanganyika":75-76.
213 FAO, "The Rufiji Basin, Tanganyika":23.

hydropower plants was not ruled out, but was left open for further study and action. In 1956, Captain Simansky again noted that;

> *Although it can, of course, be argued that the lack of pressure on the population does not justify large-scale development at present, several pilot schemes should be established now to study carefully all the factors involved in future large-scale work. It must be remembered that irrigation agronomy is an industry and must be run based on optimum efficiency, without favouring any tribe, religion or colour.*[214]

The proposed projects faced challenges in adapting to demographic factors but demonstrated foresight in addressing future needs. As the population continued to grow, these initiatives became increasingly relevant, underscoring the importance of strategic land management. Captain Simansky advocated a measured approach to developing the Rufiji Basin, believing it would optimise the valley's productivity and enhance the economic potential of the wider Tanganyika region. He suggested that the construction of multipurpose dams could serve several important functions simultaneously: flood control, irrigation systems, water resource management, navigation infrastructure, fisheries development and hydropower generation. This integrated approach was seen as an efficient means of effectively using the basin's resources.[215]

This analysis shows that a comprehensive approach to the study and development of the basin requires the involvement of various stakeholders and interests, covering both the current situation and future prospects. However, the low population density of the valley and the relatively small size of the area during the colonial period did not justify major investment. As a result, many proposed projects remained unrealised, the most notable example being Stiegler's Gorge.

Simansky's proposal coincided with the pilot study, which resulted in an interim report published in 1954 recommending that a more comprehensive study be undertaken, including investigations of soils, geology, topography, and water control. Minutes of a conference held in July 1954 outline the steps taken in the planning process, in particular, the survey for the pilot schemes and specific dam sites. It was long hoped

214 TNA, Press Release: "Pilot for Irrigation and Agriculture," (29 August 1959).
215 TNA, Press Release, "Pilot for irrigation and Agriculture," (29 August 1959).

that these schemes would earn a profit to assist the development of the Rufiji Basin. For all the schemes, contour studies were carried out, followed by soil studies of the area. The dam sites identified and studied were the Rufiji Mkalinzo (Stiegler's), Great Ruaha (Kidatu bridge), Kidatu (Mbuyuni bridge), and Mtera. The conference allowed for a further two sites to be studied, including a follow-up preliminary survey of the sites with geological investigations, and for consideration of Stiegler's site to be deferred until other reports were available to avoid overlap. The survey also included a study of headwaters and measurements of water and salt movements. The other role was to study soil conservation problems at dam sites and in the basin to draw up land-use programs.[216]

The FAO approached the study with clear Terms of Reference (ToR). The first was to investigate and assess the scope and feasibility of potential development programmes to conserve and utilise the basin's existing water resources through measures such as flood control, reclamation, drainage, and gravity- and pump-irrigation systems. In addition, proposals were to be made for possible methods and systems of water use in the basin.[217] In 1955, the Government of Tanganyika gave FAO more specific terms of reference for the study of the Rufiji Basin to determine the basin's irrigation potential and the likely cost of exploiting it. The irrigable areas had to be defined, and their relative merits determined. This study provided estimates for dam construction for further investigation. It also identified the amount of storage required and the locations of dams to relieve that storage, as well as an estimate of the likely construction costs of the proposed dams to be investigated. Finally, it involved mapping the soils and topography of the irrigable areas within the basin.[218]

Colonial officials also interacted directly with local communities to address the basin's agricultural potential. The Rufiji District Commissioner, John Young, interacted with local people to address the potential of agricultural projects in the basin, ranging from

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216 TNA 257/AN/19/06/A/85, Conference Minutes to Plan Rufiji Basin Survey, File 43697 of 26th July 1954.

217 TNA, Gilman's Water Consultant´s Report No 6, 1940: See Also Kjell Havnevik, "The Stiegler's Gorge Multipurpose Project: 1961- 1978," *DERAP Working Pape*r No A 131, (Che. Michelsen Institute, Bergen, 1978):5.

218 FAO, "The Rufiji Basin Tanganyika": 3-5.

the 'grow more cash crops' campaign to mechanisation programmes.[219] Although colonial officials and FAO studies focused on the area's agricultural potential, they also identified major hydropower potential sites.[220] The following figure gives a glimpse of the significant hydropower potential sites identified in the Rufiji Basin up to 1954.

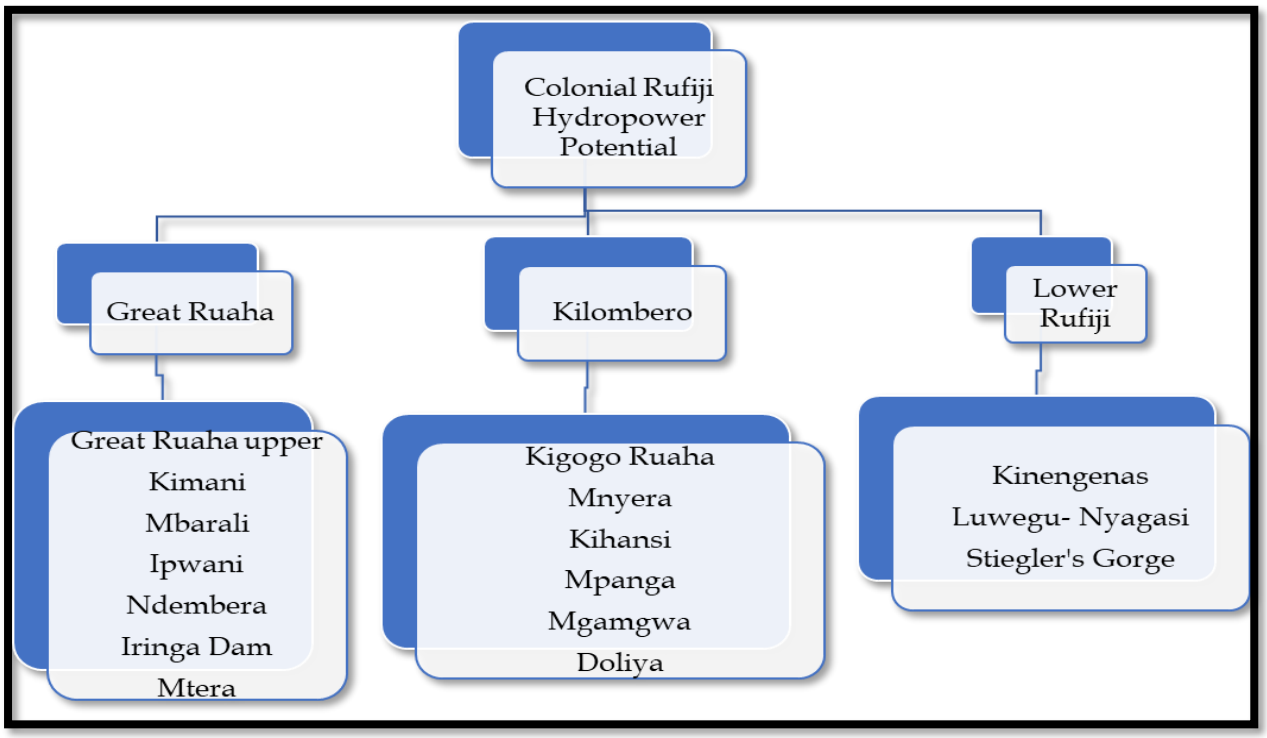

Figure 9: Planned Hydropower Sites up to 1954
Source: FAO(1960):43

Stiegler's Gorge dam was the most promising of the various options. This assessment was consistent with early exploration and subsequent analysis of the Rufiji Basin, except for Gillman's study. While most reports focused on individual aspects of the project, Gillman's work uniquely highlighted the multiple benefits of combining dam construction with power generation. Key findings from the investigations showed that implementing such a project could have far-reaching consequences across various sectors: Wildlife habitats and ecosystems, power generation capacity, agricultural practices and productivity, fisheries and aquatic resources, forest management and conservation efforts. These studies also highlighted the potential impact on the delicate

219 TNA274/11/8/230, Letter to Provincial Commissioner John Young, 1951.
220 TNA 1/2/D, Letter to all Provincial Commissioners from the Member of Agriculture and Natural Resources, 18, June 1954; NRC, Dodoma, The USAID and Bureau of Reclamation Report:109.

ecological system of the Rufiji Delta region.[221] As stated in the minutes of the conference;

> *"A dam planned for Stiegler's Gorge would have far-reaching consequences for the people of Rufiji. On the positive side, it would provide a significant degree of flood protection. In addition, the dam could release controlled amounts of water, which would be better timed and larger than naturally occurring floods. However, the dam would also have negative impacts. The Rufiji River currently carries a heavy sediment load. Some of this sediment is deposited on the floodplain during floods. Over time, these sediments have built up the alluvial soils of the floodplain and continually fertilised the fields. Almost all of the sediments are trapped in the reservoir after a dam in the gorge is closed. After 5-15 years, erosion will most likely have resulted in a situation where floods will no longer be able to irrigate the upper and possibly the middle part of the floodplain."*[222]

Multiple teams across the basin collaborated to address specific issues, with flooding being the most pressing concern. Their recommendations emphasised the importance of delaying development projects until the construction of a substantial dam in the region was completed. This approach marked a significant shift in priorities, moving away from irrigation-focused development towards hydroelectric power generation. Earlier studies had already highlighted this transition, further emphasising its necessity. All these development programmes in the basin were designed to better leverage the potential to control water for improved land use. Although the project had to be large in terms of the national economy, it also had to be weighed against the fact that financing such a large project would mean limiting support for other development projects in the country.[223]

In the mid-1950s, constructing a dam on the Rufiji River regained prominence as a key measure for developing irrigation in the region. This renewed focus stemmed from the realisation that systematic irrigation could only be considered a viable investment if flood control measures were put in place.[224] Dams were needed to generate electricity to meet the growing demand for power both within and outside the country. By this

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221 Havnevik, "Tanzania":264-265; Alison Cook, "Land-Use Recommendations for Rufiji District," *BRALUP Research Paper* No. 11, University of Dar es Salaam,1974).

222 TNA 257/AN/19/06/A/85, Conference Minutes to Plan Rufiji Basin Survey, File 43697 of 26th July 1954.

223 FAO, "The Rufiji Basin, Tanganyika":4.

224 FAO, "The Rufiji Basin, Tanganyika":14.

time, Tanganyika and Kenya were working so closely together that from 1949 to 1960, Kenya imported electricity from Tanganyika via a fixed line. This increased the importance of electricity generation.[225] Kenya had a high geothermal potential, while Tanzania had a higher hydro potential. In addition, Kenya and Tanzania share the Mara River, with a potential future capacity of 89-200 megawatts. The commercial value of this over hydropower dams, therefore, encouraged the administrators to press ahead. The following figure shows Kenya's imports of hydroelectric power from Tanganyika over the period from 1938 to 1960('000Kwh).

Table 1: Kenya's imports of hydroelectric power from Tanganyika

Year	Total Generated	Imports from Tanganyika
1938	17,234	-
1946	44,920	-
1951	103,787	11,898
1952	126,651	12,145
1953	150,192	13,075
1954	179,403	18,758
1955	208,923	22,268
1956	245,636	23,095
1957	267,891	23,381
1958	213,722	24,006
1959	212,173	21,743
1960	**221,329**	**21,169**

Source: The East Africa Power and Lighting Co. Ltd, Nairobi 1960

In the late 1950s, more hydrographers were hired to work in Tanganyika to establish new hydrometric stations and initiate meter-and-float discharge measurements. Others were responsible for the training of observers, the initiation of run-off studies,

225 Republic of Kenya, "Statistical Abstract 1968," (Nairobi: Government Printer,1969): 98

computations and analyses of results, the initiation of silt studies and water accounting, the estimation of groundwater resources, and drainage problems.[226]

An application was made to the FAO for an interim arrangement for two years from January 1956 to the end of December 1957.[227] During this time, the United Nations expanded its technical assistance programme for the Rufiji Basin to assist in the development of the area. Under the Tanganyika Country Programme for 1956, sixty FAO experts were requested for the Rufiji survey, and more were needed, including a project engineer, a hydrologist, a photogrammetrist, an irrigation engineer, an economist and a secretary. The irrigation engineer was required from January 1956, mainly to prepare preliminary designs for the proposed dam sites and irrigation systems.[228] In addition, a dam with a capacity of 6.4 million acre-feet was to cost around 10 million euros by the end of the 1950s. The cost was deemed too high to make the project viable, but such a reservoir could also be used to generate large amounts of reliable electricity.[229]

The proposal to develop Stiegler's Gorge was met in the colony with excitement and optimism. The Daily Telegraph published what could be considered the big news of the day on 1st September 1959, celebrating the colonial government's anticipation.[230] The following day, the Times ran a headline, "Second Kariba in Tanganyika".[231] Given the great celebrations, it was expected that the hydroelectric project would be put into operation soon after the Rufiji survey. Aside from other prospects and the other fourteen dam sites earmarked, Stiegler's Gorge would provide more value in terms of flood control, irrigation, navigation and hydropower, as detailed later in this thesis.

The development of this site was guided by the long-term benefits of the investment. Despite being an ambitious project, the dam concept was never pursued beyond initial

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226 TNA Ag-L-T, 19/02, Letter from the Director Agriculture Division to Chief Secretary of Tanganyika, 16 September 1955.

227 TNA, PER/6/4, Letter from N. Simasnsky to the Member for Agriculture and Natural Resources on the Rufiji Basin Survey to Mr. Trotman, 20 October 1955, TNA, CH/29, Rufiji Basin Survey, 1st December,1955.

228 TNA, FN. G/115/01, United Nations Expanded Programs of Technical Assistance 1956-Rufiji Basin Survey, 30 December 1955.

229 FAO, "Rufiji Basin, Tanganyika":41.

230 £100m Dam Plan in Tanganyika, *Daily Telegraph*, 1st September 1959.

231 Second Kariba in Tanganyika, *The Times*, 2nd September 1959.

planning during the colonial era. This delay highlights that the project's stagnation originated not simply from technical challenges, but from the colonial administration's calculation that it was too costly and insufficiently profitable for the metropole. Instead, colonial investment prioritised infrastructure that directly supported extractive goals such as railways to move goods from the interior to coastal ports, along with plantations and cash-crop schemes.[232] Under British rule, limited financial capacity further constrained infrastructural and institutional development. The emphasis on indirect rule discouraged the growth of an urban African elite and stifled the emergence of a domestic professional class capable of articulating and pursuing alternative development trajectories.[233] As such, while the dam remained dormant, it continued to echo the colonial logic of resource control and river mastery, demonstrating how historical imaginaries can persist and shape infrastructural futures long after their origin.

However, the FAO report served as a foundation for ongoing basin development from the late 1950s onward, through the post-colonial period. The report highlighted Tanganyika's significant agricultural potential, which exceeded that of Kenya and Uganda combined. It emphasised the need for increased investment in land development and initiatives to expand arable land. In particular, the report identified the Rufiji River Basin as having some of the most fertile soils in East Africa. Consequently, the FAO recommended the construction of flood control dams in the area.[234] The Colonial goals of agricultural production based on mechanisation and irrigation gave way to grand visions of a large dam at Stiegler's Gorge with the rise of post-war development science.

As Tanganyika's independence approached, the FAO team finalised the feasibility reports that would later be presented to the independent government of Tanganyika. The seven-volume study included information on the basin's topography, hydrology and soil conditions, as well as the first quantified presentation of the seasonal variation

232 See for the economic policy in German East Africa e.g. Juhani Koponen, Development for Exploitation: German Colonial Policies in Mainland Tanzania, 1884–1914 (Münster: LIT, 1995).

233 See for the history of German East Africa/Tanganyika/Tanzania generally John Iliffe, *A Modern History of Tanganyika* (Cambridge: Cambridge University Press, 1979).

234 TNA 532/22/32/1, Letter to Member for Agriculture and Natural Resources 1 May 1954; TNA, Press release: Pilot for irrigation and Agriculture; Press release, 29 August 1959.

in flow for the basin's main rivers and their tributaries. The report included charts, graphs and tables that challenged colonial perceptions of the basin's riches. Where colonial surveyors saw the Rufiji as a potential source of sacks and bundles of rice and cotton, the experts saw it as a source of megawatts of electricity.[235]

The Rufiji Basin Survey serves as a case study for understanding how Western technological advances transformed the Rufiji environment into a science-based discourse. This transformation was spearheaded by experts from a variety of disciplines, including engineers, surveyors, hydrologists and agronomists. These specialists introduced a new paradigm for river basin planning that prioritised hydropower generation over agricultural development. This demonstrates that the travelling of ideas to the Rufiji Basin is a historical process, evolving in response to changing global circumstances and helping landscapes.

3.7 Conclusion

This chapter has provided the context necessary to understand the Rufiji Basin as a landscape with a rich history and significant geography. The basin's physical features, including its vast floodplains, rivers and ecological zones, have long attracted the interest of outsiders, from early colonial explorers to post-war planners. The history of Stiegler's Gorge, named after the unfortunate German surveyor, reflects the early colonial desire to map, measure and ultimately exploit the region's hydrological potential for imperial purposes. Although these ambitions were interrupted by political transitions and war, the gorge remained symbolically embedded in developmental visions.

The establishment and expansion of the Selous Game Reserve further illustrate how colonial regimes framed the region as a place for both conservation and exclusion. The strategic consolidation of wildlife zones under British authority transformed the Rufiji landscape into a protected frontier, limiting local agency and embedding conservation within state-making processes. These colonial legacies would later shape and, in some cases, constrain developmental interventions in the basin, particularly those aimed at infrastructural transformation.

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235 FAO, "Rufiji Basin, Tanganyika":45.

Taken together, the geographical, historical and political features of the Rufiji Basin highlight the interplay of space, memory and power. These elements are crucial to understanding how Stiegler's Gorge idea evolved from an obscure colonial surveying site into a focal point for national development ambitions. Chapter four shifts the focus to post-independence Tanzania, where the vision of harnessing water resources for energy and development gained renewed momentum. The chapter examines how hydropower planning unfolded in the decades after independence, how the state framed such projects as symbols of modernity and sovereignty, and how ambitions rooted in Stiegler's Gorge were repurposed to serve new political and developmental agendas.

CHAPTER IV

HISTORICAL TRAJECTORIES OF HYDROPOWER: STATE VISIONS AND ENERGY POLICY IN TANZANIA, 1961–2010s

4.1 Introduction

This chapter examines the historical trajectories of hydropower development in Tanzania from independence in 1961 through to the 2010s, with particular attention to how shifting state ideologies, policy transformations, and global development trends shaped energy planning. Rather than presenting hydropower as a purely technical solution to electricity shortages, the chapter argues that it became a powerful symbol of nation-building, modernisation, and state authority. From the optimism of post-independence planning and the influence of socialist ideals to the restructuring efforts of the neoliberal era, Tanzania's energy policy oscillated between bold ambition and political constraint. The chapter situates dam-building initiatives within broader debates on postcolonial governance, showing how international aid, donor influence, and geopolitical shifts intersect with national development goals. Through this lens, hydropower infrastructure emerges not only as a material investment but also as an expression of temporal and ideological aspirations. Understanding these historical foundations is essential to grasping the complex legacy of Stiegler's Gorge Dam, why it stalled for decades, and why it later regained prominence. This chapter lays the groundwork for the deeper institutional and transnational analysis in the chapters that follow.

The development of hydropower in Tanzania did not occur in isolation. It was influenced by global technological trends, colonial legacies, and shifting priorities after independence. The next section provides a historical overview of hydropower's evolution, tracing its global emergence and the early introduction of dam technologies in Africa to contextualise these developments. This background sheds light on how hydropower became embedded in national development narratives and explains why large-scale dam projects were so integral to state-building agendas in the postcolonial era.

4.2 A Brief History of Hydropower

Hydropower has a rich and extensive history spanning thousands of years, dating back to ancient civilisations.[236] In the 1700s, the development of hydropower significantly advanced milling and pumping capabilities. The 1800s saw further development of water turbine technology, culminating in the installation of the world's first hydropower station at Rothburg, England, in 1870.[237] Industrial applications of hydropower soon followed, marking the beginning of a new era in renewable energy production. For example, in 1880 in Grand Rapids, Michigan, and later in 1881 at Niagara Falls, New York. The rise of hydroelectricity also spread worldwide. The first three-phase hydroelectric plant was built in Germany in 1891, and the first public plant in the southern hemisphere was built in Austria in 1895. In addition, a 500KV hydropower plant was built on Xindian Creek near Taipei in 1905, followed by the first plant in China (Shilongba), which became operational in 1912.[238]

Efforts to harness hydropower were also made during colonial times. In Africa, for example, by the British in Cape Town and Nairobi for urban consumption and by the French in Nigeria for zinc production.[239] Plants with large reservoirs were introduced, such as the low Aswan Dam in Egypt in 1912, which led a consortium of German and Italian companies to propose a combination of hydroelectric power generation and an adjacent nitrogen fertiliser factory. According to Shower, the vast hydroelectric potential of central Africa was a source of both excitement and frustration for colonial governments in the early 20th century. Despite this potential, there were no clear customers within transmission distance. Large hydropower plants remained a distant dream until technological advances and the growth of industrial and manufacturing sectors made them economically viable.[240] A major surge in hydropower installations in Africa began in the 1930s and grew with the mining sector, expanding during the

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236 Andreas N. Angelakis, Alper Baba, Mohammad Valipour, Jörg Dietrich, Elahe Fallah-Mehdipour, Jens Krasilnikoff, Esra Bilgic, C. Passchier, V. Tzanakakis, R. Kumar, Z. Min, N. Dercas, and Ahmed, "Water Dams: From Ancient to Present Times and into the Future," *Water* 16, no. 13 (2024): 1889.

237 Pierre-Louis Viollet, *Water Engineering in Ancient Civilizations: 5,000 years of History*, (CRC Press, 2007).

238 Viollet, "Water engineering"

239 Kate Showers, "Electrifying Africa: An Environmental History with Policy Implications," *Geografiska Annaler*: Series B, Human Geography 93, no. 3 (2011): 193-221.

240 Showers, " Electrifying Africa":196-197.

post-war demand for minerals, European reconstruction programmes and the resulting economic boom.

Hveding's work points out that since the turn of the 20th century, the size of hydropower projects increased significantly, accompanied by the engineering of large reservoirs. In Europe, especially in Scandinavia, the Alps and the Pyrenees, Norway's hydropower was the country's leading source of energy, and the company 'NORSK HYDRO' was the key player in hydropower development. In France, hydroelectric power also drove industrialisation, particularly on the Rhône and Garonne rivers in the Alps.[241]

After WWI, engineers worked intensively on transmission lines and the interconnection of plants. At the same time, politicians were drafting concession laws that declared water management a matter of public interest. In Spain, for example, during the Franco dictatorship, major hydropower schemes were implemented nationwide, with around 600 dams built between 1939 and 1975.[242] Hydropower also brought industrialisation to Italy, which by then ranked third worldwide in hydropower development.[243]

Similarly, in the US, the Army Corps of Engineers was authorised by Congress to build hydroelectric dams across the country. The TVA was created in the 1930s and became the world's foremost authority on dam building and river management.[244] With such ambition, the Hoover Dam was built in 1936 to provide irrigation water, flood control, and a water supply. Shasta and Grand Coulee dams were also built and made a significant contribution to the US war industry in the 1940s.[245] These first projects were glorified as 'engineering marvels', driving national economic growth through industrialisation and progress.

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241 NAN, 0010, RA-PA-1700, Norsk Hydro; See also, Vidkunn Hveding, Hydropower Development in Norway, (Norwegian Institute of Technology, Department of Hydraulic Engineering, 1992).

242 Erik Swyngedouw, *Liquid Power: Water and Contested Modernities in Spain, 1898-2010*," (Cambridge, MA: MIT Press, 2015):1898-2010.

243 Marco Armiero, & Rugged Nation, "Mountains and the Making of Modern Italy: Nineteenth and Twentieth Centuries," (White Horse, 2011).

244 Congressional Records: Proceedings and Debates of the Second Session 87th Congress, vol. 108, part 8, June 11, 1962, to June 22, 1962), (United States Government Printing Office, Washington, 1962. (Ngram online database).

245 McCully," Silenced Rivers"

From the 1960s onwards, large hydropower developments were carried out in various parts of the world, including the USSR, Canada, Latin America, Africa, India, China, and other countries. This decade saw an increase in the development of multipurpose dams, in which hydropower components were added to larger water storage and flood control systems.[246] In Canada, for example, high-voltage transmission technology revolutionised the electricity sector, enabling the harnessing of hydropower. However, growing opposition to large dams from environmentalists and the WCD forced delays, stalling, and the cancellation of several projects from the 1980s onwards. A good example was the Site C dam on the Peace River in British Columbia.[247]

Large-scale hydropower was carried out in Africa, particularly around mining and industrial sites. The Kariba Dam on the Zambezi, the Inga Falls on the Congolese Ruhr, and further industrialisation took place on the Volta River in Ghana, one of Africa's first and most prominent examples of river basin planning. The Akosombo Dam was built in the Volta project primarily for Ghana's bauxite deposits to produce aluminium. Its centrepiece, the 80-metre-high Akosombo Dam, was heralded as "a solid symbol in the dream of prosperity" when commissioned on 24 January 1966.[248] Some scholars linked these to technological breakthroughs that confirmed Britain as a major dam-building nation.[249] The Kariba and Aswan dams ushered in the era of large dams. Governments of independent states continued down this path of hydropower development, with former colonial masters lending a helping hand.[250] Support also came from foreign development agencies or bilateral agreements with the IMF and WB, the UN Development Programme, development agencies such as SIDA and NORAD,

246 McCully, "Silenced Rivers"

247 Patrick McCully, "The Use of a Trilateral Network: An Activist's Perspective on the Formation of the World Commission on Dams," *Amsterdam University Int'l Law. Rev*. 16 (2000): 1453.

248 Jonas Van der Straeten, "Measuring Progress in Megawatt: Colonialism, Development, and the "Unseeing" Electricity Grid in East Africa, *International Journal of the History of Science and its Cultural Aspects* 63no.4(2021):651-674.

249 Showers, " Electrifying Africa":197; Heather Hoag, *Developing the Rivers of East and West Africa: An Environmental History*, (London, New Delhi, NY, and Sydney: Bloomsbury, 2013).

250 Julia Tischler, *Light and Power for a Multiracial Nation: The Kariba Dam Scheme in the Central African Federation,* (New York: Palgrave Macmillan, 2013); McCully, "Silenced Rivers".

and aid agencies such as USAID.[251] Tanzania was not behind in embracing such a development as part of its post-independence modernisation strategy.[252]

Following independence, Tanzania embarked on an ambitious program to construct dams and hydropower plants. This initiative aimed to expand agriculture and address the growing nationwide demand for electricity. The state-owned utility company, TANESCO, played a crucial role in coordinating this effort.[253] The first hydropower plant was built at Hale in the Pangani Basin in 1964, followed by a second plant further upstream in 1969, and the two interconnected dams and hydropower plants of Kidatu and Mtera on the upper catchment of the Rufiji Basin in 1975 and 1981, respectively.[254] While the idea of building a large dam at Stiegler's Gorge on the Rufiji River remained unrealised during Nyerere's tenure, the ambitious project was revived six decades later, despite fierce opposition from international organisations and foreign donors who argued that conservation and biodiversity should be a priority. Detailed discussions about the planning and development of Stiegler's Gorge Dam are presented in chapters 5 and 6 of this thesis.

4.3 Early Initiatives, Colonial Legacy and Future Prospects

The Rufiji Basin Survey of the 1950s marked the start of the formal planning phase for hydropower dam development in the region. The original Rufiji Basin Survey incurred significant costs, £727,000, of which £520,000 was provided by the Colonial Development and Welfare Fund and £207,000 by the FAO.[255] The primary objective of the survey was to optimise the utilisation of the Rufiji Basin's potential among multiple stakeholders through a multipurpose project. The colonial administration sought to expand its influence by providing developmental assistance to Tanganyika. This comprehensive study laid the groundwork for future infrastructure projects in the area.

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251 May-Britt Öhman, "Taming Exotic Beauties: Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s-1990s," (PhD Diss., KTH Royal Institute of Technology, 2007); Kate B. Showers, "Water Scarcity and Urban Africa: An Overview of Urban-rural Water Linkages," *Water development* 30no.4(2002):621-648.

252 SNA, F1AG1 224-242, Cooperation with the World Bank, 1966-1984.

253 SNA, SIDA TAN-DCO,2821, Development Cooperation Report, Stockholm, 1991

254 Van der Straeten, "Measuring Progress in Megawatt":651-674; Jonas Van der Straeten, "Electrification in Tanzania from a Historical Perspective–Discourses of Development and the Marginalization of the Rural Poor," *Micro Perspectives for Decentralized Energy Supply* (2015): 156.

255 FAO, "The Rufiji Basin Tanganyika": 8.

Following the FAO survey, the Tanzanian socialist government undertook additional research efforts throughout the 1960s and 1970s. These subsequent studies aimed to gather more detailed information about the basin's potential for a multipurpose dam, including agriculture and flood control. However, foreign planners shifted the focus of planning from multipurpose to hydropower projects to suit their interests.

The early days of Tanzania's independence were characterised by a delicate dance between maintaining existing structures and implementing transformative change. When Tanganyika attained independence from British colonial rule in December 1961, it inherited an electricity sector run by the Tanganyika Electric Supply Company (TANESCO) established in 1957.[256] Future-making meant building national plans and looking back to what already existed. The legacy of colonial rule continued to influence and shape the country's administrative systems, political landscape and economic vision. As Tanzania moved forward, it faced the challenge of reconciling historical continuity with the pressing need for development and progress.[257] Tanzania relied heavily on the export of cash crops such as cotton, coffee, sisal and pyrethrum, and on import-substitution industries owned largely by European entrepreneurs.[258] In terms of infrastructure, the legacy of colonial planning left many basic facilities throughout the country largely underdeveloped. Roads and railways suffered from poor maintenance and were often incomplete. The energy sector lagged, with poorly maintained infrastructure and power generation relying mainly on costly thermal technology, lacking both capacity and expansion efforts. Large-scale hydropower plants remained a fantasy until technological advances and industrial development made them economically feasible.[259]

Hydropower came from three main sources. The largest contributor was the Pangani Falls in Tanga province, with a capacity of 17,500 kilowatts, while the Kikuletwa River, south of Moshi, produced 1,160 kilowatts. Finally, the Mbeya and Iringa power stations in the southern highlands contributed 340 kilowatts. Together, these plants provided

256 NAN, TAN 006-272, Tanzania: TANESCO General Manager,1988-1989.

257 Lindner Schneider, "Colonial Legacies and Postcolonial Authoritarianism in Tanzania: Connects and Disconnects," *African Studies Review*, *49* no.1(2006):93–118.

258 Andrew Coulson, *Tanzania: A Political Economy*, 2nd ed. (Oxford: Oxford University Press, 2013).

259 Schneider, "Colonial Legacies".

about 21 megawatts of hydropower for the whole country.[260] At that time, however, there was no national grid; each power system operated in isolation. Electricity consumption patterns revealed interesting demographics. Approximately 30,912 households had access to electricity throughout the territory. Notably, the majority of these consumers were European and Asian business owners and executives who held prominent positions in the civil service.[261] In contrast, only a small fraction of African colonial government employees had access to electricity, highlighting a significant disparity in energy access across groups.[262] However, during the British colonial era, the distribution of electricity wasn't solely orchestrated by imperial strategies. While Europeans and Indians enjoyed greater privileges in terms of access, a variety of institutional, economic and technological factors, such as the lack of economic power to pay electricity bills, poor housing conditions, poor safety measures and technical electricity regulations, contributed to the late electrification of Africans, rather than explicit colonial racial policies.[263]

Although the British had a strong interest in irrigated agriculture, the development of dams for electricity generation was also an important aspect of development in Tanzania. After the Second World War, the British colonial administration shifted its focus to integrated socio-economic development, which was accompanied by the rise of the interventionist developmental state and a vision of applying technical and scientific progress through state intervention. As a newly independent country, the Tanzanian government associated modernisation and engineering programmes with power and development measured in megawatts. [264] According to Scott, large infrastructures such as dams were emblems of development. Nyerere, the first president of Tanzania, adopted the colonialist view that successful economic development required a strong state. His ideas for modernisation included large

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260 Bashir A. Datoo, "East African Record the Generation of Hydro-electric Power on the Lower Pangani River," *East African Geographical Review*, 3 (1965): 47-49.

261 Datoo, "The Generation of Hydroelectric Power": 48.

262 EAF-UDSM Library, URT, Annual Report 1961, (The Ministry of Communications, Power and Works; Dar es Salaam, 1961): 102; EAF-UDSM Library: Development Plans for Tanganyika 1961/1962–1963-196.

263 Emmanuel L. Mchome, 'Blackout Blues': A Socio-cultural History of Vulnerable Electricity Networks and Resilient Users in Dar es Salaam, 1920–2020,(PhD thesis, Technical University of Darmstadt,2022).

264 Van der Straeten, "Measuring Progress in Megawatt":651 -674.

infrastructure projects, such as dams. The pursuit of electricity as a modernising and developmental force for state-led development coincided with the global rise of an ideology of multi-purpose river basin planning.[265]

For Nyerere, the development of hydropower was a key strategy to combat the nation's main enemies: ignorance, disease and poverty. He saw dams as a multi-faceted solution, not only for power generation but also for effective water resource management, particularly for the irrigation of agricultural land. This is why Tanzania's planning for Stiegler's Dam did not focus only on hydropower but also on agriculture and flood control.[266] Beyond their practical applications, dams were seen as tangible manifestations of modern development and reflections of state authority. These infrastructure projects were an integral part of post-colonial intervention, aimed at reviving a peasant economy devastated by colonial rule.[267] Recognising the importance of hydropower development, the government prioritised it in national socio-economic plans from the early years of independence through to the 1980s. This strategic focus underscored the government's commitment to using power generation and distribution as a catalyst for broad-based national growth and transformation.[268]

The transition from British colonial rule to independence in Tanganyika did not lead to radical changes in Tanzania's foreign and domestic policies. In particular, infrastructure development continued to benefit from the stable diplomatic relations between Tanzania and Britain during the early years of independence.[269] The British continued to fund most of the development projects they had started in the 1950s. As mentioned in chapter three, before independence, the British and Tanganyika

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265 Scott, "*Seeing like a State*"

266 CCM Library-Dodoma: Julius Nyerere, "TANU na Raia", Dar es Salaam, 1962; URT, Hansard, The Government of Tanganyika, Official Parliamentary Debates in the National Assembly, Minister's Speech, 30th June 1964):914; URT, The Second Five-Year Plan for Economic and Social Development, 1, July 1969-30, June 1974, Vol.1, General Analysis, (Dar es Salaam: Government Printer 1969):120- 121.

267 URT, Hansard, the Government of Tanganyika, Official Parliamentary Debates in the National Assembly, (10th Meeting), Minister's Speech, 30th June 1964):915.

268 URT, Hansard, A. K. Hanga, Minister for Industries, Commerce and Power, "The Government of Tanganyika, Parliamentary Debates: National Assembly Official Report (10th Meeting), Speech, (30th June 1964):909; Hansard: Official Parliamentary Debates in National Assembly, (10 Meeting), Minister's Speech, 30 June 1964):914-5.

269 Arrigo Pallotti, "Post-colonial Nation Building and Southern African Liberation: Tanzania and the Break of Diplomatic Relations with the United Kingdom, 1965–1968," *African Historical Review* 41, no. 2 (2009): 60-84.

governments had agreed to build the Hale Hydroelectric Project at Pangani Falls, for which the Colonial Development Corporation in London would provide £3 million, and the Tanganyika government would contribute £1.75 million. This made the Hale project the first post-colonial hydroelectric dam, with a generating capacity of 21 megawatts, the largest in the country.[270]

At the inauguration of the Hale Hydropower Station in 1965, Nyerere made a decisive statement about Tanzania's future energy landscape. With unwavering conviction, he emphasised the crucial technological role of hydropower in driving national development. His vision was clear: to harness the power of water to transform the lives of Tanzanians and propel the country towards economic prosperity. He said;

> *"Schemes like this one (Hale hydropower project) are in fact bricks and mortar evidence of the revolution which Tanzania is deliberately and purposely undergoing. It represents the application of science and technology to the needs of the people."*[271]

In 1967, Julius Nyerere reaffirmed his commitment to socialism with the Arusha Declaration. This landmark document outlined a vision for Tanzania's development that emphasised small-scale farming, village-level cooperation and the preservation of traditional knowledge systems.[272] Nyerere aimed to organise communities around villages, making it easier for rural people to access basic services. In one of his early speeches, he said;

> *"And if you ask me why the government wants us to live in villages, the answer is just as simple: If we don't, we won't be able to provide ourselves with the things we need to develop our land and raise our standard of living. We will not be able to use tractors; it will be quite impossible to start small industries in the villages, and instead, we will have to continue to depend on the cities for all our needs; even if we have an abundant supply of electricity, we would never be able to bring it to every isolated homestead."*[273]

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270 URT, Development Plans for Tanganyika 1961/1962–1963-1964; Datoo, "The Generation of Hydroelectric Power": 3:47-49.

271 TNA: News Review, "Mwalimu Opens Hydroelectric Plant" January 1965; Also cited in for example, Hoag & Öhman, Turning Water into Power":624-651; "Designing the Delta"; Van der Straten, "Transmitting Development"

272 Coulson, "Tanzania":1-5.

273 URT, Hansard: "Julius Kambarage Nyerere: President's Inaugural Address," (10th December 1962); Also cited in Scott, "Seeing like State"; Van der Straten, "Transmitting Development".

Using technology, the government wanted to build dams to generate electricity, not only to power the industry but also to supply villages.

Drawing particularly on Öhman's notion of the 'technoscientific artefact', which refers to complex systems that combine scientific knowledge, technology and social practices.[274]The Hale hydropower project revealed the role of technology as an instrument of British expansion and continued domination. It shows how expertise and technology were integrated into Tanzanian development, a 'technoscientific artefact in action'. However, how knowledge was colonially designed represented a Eurocentric perspective that brought about European domination and shaped the minds of the colonised.[275]

Despite this, there were calls from the ruling TANU party and its leader, Nyerere, to embrace Africanisation and throw off the shackles of colonialism. However, this was not possible, and many sectors continued to follow the colonial political, social and economic system they were desperately trying to escape. Most infrastructure also continued to favour urban over rural areas. For example, the British company Balfour Beatty & Company Limited was involved in the construction of the Hale Hydroelectric Power Station in Dar es Salaam. As the generation infrastructure was completed, a 132-kilovolt transmission line was built to carry the hydroelectricity from Hale to Dar es Salaam. The transmission to Dar es Salaam aimed to connect the city to hydroelectric sources, as it had been dependent on expensive thermal power technologies since the first electricity installation in Tanganyika.[276]

The Hale power plant was expected to reduce the cost of importing diesel fuel for Dar es Salaam's thermal power plants, improve power reliability, and reduce power outages caused by weak, costly thermal plants. Politically, the transmission line to Dar es Salaam was significant and was hailed as an outstanding achievement in bringing electricity to Tanzania's first major city.[277] The Hale hydropower project represented a

274 Öhman, "Taming Exotic Beauties": 217.

275 Mudimbe, "The invention of Africa: Gnosis".

276 URT, The First Five-Year Plan for Economic and Social Development, 1st July 1964– 30th June 1969, Vol. I. Dar es Salaam: The Ministry of Planning, 1964.

277 "TANESCO Preparing Dar es Salaam for Hydro-Electric Power," *Tanganyika Standard*, 12th March 1963.

significant step forward in tangible development and contributed significantly to meeting the country's power demand, which was estimated to be growing at an annual rate of 12 per cent between 1964 and 1970.[278]

Continued efforts to develop hydropower in Tanzania after independence were also reflected in the construction of the *Nyumba ya Mungu* (god's house or *miungu ya Wapare na Wakahe*) dam on the Pangani River basin. The dam and power station were built to support a local fishing industry, irrigate farms and generate hydroelectric power for the towns of Moshi and Arusha. These towns had been important since colonial times for industrial and cash crops, particularly coffee. Building the dam in this area was important to support agriculture and provide electricity for economic development. At the opening of the *Nyumba ya Mungu* Dam in 1964, the Minister of Lands, Settlement and Water Development, Alhaji Tewa Said Tewa, spoke about the relationship between people and the nation's rivers. He said;

> *"Tanganyika is fortunate to have so many perennial rivers, whose water resources constitute an asset of immense value to the United Republic, for irrigation and hydroelectric power, as well as for domestic and livestock needs"*[279]

Tewa's speech underscored the importance of continued exploitation of the country's water resources for post-colonial developmentalism and the potential for hydroelectric dams to harness the basins' power for the benefit of the country's economic sectors. TANESCO estimated that electricity consumption in Tanzania would increase by 9.6 to 9.9 per cent in the 1960s due to post-colonial expansion plans. As a result, by the early 1970s, the capacity of the existing hydropower infrastructure could not meet the expected demand and needed to be expanded. This growing demand attracted the government's attention to the construction of more hydropower dams.[280]

Plans for the *Nyumba ya Mungu* Dam date back to the 1950s. In 1952, the British colonial administration carried out feasibility studies to build the dam and provide electricity

278 URT, Tanzania, Plan for Social and Economic Development, 1964-1969: 52.

279 TNA, Tanganyika News Review, "Nyumba ya Mungu Dam to Encourage Irrigation," October 1964; Also cited in Hoag, "Developing the Rivers".

280 NRC, Dodoma: Tanzania's Plan for Economic and Social Development 1969–1974:124; URT, The Second Five-Year Plan for Economic and Social Development, 1 July 1969-30 June 1974, Vol. I, (Dar es Salaam: Government Printer, 1965):122-23.

to the town of Moshi. [281] This undertaking exemplifies the continued colonial practice of prioritising urban development over rural areas. However, the feasibility study revealed that the area consisted of volcanic sand, making it impossible to build a gravity dam. Instead, the geological structure allowed for a rockfill dam.[282] The government contracted Halcrow and Partners, a British company, to design a multipurpose dam at *Nyumba ya Mungu.* The terms of reference of the project required recommendations not only on the specification and design of a dam and cost estimates, but also on water use in the basin as a whole. The final report from the Halcrow and Partners engineers addressed all the engineering and other related issues associated with the construction of a dam and reservoir at *Nyumba ya Mungu*. They recommended constructing an 8-megawatt hydroelectric dam, noting that it could be safely built at a reasonable cost.[283]

Due to financial constraints, the Tanzanian government once again sought help from Britain. Britain's funding of the *Nyumba ya Mungu* project was crucial not only for maintaining its influence in the former colony but also for safeguarding its interests in the Pangani River basin. During the colonial period, British companies built the Pangani Falls and, after independence, financed the Hale power station, both located in the lower part of the basin. The funding of *Nyumba ya Mungu* in the upper reaches of the river would ensure that British capital and companies dominate the entire Pangani River Basin, which runs through the northeastern part of the country. In October 1963, the finance minister, Paul Bomani, travelled to London to sign the financial contract for the dam project. Britain granted a loan of £2 million, of which £0.8 million was to be spent on the dam and the remainder on improving access roads and any imported materials and equipment the government needed. The Tanzanian government also funded the project with £0.7 million, while TANESCO contributed £0.53 million from its revenues to complete it.[284] Figure 10 shows Nyumba ya Mungu and Pangani Falls dams.

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281 TNA: Acc. 5 File No. 31/7, Letter from Stinger to Moshi District Commissioner, 24th April 1956.

282 TNA Acc. 5 File No. 31/7: Stinger to Moshi District Commissioner.

283 EAF-UDSM: Report by William Halcrow and Partners.

284 URT, The First Five-Year Plan for Economic and Social Development, 1 July 1964-30 June 1969, Vol. I, (Dar es Salaam: Ministry of Planning, Government Printer, 1964):57-58; Tanganyika Standard, 26th October 1963.

Figure 10: Nyumba ya Mungu Dam and Pangani Falls
Source: The Citizen Digital, 16 February 2020.

The completion of the *Nyumba ya Mungu* Dam represented an extension of British influence and the transfer of technology to post-colonial Tanzania. The British engineering firms were involved in the tendering process, and all imported materials were of British origin. Construction of the dam took four years, from 1964 to 1968, and added 8 MW to the northern power grid, which reached 15.4 MW in 1969. Electricity was transmitted from the dam to the towns of Moshi and Arusha via a 66-kilovolt line to ensure a reliable power supply.[285]

4.4 Influence of Home-grown Reforms

Although Britain played an important role in shaping development initiatives in the early years of Tanzania's independence, Tanzania itself took decisive steps towards institutional reform. These reforms were designed to centralise control over all facets of the economy, including economic, social and political activities, under the authority of the government. From the outset of its independence, Tanzania's domestic and international policies had a significant impact on the course of hydropower development. These policies not only dictated which projects could proceed but also determined the sources of funding from international and transnational donors and the selection of experts responsible for designing and constructing the necessary infrastructure.[286] The goals of socio-economic and political development guided and dictated the decisions and actions of the state. The post-independent state's meaning of development went beyond the narrow economic aspirations of material possession and

285 SNA, TAN-42.6-TANESCO, SIDA, 1965-1995.

286 URT: Parliamentary Debates, Official Report, Second Session, 17 Meeting from 26 June – 17 July 1969; URT: "The First Five-Year Plan for Economic and Social Development, 1st July 1964– 30th June 1969, Vol. I." Dar es Salaam: The Ministry of Planning, 1964.

growth of Gross Domestic Product (GDP) to human emancipation and freedom.[287] Nyerere, Tanzania's first president, linked development with freedom. For him, without freedom, there is no development, and without development, you lose your freedom. So, building infrastructure such as dams to modernise industry and agriculture was, in Tanzania's view, a means of achieving human freedom and progress.[288] When Tanzania gained its political independence in 1961, the Cold War was at its peak. The country carved its foreign policy and development path along non-alignment strategies. As a newly independent state, Tanzania did not want to take sides in the Cold War divide. Nyerere made it clear at the United Nations General Assembly in 1962 that Tanzania was, and would remain, a non-aligned country. He also insisted that if aid was to be used as a basis for interference in internal affairs, Tanzania would not take it. This was because Nyerere was aware that both the Western and Eastern blocs could provide the economic and technical assistance that Tanzania desperately needed. To gain support, as Nyerere put it in one of his speeches:

> *"We must recognise that some overseas nations will help us if they can and if they do not believe that they will be harmed in the process; other nations will help us only in the hope of some kind of return to themselves - be it diplomatic, political or economic".*[289]

Being a non-aligned country, Tanzania became the 'aid darling' of the Eastern and Western blocs for economic and technical assistance, without compromising its basic principles of independence, sovereignty and support for liberation movements. This assistance was bolstered by Nyerere's reputation as a principled, charismatic, and intellectual leader.[290] However, things did not turn out as Tanzania had hoped. Within three years of independence, the country found itself in political disputes with various countries, a situation that led Tanzania to change its foreign policy and development path.[291]

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287 Julius K. Nyerere, "Freedom and Socialism= *Uhuru na Ujamaa*: A Selection from Writings and Speeches, 1965-1967," (Dar es Salaam: Oxford University Press, 1968):24-25.

288 Nyerere, "Freedom and development":24-26.

289 Quoted from Cranford Pratt, "Foreign-Policy Issues and the Emergence of Socialism in Tanzania 1961–8," *International Journal* 30, no. 3 (1975): 445-470.

290 Michael Jennings, *Surrogates of the State: NGOs, Development, and Ujamaa in Tanzania*, (Kumarian Press, 2008).

291 Paul Bjerk, "Postcolonial Realism: Tanganyika's Foreign Policy Under Nyerere, 1960—1963," *The International Journal of African Historical Studies* 44, no. 2 (2011): 215-247.

According to Lipumba, Tanzania was embroiled in a dispute with West Germany over the union of Tanganyika and Zanzibar. Following the unification of Tanganyika and the People's Republic of Zanzibar and Pemba to form the United Republic of Tanzania on 26 April 1964, East Germany (GDR) established full diplomatic relations with the new regime and was one of the first countries to recognise and support the revolutionary government of Zanzibar. The West German Christian Democratic '*Christlich Demokratische*' government opposed the establishment of diplomatic relations between the new Union government and the GDR.[292] The Federal Republic of Germany (FRG) demanded that Zanzibar end its diplomatic relations with the German Democratic Republic. Zanzibar had a GDR consulate and Tanganyika had a FRG mission in Dar es Salaam where both missions were allowed to operate in the country to benefit from aid from both countries, in line with its policy of non-alignment.[293] However, conflicts arose over the Hallstein Doctrine, which postulated that a country that recognised the GDR was committing an unfriendly act against the FRG and would have to bear the consequences.[294] The Hallstein Doctrine[295] means that former West Germany would not establish or maintain diplomatic relations with any government that recognised East Germany at the time. To maintain its stronghold in Tanzania, the FRG therefore, promised Tanzania the technical and economic support that the GDR had offered to Zanzibar. President Nyerere saw this as blackmail and bribery. As a result, in February 1965, he announced that the East German consulate would be moved from Zanzibar to Dar es Salaam. The situation prompted the West Germans to withdraw some of their technical assistance personnel, including those involved in training the air force and the marine police. The Tanzanian government responded by expelling all West German technical personnel, and West German aid was reduced to negligible levels until the 1970s when the Social Democratic Party '*Sozial demokratische*

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292 Ibrahim H. Lipumba, Foreign Aid and Economic Development in Tanzania, in *Change in Tanzania, 1980-1998: Political and Economic Reforms as Observed by Four Tanzanian Scholars*, Sweden: SIDA, 1995):19-21.

293 Pratt, "Foreign-Policy Issues":452-58.

294 Kapepwa Tambila, Aid from the Recipient's Point of View: The Tanzanian Experience, in Dierickx, M. (ed), *Diplomacy and Development: Proceedings of the 10th International Conference of Editors of Diplomatic Documents*, (The Hague: Institute of Netherlands History,2010):82.

295 The 'Hallstein Doctrine', named after Walter Hallstein, Secretary of State in the West German Foreign Office (1951-1958), emerged at a critical time, but its roots go back even further - to the founding of the Federal Republic of Germany in 1949.

Partei' won the West German elections.[296] Tanzania was particularly against the FRG's attempt to establish diplomatic relations with Tanzania by providing economic and technological aid on the condition that the GDR or its union with Zanzibar be suspended. The aid promoted development in Tanzania, particularly in industrial production.

Relations between Tanzania and the United States were good during the Kennedy years (see Figure 11) but deteriorated after 1964 because Tanzania was critical of US-Belgian involvement in the Congo (now DRC), where they supported Tshombe, the secessionist leader of Katanga, who was responsible for the assassination of Lumumba. Tanzanian American relations were further strained by the disinformation tactics of the Cold War. In 1964, the Tanzanian embassy in Kinshasa came across documents showing that the US was planning to assassinate and overthrow Nyerere. The then foreign minister and TANU secretary-general, Oscar Salathiel Kambona, organised anti-American demonstrations across the country, while the Americans denied having any plans to assassinate Nyerere, the diplomatic damage however, had already been done.[297] Kambona was also a chairman of the OAU Liberation Committee, which was set up in Dar es Salaam in 1963. He became one of Tanzania's most prominent political figures and was widely respected, especially after he negotiated with rebel soldiers in January 1964. However, rumours circulated about his possible involvement in the rebellion.[298]

296 Lipumba, "Foreign Aid":19; Pratt, "Foreign-Policy Issues,":458; George Roberts, *Revolutionary State-making in Dar Es Salaam: African Liberation and the Global Cold War, 1961-1974*, (Cambridge University Press, 2022).

297 Lipumba, "Foreign aid": 20; Godfrey Mwakikagile, *Nyerere and Africa: End of an Era*, (New Africa Press, 2007).

298 The TANU Fall-out that spelt Doom for Kambona's Career, *The Citizen*, 20th April 2019.

Figure 11: Oscar Kambona(left) with President Nyerere and Kennedy in 1963

Source: NAN-TAN-02: Nyerere visits,1963-1970.

Tensions between Tanzania and Britain reached a boiling point over the latter's inability to prevent the Unilateral Declaration of Independence (UDI) by the white minority regime in Rhodesia (now Zimbabwe). This situation eventually led to the breakdown of diplomatic relations between the two nations. In late 1965, Tanzania implemented an OAU resolution to break diplomatic relations with Britain because it failed to remove the illegal Smith government in Rhodesia.[299] The British government responded by freezing a 7.5-million-euro loan that was planned to finance the Second Five-Year Development Plan. All British aid to Tanzania was stopped in 1968 because Tanzania refused to continue paying pensions to British retired citizens who worked for the colonial government in Tanganyika before independence.[300]

On 5th February 1967, a massive crowd of more than 100,000 people gathered at the Mnazi Mmoja grounds in Dar es Salaam. Their purpose was to hear Nyerere explain a

299 Sebastian Edwards, *Toxic Aid: Economic Collapse and Recovery in Tanzania*, (Oxford: Oxford University Press, 2014).

300 Lipumba, "Foreign aid":19-20.

groundbreaking new party manifesto, soon to be known as the Arusha Declaration. The following day, newspapers published the full text of this momentous document, "TANU's policy to build a socialist state".[301] The bottom-line quote stated; "We have been oppressed, exploited and disregarded a great deal. Now we want a revolution that will put an end to our weakness so that we will never again be exploited, oppressed or disregarded".[302] This was a development model based on the concept of *Ujamaa* 'familyhood' and was an exceptionally enduring and perhaps the most significant example of "African socialism", characterised by a conceptual focus on self-reliance, rural development and socio-economic egalitarianism.[303]

The Arusha Declaration aimed at reducing economic and technological dependence on the capitalist West based on the proper use of domestic resources.[304] It condemned Western aid as a development strategy and saw aid as an enemy of independence, freedom and self-reliance. In one of his speeches, Nyerere proclaimed that: "the development of a country is brought about by people, not by money. Money and the wealth it represent are the results and not the basis of development."[305] Nyerere identified four foundations for development: people, land, good policies and good leadership. He went on to say that "even if a nation is willing to give us all the money, we need for our development, it would be inappropriate for us to accept such assistance without asking ourselves how it would affect our independence and survival as a nation."[306] For him, self-reliance policies were strategies for building internal economic and technological capacity and uprooting all aid-related colonial remnants in the country. However, the policies of socialism and self-reliance were ambitious and

301 Masses Hail Declaration, *Nationalist*, 6th February 1967.

302 Nyerere, "Freedom and Socialism":231.

303 TANU, The Arusha Declaration and TANU's Policy on Socialism and Self-Reliance, (Dar es Salaam: Publicity Section,1967); See also, Lindner Schneider, Government *of Development. Peasants and Politicians in Postcolonial Tanzania*, (Bloomington, Indiana University Press,2014).

304 Julius Kambarage Nyerere, *The Arusha Declaration and Tanu's Policy on Socialism and Self-reliance*, (Ministry of Information and Tourism, 1968).

305 URT, Hansard: "After the Arusha Declaration: Presidential Address to the National Conference of the Tanganyika Africa Nation Union, Mwanza,"(Dar es Salaam: Ministry of Information and Tourism, 16th October 1967).

306 URT, Hansard: "Presidential address to the National Conference of the Tanganyika Africa Nation Union, Mwanza", 16th October 1967.

complex in an economically and technologically weak nation that continued to seek external assistance for its development.

Nyerere's administration simultaneously embraced progressive ideologies and implemented a comprehensive modernisation programme. This initiative included ambitious infrastructure projects, technological advances and far-reaching socio-economic restructuring, exemplified by the villagisation policy.[307] The Tanzanian government also embarked on an infrastructure development drive, focusing on the construction of dams to address the country's energy shortages. Of particular note was the Great Ruaha Hydroelectric Project, which was hailed as a catalyst for economic growth. These modernisation efforts meant industrialisation, urbanisation, population growth and improved social welfare all of which exacerbated energy demand.[308]

As the country struggled to break out of a vicious cycle of poverty, energy generation was one of the top priorities to boost the economy. Fortunately, Tanzania was blessed with a hydropower potential estimated at 6,000 installed megawatts[309], mainly concentrated in the southern part of the country, especially along the Rufiji River basin and other tributaries such as the Kilombero and the Great Ruaha, while others were in the Kagera River basin in the north-west of Tanzania, which Tanzania shares with Burundi and Rwanda to the west and Uganda to the north. [310] Other potential areas included Pangani Falls, Malagarasi, Rumakali and Mnyera.[311] The Rufiji River Basin was identified as having the highest hydropower potential in Tanzania. This potential was seen as critical to addressing the country's unreliable electricity supply, which was recognised as one of several factors hindering economic growth.[312]

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307 Coulson, "Tanzania"; Schneider, "Government of Development".

308 Janbert Kiwia, "River Resources Towards Sustainable Development of Tanzania.: A contribution of Hydropower to the Energy Security in Tanzania: Case study, Rufiji River Basin,"(2013).

309 JMT, Taarifa na Takwimu Muhimu kuhusu Sekta za Nishati na Madini, Dar es Salaam, Wizara ya Nishati na Madini, 1982.

310 Bartholomew M. Lyimo, "Energy and Sustainable Development in Tanzania," *HELIO International Energy Watch, Dar es Salaam* (8) (2006): 3-8; UNDP/WB Report,1984.

311 Eng Leonard B.Kassana, Ntungumburanye Gerard, D. Mashauri, Zelalem Hailu, D. J. Chambega, Sibilike K. Makhanu, I. S. N. Mkilaha et al. "Small Scale Hydropower for Rural Development," (2005).

312 Rufiji ni Matumaini ya Msukumo wa Uchumi Wetu, *Uhuru*, 22nd October 1976; NRC Dodoma, Rufiji Basin Survey: Extract from CHIEFSEC'S Monthly Newsletter,1.11.1956.

The Arusha Declaration clearly stated that a society should be built that is self-sufficient and free from exploitation. As a result, the main means of production, including those relevant to energy such as oil, water and electricity, were placed under the control and ownership of the people through their government. To realise these grand goals several development plans were adopted up to 1981. These included the three-year development plan (1961–1964), the first five-year development plan (1964–1969), the second five-year development plan (1969–74), and the third five-year development plan (1975– 1980).[313] The second Long Perspective Plan was launched in 1981, which among other things aimed to increase the contribution of the water and energy sector from 6.3 per cent to 8.4 per cent by the year 2000. The progress report for the first half of the five-year plan from 1964 to 1969, presented to parliament in 1967, revealed the government's ambitious plans to revitalise the country's economy. The construction of dams for the production of cheap, reliable electricity to support the industrialisation strategy had to go hand in hand with the broader development of the nation.[314] This sector of the economy contributed to national revenue generation through water use and hydropower generation.[315]

From 1961 to 1967, Tanzania's hydropower production was largely consumed domestically, with only a small share exported to neighbouring countries, particularly Kenya. In 1961, approximately 120 kWh were sold within Tanzania, compared with 23 kWh exported. Domestic sales increased steadily to 135 kWh in 1962 and 147 kWh in 1963, while exports declined to 21 kWh and 16 kWh, respectively. By 1964, domestic consumption had risen to 162 kWh, with exports falling sharply to 5 kWh. In 1965, all recorded hydropower production—about 180 kWh—was sold domestically. This upward trend continued in 1966, when domestic sales reached approximately 215 kWh, underscoring the growing priority of internal energy consumption.[316] The data show a consistent trend of rising domestic consumption and falling exports over this period.

313 Kighoma A. Malima, "Planning for self-reliance: Tanzania's Third Five-year Development Plan," *Africa Development* 4 no.1(1979): 37–56; See also, Coulson, "Tanzania".

314 JMT, Majadiliano Rasmi ya Bunge, Mkutano wa 5 wa Bunge,1967.

315 JMT, Taarifa ya Mafanikio Katika Nusu ya Kwanza ya Mpango wa Miaka Mitano Julai 1964-Juni 1969, Wizara ya Uchumi na Mipango ya Maendeleo, April 1967: 31-36.

316 URT, "National Assembly Official Report, First Session, 2nd Meeting, Sittings from 10th June 1966 to July 1966."; TANESCO: TANESCO Annual Directors' and Account Report, 1967.

However, electricity demand was also not high because there were still few industries in the country. Despite the country's transition from colonial dominance to building a national economy, it was making progress, albeit slowly.

The government's long-term strategy emphasised scientific research within river basins to identify additional areas suitable for irrigated agriculture and hydropower generation. One of the breakthroughs in these studies was the Stiegler's Gorge project in the Rufiji Basin, which was mentioned in the FAO report of the Rufiji surveys in the late 1950s. Speaking in parliament, the then Minister of Water and Energy, Mr Eliawinga (MB) said;

> *"For the 1973/74 financial year, the government intends to investigate rainfall and weather conditions, irrigation plans and the condition of river basins for the construction of hydroelectric dams. The Ruvuma, Mara, Mkondoa and Rufiji basins are among the priority areas to be studied."*[317]

The minister's statement underscored Tanzania's commitment to harnessing water resources for power generation to drive industrial growth. Despite economic turmoil in the late 1970s, due to conflicts with Uganda and rising oil prices, the government remained resolute in its pursuit of sustainable energy solutions. Through long-term planning, it sought to invest in the emerging renewable energy sector and promote economic resilience and recovery in times of crisis.

The Five-Year Plan, covering 1980/81 to 1985/86, was conceived as the first phase of the long-term plan for 1981-2000. This ambitious plan faced several challenges but achieved some successes. To achieve the plan's objectives, it was agreed that 51.4 per cent of resources would come from external sources and 48.6 per cent from internal sources.[318] For some reason, the targets were not met, and two programmes were required: the Structural Adjustment Programme (SAP) and the National Economic and Social Development Programme (NESP). These programmes postponed or cancelled all new development projects in the country.[319]

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317 JMT, Majadiliano Rasmi ya Bunge: Elinewinga, Hotuba ya Waziri Kuhusu Makadirio ya Wizara ya Maji na Nguvu za Umeme, 1973/ 74 " Juhudi za Wananchi Hoyee",1973.

318 URT, "Tanzania Five-Years Plan for the Union Development, 1986/1987–1990/1991, Vol I." Dar es Salaam: The Minister of Planning, Tanzania Mainland and Zanzibar, 1986.

319 URT, The Energy Policy, Ministry of Water, Energy and Minerals. Dar es Salaam, April 1992.

The period from 1980 to 1985 was characterised by a decline in industrial and agricultural production, which led to inflation in Tanzania. To arrest the decline, the Economic Recovery Programme (ERP) was adopted from 1986/87 to 1988/89. One of the programme's objectives was to rehabilitate the basic economic infrastructure, in particular the energy and water sectors, to fully support production in these sectors. In 1987, the ruling party, Chama Cha Mapinduzi (CCM), promulgated its party program for the period from 1987 to 2002. The program was conceived as a result of the normal process of reflection and review of the implementation of the directions contained in the Arusha declaration and further expanded by the party guidelines of 1981 and the CCM constitution of 1982.[320] The programme emphasised the importance of energy for national development and the confidence that should be placed in the development of this sector. In particular, it highlighted the country's vast potential for hydropower and other energy resources.[321]

From 1988/89 to 1992/93, the Union's second Five-year Development Plan was adopted, taking into account the experience of the difficult economic situation of 1981-1986, and relying heavily on the ERP. The economic crisis that hit the country affected the availability of foreign exchange for importing machinery for hydroelectric plant development, the rising price of oil, especially diesel, and the inability of citizens to afford energy. For these reasons, the main thrust of the government and the energy sector was on the development and use of indigenous energy sources, especially hydropower, and the efficient use of energy. Hydropower was considered the most important indigenous source of commercial energy, and the government continued to focus on expanding it to ensure its availability to support development plans (see the expansion projects in Figure 2). At the time, the country was capable of generating up to 4,000 megawatts of hydropower. In addition, it was estimated that the country had more than 80 potential sites for the construction of small hydroelectric dams.[322]

320 JMT, Mpango wa Kufufua Uchumi Tanzania, Wizara ya Mipango, Mei, 1986.

321 JMT, Mpango wa Kwanza wa Muungano wa Maendeleo ya Miaka Mitano 1981/82–1985/86.

322 JMT, Taarifa ya Serikali Juu ya Utekelezaji wa Maagizo ya Mkutano Mkuu wa Pili wa Oktoba,1982 kwa Kipindi cha Miaka Mitano Inayofuata(1982-1987), Imetolewa na Mwinyi katika Mkutano Mkuu wa Tatu wa Kawaida wa CCM, Dodoma, Oktoba,1987:52-53.

Tanzania's Renewable Energy Development and Utilisation Technologies and Activities Report revealed that, as of 2007, micro and mini-hydro projects remained of interest to the state, with several reconnaissance studies and installations in place. The specific regions in this case were Morogoro, Ruvuma, Iringa, Kagera, Kilimanjaro, Rukwa and Kigoma, and the main stakeholders were TANESCO, NGOs and the Ministry of Energy and Minerals.[323] The report identified cost variations across different fuel technology combinations for electricity generation, including renewable energy, with large hydropower schemes providing cheaper power than wind.

4.5 The Political Discourse on Dam Building and Hydropower Development

Historically, the construction of dams has been heavily influenced by the prevailing political discourse. These infrastructures have undergone significant shifts in how they are perceived within global development narratives. In the early 1960s, dams were seen as drivers of state-led transformation.[324] They were associated with political power and its intertwined role in nation-building. With the increased emphasis on socialism and the intensification of economic development and modernisation in the late 1960s and early 1970s, the era of large hydropower projects began, designed to generate electricity to power the country's industrialisation. The most notable of these was the Stiegler's Gorge project, a 2100 MW scheme on the Rufiji River. Although initially supported by the country's socialist policies and various international backers, the project failed to materialise. A detailed analysis of the delays and stalling-"ghosting"—of this project, and what they mean for the popular imagination, is given in the next chapter.

The structure of dams then changed in the 1980s with the introduction of neoliberal policies for small dams, especially through private-sector involvement.[325] As a result, few dams were built between the 1990s and the mid-2000s. Growing criticism of large, top-down infrastructure projects, including increasing evidence of their economic costs and serious doubts about their ability to deliver promised benefits, was a major reason

323 JMT, Ripoti ya Wizara ya Nishati na Madini: Taarifa na Takwimu Muhimu Kuhusu Sekta ya Nishati an Madini, Julai, 2007:20-23.

324 Scott, "Seeing Like a State"

325 Öhman, "Taming Exotic Beauties"; Maria Kaika, "Dams as Symbols of Modernization: The Urbanization of Nature between Geographical Imagination and Materiality," *Annals of the Association of American Geographers* 96, no. 2 (2006): 276-301.

for this change.[326] Scott coined the term modernity, defining it as the ordering of society and nature through the rational design of development via scientific and technological processes. The ideology also involves the intervention of the authoritarian state. Therefore, modernism not only involves ideas of development but also sees development as a political and empowering science rather than a political act of centralising power. This is particularly true, as Havnevik puts it, of 'development from above', which takes place without the consent and participation of its subjects.[327] The following figure shows the evolution of dam building.

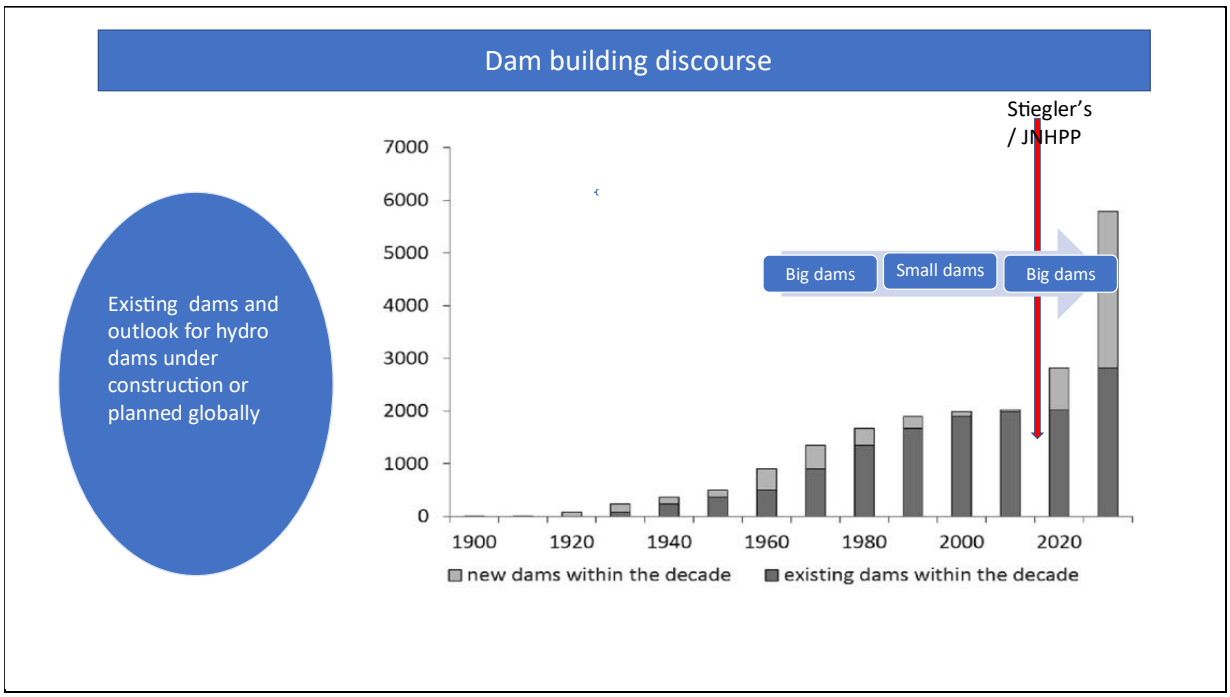

Figure 12 : Evolution of Dam Building, 1900s to 2010s, after Lehner et al. 2011

As Tanzania embraced modernity, hydropower dams became key infrastructure projects. Elaborate construction and commissioning ceremonies in various regions underscored the importance of these dams. This emphasis stemmed from the belief that electricity would serve as a catalyst for industrial growth, facilitate the movement of goods and services, and power machinery, thereby enhancing overall socio-economic development. The construction of Tanzania's hydropower dams was a monumental

326 McCully, "Silenced Rivers":3 ; Sanjeev khagram, "Dams and Development: Transnational Struggles for Water and Power," In *Dams and Development*, (Cornell University Press, 2018).

327 Scott, "Seeing like a State"; Havnevik, "Tanzania".

achievement in both economic and political terms. These projects not only showcased the country's technological prowess but also demonstrated its commitment to progress and self-reliance. By harnessing water resources, Tanzania aimed to transform its energy landscape and pave the way for sustainable economic growth. As McCully puts it, hydropower infrastructure goes beyond its functional role as a mere electricity generator and water reservoir- they are concrete, rock and earth expressions of the dominant ideology of the technological age: icons of economic development and scientific progress on a par with atomic bombs and motor cars.[328]

In this context, hydroelectric infrastructures symbolised modernity and conferred legitimacy on the authority exercised by leaders. They highlighted the contrast between the underdevelopment of the colonial era and the deliberate development efforts of post-colonial rulers. For Tanzania's ruling elite, embracing concepts of modernisation became a strategic way to secure loans and foreign aid from their former colonisers, which were essential for sustaining their economies. Africanist scholars, however, saw the theory as too "Western-centric" in nature.[329] This difference in thinking between members of the African elite and scholars led to a crisis of ideas, resulting in uncertainty, conflicts of interest and misapplication of development ideas and programmes. Even though the systems of power in Tanzania represented the deliberate efforts and capacity of the state to promote human progress.

This trend was not unique to Tanzania. Gamal Abdiel Nassar, then president of Egypt, used the Soviet-backed Aswan High Dam project between 1960 and 1970 to represent post-colonial nationhood, modernity and development.[330] Egyptian leaders and decision-makers, backed by solid justifications of the project's vitality and importance to the people's welfare, took a step forward to proceed with construction. Despite the dam's critics and the so-called megalomania of the president by the West, the dam was built in the 1960s and was seen as a model of large dams in Africa.[331] Similarly, Kwame

328 McCully, "Silenced Rivers":3.

329 Linda Sorensen, "Modernization and the Third World," *Global Studies Capstone Portfolio Project*, 410(2001):2–3.

330 AA, Abul El-Atta, *Egypt and the Nile after the Construction of the High Aswan Dam*, (Egypt Ministry of Irrigation and Land Reclamation, 1978).

331 These findings were evident in the outcome of the Executive Meeting of the International Commission on Large Dams (ICOLD), held in Cairo in 1993.

Nkrumah, then President of Ghana, used the Volta Hydroelectric Project and the Akosombo Hydroelectric Dam as 'powerful symbols of progress and modernisation' in the 1950s and 1960s. In one of his speeches, he said;

> *"Major projects like the Volta are the new 'places of pilgrimage' in this modern age of science and technology. They serve as monuments to the determination and dedication of an entire people to lift themselves to a fuller and richer life."*[332]

Nkrumah not only praised the Volta project but also eloquently described it. He strongly encouraged members of the National Assembly to make regular visits to the Akosombo site, stressing that it symbolises both development and hope for Ghana. Similarly, the commissioning of the Hale project in 1964 was a political and technological celebration of post-colonial achievement and cooperation with the former colonial power, Britain. As explained earlier, Nyerere boldly indicated that the project was about transforming the region into a modern state, but also about the bright future embedded in colonial technologies.[333] This reflected Tanzania's ambitious goal of using technology and science to transform its social structures during its heyday. The country's reliance on British scientific expertise played a key role in the development of the Hale Hydroelectric Project, which was instrumental in overcoming the economic challenges inherited from colonial rule. With the construction of the Hale project, Tanzania embarked on a journey of modernisation, focusing on upgrading its infrastructure and addressing the pressing issue of poverty among its citizens. This initiative not only symbolised the government's commitment to improving living standards but also underlined the transformative potential of government-led projects to drive national development.

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332 Quoted in Stephan F. Miescher, "Nkrumah's Baby": The Akosombo Dam and the Dream of Development in Ghana, 1952–1966," *Water History* 6 (2014): 341-366.

333 Nationalist, 26 September 1966; See also, Hoag, "Developing Rivers in East and West Africa": 180.

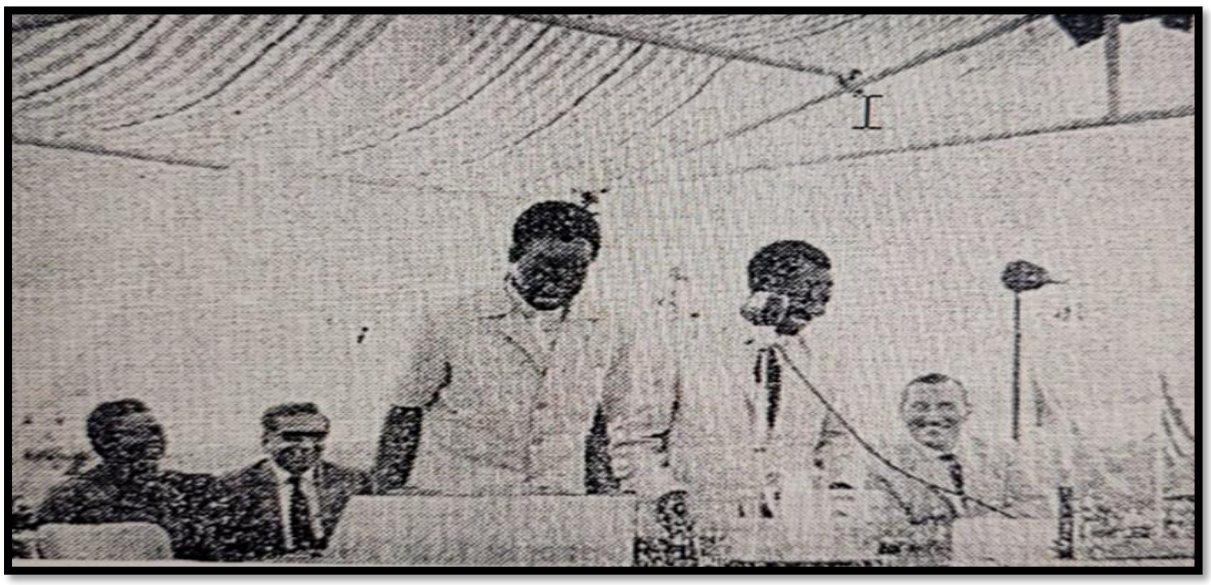

Figure 13: President Nyerere (standing on the left) at the Opening Ceremony of the Hale Hydropower Plant

Source: The Nationalist, 26 September 1966

Beyond the Hale project, the Great Ruaha Power Project was established with funding from SIDA and the World Bank, resulting in two dams along the Ruaha River. Downstream lies the Kidatu Dam, while upstream is the Mtera Dam, which serves as the primary reservoir for regulating water flow to the Kidatu Power Station during both the normal and dry seasons.[334] The Great Ruaha was hailed as a driving force behind Tanzania's economic growth. Its significance lay not only in hydroelectricity but also in how technological advances influenced post-colonial leaders' aspirations for national development.[335] In November 1971, the Minister of Water Development and Power, Wilbert Chagula, launched the main construction works by blasting a 3000-metre cube of rock, a move that symbolised the mix of technologies and political motives in addressing Tanzania's post-colonial challenges. The Tanzanian Minister of Water and Power, following Nkrumah's example, encouraged frequent visits to the dam site. He instructed TANESCO officials and Swedish contractors to arrange presidential tours at each stage of construction. This initiative served as a testament to Tanzania's socialist

334 See, Öhman, Taming Exotic Beauties"; Martin Walsh, "The Not-so-Great Ruaha and Hidden Histories of an Environmental Panic in Tanzania," *Journal of Eastern African Studies* 6, no. 2 (2012): 303-335.

335 SNA, F1TAN32.1, A short description of the Great Ruaha Project, 1971.

government's remarkable achievements. Newspapers featured public displays that highlighted the knowledge, skills, technologies and cost of the construction - the application of complex and sophisticated technologies.[336]

The construction of the Kidatu Hydropower Station took place in two phases: Phase I (1970-1975). During this phase, a 40 metre high and 350 metre long rockfill dam was constructed. The Kidatu underground power station was equipped with two generating units, each with a capacity of 50 MW, for a total of 100 MW. In Phase II (1977-1981), two additional 50 MW units were installed at Kidatu, bringing the final capacity of the plant to 200 MW. Phase II also involved the building of Mtera Dam.[337]

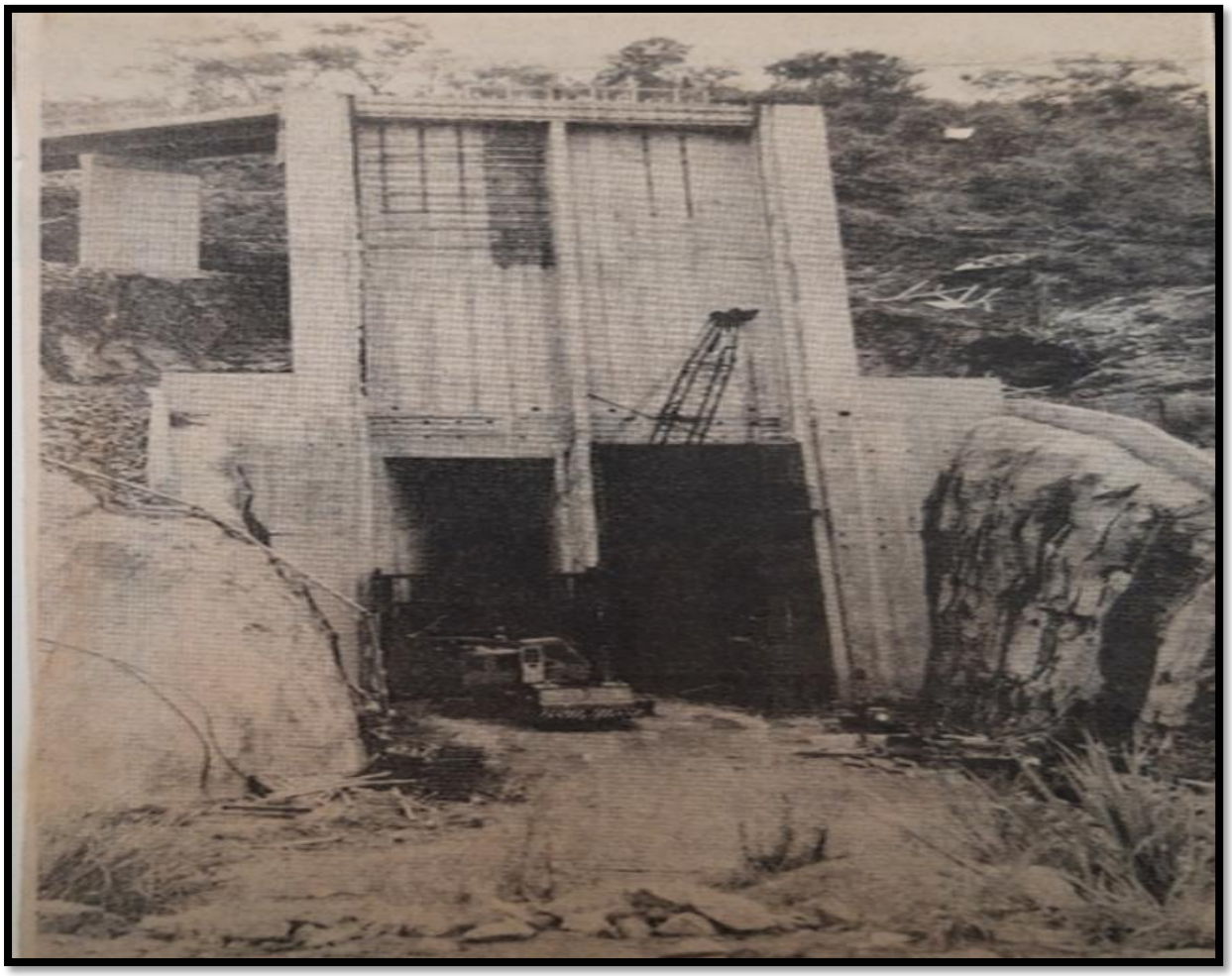

Figure 14: **Construction of the Kidatu Project in Progress**
Source: Daily News, 29 Jan. 1974.

[336] SNA, F13B: 2, "Kidatu Power to Boost Economy," *The Standard*, 27 March 1971; See also; "Kidatu Project will take Electricity to Villages," *Daily News*, 19 September 1973.

[337] SNA, F13B: 2.1, Appraisal of the Kidatu Hydroelectric Project of Tanzania Electric Supply Company Ltd Tanzania, October 8, 1970; Daily News, 19 September 1973.

According to Öhman, the project was supported by Sweden, symbolising Sweden's partnership with Tanzania's socialist development.[338] The inauguration ceremony was attended by political dignitaries, TANESCO officials, SWECO chairman, AB-SKANSKA, the main Swedish contractors and international representatives.[339] During the ceremony, Tanzanian schoolchildren sang a song saying that the electricity from the plant would spread light over Tanzania and make all opponents of socialism visible. The government saw this infrastructure as a tool to break the shackles of capitalism and as a point of departure from the former colonisers.[340]

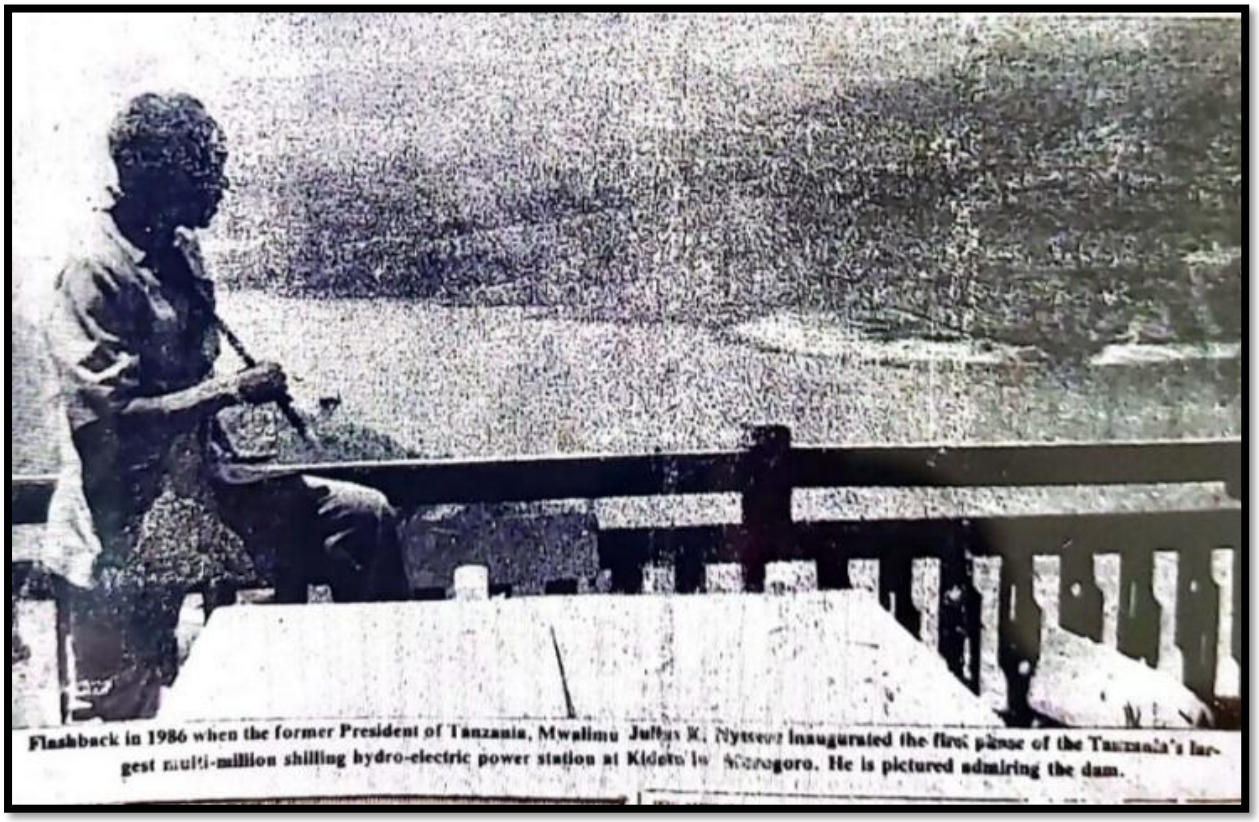

Figure 15: Flashback to 1986, when Nyerere Inaugurated the First Phase of Tanzania's Multimillion-shilling Hydroelectric Power Station at Kidatu
Source: Sunday News 26 April 1992

338 Öhman, "Taming Exotic Beauties":132.
339 SNA, F13B: 2, The Standard, Kidatu Power to Boost Economy, 27 March 1971.
340 SNA, F13B: 2, The Standard, Kidatu Power to Boost Economy, 27 March 1971.

Figure 16: Kidatu Dam in the Rufiji River Basin
Source: TANESCO, Directors and Accounts Annual Report, 2010

Similarly, the government's efforts were directed towards constructing the Mtera Dam, which officially opened on 19 February 1981 to supply the Kidatu station, with a storage capacity of 3,800 million litres.[341] The following day, the government newspaper carried big headlines announcing the dam's completion as a major solution to Tanzania's electricity problems.[342] The construction of the Mtera Dam lasted 30 months and required approximately 750 Tanzanian workers during its initial phases. Later, in its third phase, 100 Italian experts were brought in to assist with the project. This initiative transferred technical expertise from European professionals to local staff and fostered a sustainable long-term impact in Tanzania. When the international team left, many Tanzanians who had worked on the project became skilled managers, ensuring the project's continued success well beyond its initial completion.[343] This trend is consistent with the travel of ideas model, which holds that skills, technology, and money have travelled from the Global North to the Global South, impacting the process.

341 Nyerere to Inaugurate Mtera Dam Today, *Daily News*, 19th February 1981.
342 Mtera Dam Ecologically Important, *Daily News*, 20th February 1981.
343 Daily News, 20th February 1981.

Unlike the construction of Kidatu, the financing of the Mtera project required support from the World Bank and SIDA, which provided about Sh900 million to complete the project (this cost rose to 1.5 billion in 1986).[344] It allowed the addition of 100MW at Kidatu and, later, 80MW at Mtera in the III phase, providing most of the electricity consumed in the country. As it was challenged by weather and other controversial uses, it sent a threatening signal to the country. With time, farmers became the main cause of water shortages at the dam.[345]

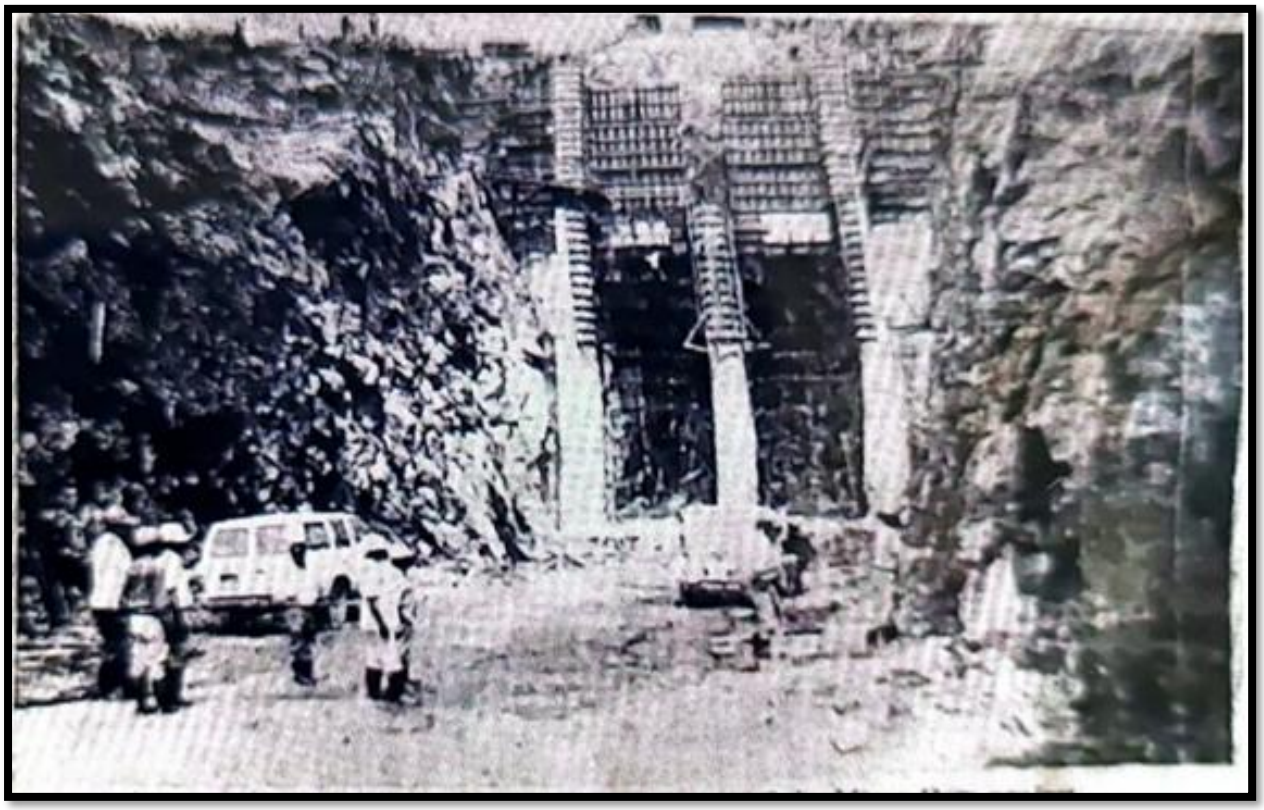

Figure 17: An Opening for Channeling Water in the Tunnel of the Mtera Dam Project
Source: Sunday News, 24 November 1976, in SNA, F13B: 1

344 SNA, F1TAN32.1, A short description of the Great Ruaha Project, 1971; Uhuru, 19th February 1981.

345 Water Crisis in Mtera Dam Worrisome, *The Guardian*, 20th February 2006.

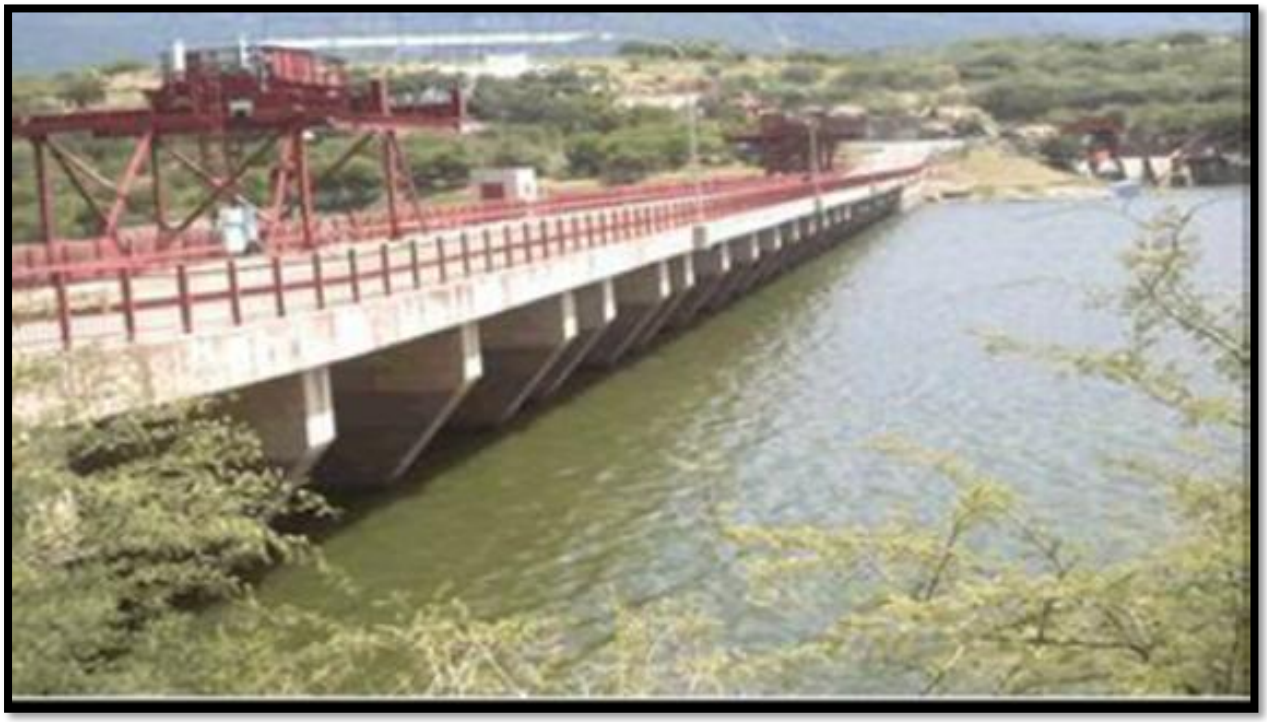

Figure 18: Mtera Dam in Rufiji River Basin
Source: TANESCO Directors and Accounts Annual Report, 2010

Later in the 1990s, the rehabilitation and redevelopment of the Pangani project received significant support from Nordic countries, particularly Sweden, Norway, and Finland. This initiative aimed to enhance the region's power generation capabilities. The Pangani project dates back to the 1930s but underwent major renovations in the early 1990s. The project involved renovating and rebuilding the old Pangani dam and installing two new turbines with a total capacity of 66 MW. The Nordic countries provided substantial financial support for this initiative, particularly Norway, Sweden and Finland. The project was implemented as a turn-key operation, with most supplies coming from abroad and including significant training for local staff. The plant was completed ahead of schedule and commissioned in 1994. Following the success of the Pangani project, international support for the Kihansi project expanded. This initiative garnered wider international backing, including contributions from Norway, Sweden, Germany, the European Investment Bank and the World Bank.[346]

From the foregoing narratives, it can be argued that hydropower development in Tanzania played a key role in the country's progress since the 1960s. Large hydropower

346 SNA, Biständskontoret, F6:1, SIDA: Tanzania Development Cooperation Report, 1987-1991.

projects are politically symbolic, demonstrating the authority of the state and its leaders and their commitment to meeting the development needs of the population. These projects served as a tangible demonstration of what a modern country should be, demonstrating the influence and vision of its leaders. The primary motivation for developing hydropower infrastructure after independence stemmed from its critical role in national development. Government publications and engineering projects highlighted these structures as essential for powering urban centres, factories and rural communities. This focus was intended to improve the delivery of social services and stimulate economic growth through industrialisation. However, questions have arisen about the true beneficiaries of these infrastructure projects. This analysis shows that the legacy of colonialism continued to influence decision-making, favouring urban over rural areas. The Hale Dam project, for example, was designed primarily to provide electricity to Dar es Salaam, Arusha and Moshi to industrialise these regions, rather than to meet broader national needs. Engineers for the Kidatu project consistently emphasised its potential to support industrial growth in Dar es Salaam, the Southern Highlands, Arusha and Moshi. They also highlighted its role in generating electricity for socialist villages and in the construction of the TAZARA in the 1970s.[347] It is important to note that even the villages targeted for electrification had political implications: Chamwino village in Dodoma, where the capital was to be relocated, and Butiama village, Nyerere's birthplace serve a good example.[348] These observations suggest that while hydropower projects were presented as tools for national development, they were also influenced by political considerations, regional priorities and international power structures.

Öhman's thesis emphasises that while political intentions can influence outcomes, technical considerations are equally important in technological infrastructure projects.[349] The construction of large hydropower plants symbolised the importance of electricity to national development. These initiatives demonstrated the value of international cooperation, including expertise, finance and technology, as well as the commitment of political leaders. Despite these efforts, the dams built were unable to

347 SNA, F13B: 4-5, Mwalimu Kufungua Mpango wa Kidatu, *Uhuru*, 30 October 1975.
348 NRC, File no. 450/CCU/S100/III. Ujamaa Villages General, 1972-1973.
349 Öhman, "Taming Exotic Beauties":132-133.

meet the energy demand in Tanzania. Confronted by the prospect of power shortages, more hydropower projects were proposed and approved with donor support.

4.6 Navigating Aid Dependency

The results of the Cold War era show that Tanzania's diplomatic approach led the country to receive more financial aid from Eastern Bloc and Nordic countries (Sweden, Norway, and Denmark) than from its former Western colonial powers between 1970 and 1990. Although President Nyerere viewed Western donors as untrustworthy towards impoverished nations, he had a special perspective on development aid from Nordic countries.[350] He believed that the Nordic countries had a genuine desire to transfer wealth to the poor. He expressed this view in various rhetorical speeches following Sweden's opposition to the oppression of Vietnam in the 1960s. He openly stated that he had warm feelings for Sweden and that the Swedish people support human equality and oppose imperialism.[351] Aid from these countries was perceived in Tanzania as altruistic and not interfering in the internal affairs of the state. These countries were not only major financiers but also sources of electricity expatriates and technology.[352]

Norwegian assistance was crucial in supporting the feasibility studies for the Stiegler's Gorge project, while Sweden played a dominant role in supporting the Great Ruaha project, along with the World Bank and other Nordic countries. Major repair and maintenance programmes of TANESCO-owned power systems in the 1980s also received greater economic and technical support from the Nordic countries.[353] Tanzania's financial dependence grew rapidly in contrast to the fact that in the 1960s Tanzania was a "proud and defiant state" because it had a budget surplus, but by the 1980s it had become a "shameless beggar".[354] As we shall see in the coming chapters of this thesis, this economic and technological dependence led to the suspension of Tanzania's planning process for infrastructure development, in particular the Stiegler's Gorge Dam.

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350 Lipumba, "Foreign aid":20.
351 Nyerere, "Freedom and Development": 332.
352 SNA, SIDA-TAN- DCO,2821, Development Cooperation Report, 5th August 1991.
353 SNA, SIDA-TAN- DCO,2821, 5th August 1991.
354 Mukandala, "From Proud Defiance to Beggary":31.

Throughout its history, Tanzania has received development assistance from various bilateral and multilateral partners.[355] After independence, the country lacked sufficient domestic resources to fund key development projects. As a result, it relied heavily on international aid. Initially, the United Kingdom played a key role in providing financial support. In the first two years after independence, British funding accounted for a significant proportion of the development budget.[356] Over time, however, the UK's dominance in foreign aid gradually declined. In contrast, the United States and West Germany emerged as major donors after 1963. Between 1962 and 1965, these countries significantly increased their contributions to Tanzania's development efforts.[357]

The first five-year development plan, from 1964/65 to 1969/70, was based primarily on the 1961 World Bank report entitled "Economic Development of Tanganyika". This ambitious plan aimed to secure funding from Western countries, particularly the United Kingdom, the United States of America, West Germany and the World Bank. However, political developments in Tanzania significantly impacted relations with these traditional donor nations, ultimately hampering the external financing of the development plan.[358] To address this challenge, Nyerere sought alternative sources of funding. Nyerere extended his diplomatic efforts beyond traditional Western donors to include middle powers such as Canada, the Nordic countries and the People's Republic of China.[359] This strategic move proved fruitful during Nyerere's visit to China in 1965. During his visit to China, Nyerere secured significant financial assistance in the form of an interest-free loan of 10 million euros from the Chinese, to be repaid in ten years after a ten-year grace period. More importantly, they offered an immediate grant of one million euros, half in convertible currency and half in commodity import support.[360]

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355 Netherlands Development Cooperation (NDC), (1994). Tanzania: Evaluation of the Netherlands Development Programme with Tanzania, 1970-1992. Ministry of Foreign Affairs:10

356 Lipumba, "Foreign Aid": 20-24.

357 Hyden, Goran, and Rwekaza Mukandala, (eds.), *Agencies in Foreign Aid: Comparing China, Sweden and the United States in Tanzania*, (Great Britain: Macmillan Press LTD, 1999): 1-10.

358 NRC, File no C/480.ACC/2, Diplomatic Relations and visits, 1966-1969; See also, Craford Pratt, The Critical Phase in Tanzania 1965-1968: Nyerere and the Emergence of Socialist Strategy,(Cambridge: Cambridge University Press, 1976).

359 NRC, File no C/480.ACC/3, Foreign Aid, 1965-1975.

360 NRC, File no C/480.ACC/2, Foreign Aid, 1965-1975.

Figure 19: President Nyerere*(right), *Received by Mao Zedong, Chairman of the Central Committee of the Communist Party of China, Beijing, China 19 February 1965
Source: TNA, News Review

The Chinese also agreed to build friendship textile factories, a dam, large state farms, agricultural equipment factories, village water supplies in southern Tanzania, police training schools and army barracks. Tanzania's material and political relations with China were for a time very intense, and China emerged as Tanzania's most important donor as a result of some large-scale projects, including the construction of a railway from the port of Dar es Salaam to the Zambian copper belt (TAZARA), which both Western and USSR policymakers had refused to finance.[361] Moreover, Canada and Sweden were asked to finance the military. Canada accepted to train the airwing in Tanzania and Sweden's aid concentrated on the Kibaha Education Centre.[362] In the same year, Sweden began modestly funding a rural water development programme.

Nevertheless, the development aid that flowed to Tanzania on behalf of Canada and Sweden could not compensate for the loss of aid expected from Western countries, especially West Germany and the United Kingdom. Nyerere was impressed by the

361 Jamie Monson, *Africa's Freedom Railway: How a Chinese Development Project Changed Lives and Livelihoods in Tanzania*, (Bloomington: Indiana University Press, 2009).
362 SNA, F52.3(2.32 1-4), KEC, Nordiska Tanganyika Projektet, 1962-1970.

Chinese development strategy after he visited China. This followed the decline in relations between Tanzania and the Western powers. China was viewed as a proponent and instigator of class warfare and conflict. However, in discussions amongst South-South nations, Marxism took a back seat to a united "non-white" identity, characterised by a shared past of resisting Western colonialism.[363] According to Emma Hunter, this emphasis on anti-imperialism, rather than anti-capitalism, aligned with Tanzanian attitudes. Nyerere's worldview was shaped by anti-imperialism and the pursuit of liberation. He prioritised solidarity against colonialism over Cold War divisions, which explains the strong ties between China and Tanzania. Rather than viewing China as part of the socialist camp, they saw them as a partner in South-South relations, providing aid and inspiration for both liberation struggles and economic development in African nations.[364]

The Arusha Declaration, which advocated socialism and self-reliance, was influenced by Tanzania's unfavourable experience with foreign aid from countries such as Britain, West Germany and the United States. The declaration warned that heavy reliance on external funding for development projects would undermine Tanzania's hard-won political independence.[365] The self-reliance policy aimed to limit the proportion of development spending funded by foreign aid and emphasised that excessive reliance on foreign aid could threaten a nation's sovereignty and independence. [366] In a 1976 parliamentary speech, Edward Moringe Sokoine, then Prime Minister of Tanzania, explained the country's foreign policy stance as follows;

> *"Our strategy in respect of international co-operation will continue to be on equitable redistribution of the world resources through trade rather than aid. Tanzania will continue to press for soft loans to developing countries, insist on grants whenever*

363 Jeremy Friedman, *Shadow Cold War: The Sino-Soviet Competition for the Third World*, (Chapel Hill: UNC Press Books, 2015).

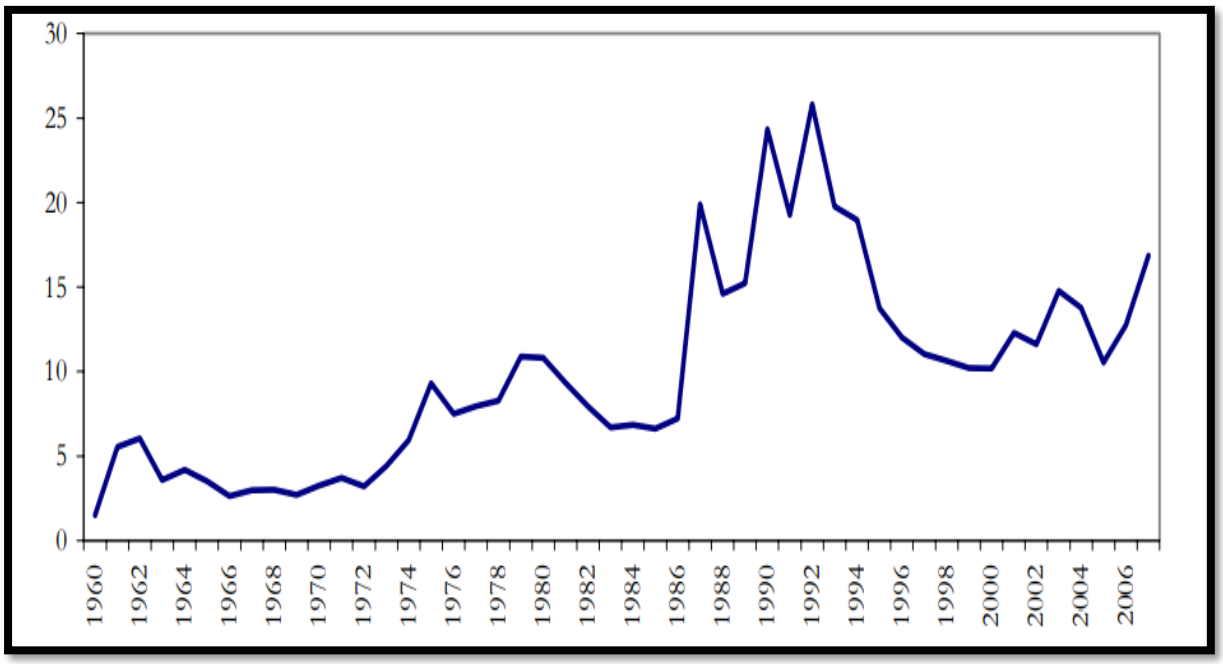
364 Emma Hunter, "Julius Nyerere" in Steven Casey and Jonathan Wright (eds.*), Mental Maps in the Era of Détente and the End of the Cold War, 1968–1991*, (Houndmills, Palgrave Macmillan, 2015): 82.

365 C.C.M Library, Dodoma Tanzania, President Julius Nyerere Paper on Socialism and Rural Development, September 1976.

366 Julius Kambarage Nyerere, *Essays on Socialism*, (Oxford University Press, 1968).

possible and fight consistently for the new international economic order."[367]

The discrepancy between public perception and reality became apparent after the implementation of this home-grown policy. Before the policy was adopted, foreign aid accounted for more than half of the government's development spending. Soon after the Arusha Declaration, however, domestic sources of funding exceeded expectations, accounting for 59.1% of development spending, while foreign aid fell to just 40.9%.[368] Despite the country's policy against foreign aid, Tanzania continued to rely on foreign aid, to finance government operations. Tanzania was one of the countries in the world that relied heavily on foreign aid to support its economy in the post-Arusha era. Prior to the Arusha Declaration, Kenya was the main recipient of donor aid within the East African region. By 1972, however, Tanzania had overtaken Kenya as the largest recipient of aid. The financial support received in the 1970s was substantial, accounting for over 5% of the country's GDP. This aid continued to increase, reaching a peak of 26% of GDP in 1992.[369] Interestingly, as an indicator of effective policy implementation, dependence on foreign aid was expected to decline (see Figure 24).



367 URT, Tanzania Third Five-Year Plan for Economic and Social Development 1976-1981, Dar es Salaam: The Ministry of Planning, 1976: 13.

368 URT, "Tanzania Third Five-Year Development Plan": 13-14.

369 URT, "The Second Five-Year Plan for Social and Economic Development, 1969 – 1974 Vol. II." Dar es Salaam: The Ministry of Finance and Planning, 1969:122.

Figure 20:Tanzania: Official Development Assistance, 1960s-2000s (% of GDP)
Source: *Adopted from IMF Report,2009, p.51*
Based on data reported by donor countries and institutions (OECD DAC Database)

This trend indicates a growing dependence over time. Aid and enthusiasm for Tanzania were enhanced by President Nyerere's extraordinary charisma. During the late 1960s and 1970s, most aid focused on large infrastructure projects, particularly hydropower initiatives such as Stiegler's Gorge, the Great Ruaha Project, TAZAMA, TAZARA, tarmac roads, water infrastructures, and bridges. At the time, the People's Republic of China was under the influence of the Cultural Revolution, which emphasised selfless international solidarity with other Third World countries. Tanzania's choice of a non-aligned policy and its warm relations with both powers, the Soviet Union and the USA encouraged the Chinese to provide economic aid to Tanzania as a showcase of true socialist solidarity.[370] The World Bank also pledged financial aid to Tanzania. The US considered Tanzania a strategic asset in its calculations and sought to prevent its government from developing closer ties with the Soviet Union.[371] However, the US continued to provide only small amounts of aid to Tanzania after the strained diplomatic relations. More importantly, the US government allowed the WB to finance Tanzania in the 1970s, at a time when the UK was lobbying to cut off all WB loans to Tanzania in protest at the nationalisation of commercial property in 1971.[372] A combination of seemingly unrelated factors made possible the rapid increase in foreign aid to Tanzania in the 1970s. The Arusha Declaration's call for self-reliance was supported by a more cooperative global community willing to help Tanzania. However, it is important to recognise that, while Tanzania had greater influence over aid allocation, donors still retained the authority to choose which sectors they wished to support.

370 Ai Ping, From Proletarian Internationalism to Mutual Development: China's Cooperation with Tanzania, 1965-95, in *Agencies in Foreign Aid: Comparing China, Sweden and the United States in Tanzania*, (Great Britain: Macmillan Press LTD, 1999):115-156.
371 Ping, "From Proletarian Internationalism to Mutual Development":115.
372 Lipumba, "Foreign aid":19-20.

Tanzania's remarkable ability to secure substantial aid stemmed from Nyerere's adeptness in pursuing an independent, non-aligned foreign policy. At the same time, he skillfully conveyed to Western social democratic leaders the humanitarian intention behind his domestic policies. These policies emphasised rural development, illiteracy eradication, accessible health services, and improved rural water infrastructure.[373] In hydropower development, donors also played a crucial role in deciding which projects to support and why. In 1986, for example, Sweden and the World Bank jointly planned the third phase of the Kidatu power station in the Great Ruaha River. Meanwhile, through the International Development Association (IDA), the World Bank pledged 420 million shillings to Tanzania to finance the Mtera Dam project.[374] While the Great Ruaha was TANESCO's best option for expanding the power supply, the government supported the small Wami project because it was a multipurpose project for power supply and other facets such as irrigation components for agricultural development and flood control.[375] The early plan (1964–1969) also included the construction of a hydropower plant at Wami as a possibility.[376] However, Tanzania faced several challenges in financing the project. It had the UN Special Fund (later UNDP) and the British River Valley Development Fund, but these were insufficient. In addition, diplomatic problems with Britain had reduced economic aid, making it difficult to implement the infrastructure.[377] To implement the Wami project, Tanzania needed financial support from donors other than Britain, the USA, and West Germany, with whom it had diplomatic conflicts in the mid-1960s. At the time, plans were underway to hire an international consulting firm to prepare an elaborate technical report that Tanzania would use to seek funding from various international agencies, particularly the World Bank.

373 NAN, TAN 002-RA-S-6794, Tanzania's President Nyerere, 1970-1979.

374 NAN, TAN 0001, SWECO - Mtera Project,1988-89.

375 SNA, SE/RA,2715, 01, Nordiska Tanganyika Projektet, 1962-1970; Öhman, "Taming Exotic":159-160.

376 URT, Tanzania First Five-Year Development Plan (1964-1969), Dar es Salaam: Planning Commission, 1964: 46-48; URT, The Second Five-Year Plan for Economic and Social Development.

377 SNA, F1AB 1387-1393, Correspondence and Reports on the Wami and Great Ruaha Power Project, 1966 -1972; Bjerk, "Postcolonial Realism": 215-247.

Tanzania turned to Sweden for support in developing its hydropower infrastructure and rural water supply systems. In the case of the Wami project, a key aspect of the partnership was that Swedish engineers identified opportunities to invest in Tanzania's hydropower sector during discussions on the development of the Wami project. [378] In October 1965, while discussing water supply projects and possible future loans with other representatives, Swedish engineer Petter Narfström heard about the Wami Hydroelectric Multipurpose Project. Narfström recognised that the project was in line with Sweden's dual-purpose development aid policy and that it would be "excellent for Swedish technology" and would have a significant impact on development in Tanzania.[379]

Discussions between Tanzania and Sweden in 1966 resulted in an agreement for TANESCO to commission SWECO, Swedish consulting engineers, to carry out feasibility studies and to apply for funding.[380] In terms of the travelling of ideas model, this indicates a flow of money, technology and expertise from Sweden to Tanzania. Based on this discussion, one could argue in whose interest this support was. Sweden played a key role in Tanzania's hydropower development, but this aid came with a trade-off. While helping to build hydropower infrastructure, Sweden also sold its technology and expertise, inadvertently making Tanzania dependent on aid.

As the largest recipient of Swedish development aid, Tanzania received substantial support – more than SEK 7.5 billion by the early 1990s. Most of this aid took the form of grants, with a focus on social sectors such as rural water supply and education.[381] Sweden and other Nordic countries had already contributed to the development of Tanzania's energy sector, focusing on the construction of hydropower plants.[382] This infusion of aid was more than just financial support; it was social capital - an essential

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378 SNA, SIDA TAN-DCO,2821, Development Cooperation Report, Stockholm, 1991; Öhman, "Taming Exotic":142.

379 SNA, F1AB 1405, SIDA. Dept. II. PN, Tanzania, Director of Water Development and Irrigation Division (WD&ID), Oct. 22, 1965.

380 SNA, F1AG1 224-242, Cooperation with the World Bank, 1966-1984; See also Öhman, "Taming Exotic":170.

381 SNA, SIDA TAN-DCO,2821, Development Cooperation Report, Stockholm, 1991.

382 NAN, 002, Hydropower General: International Hydropower Association, Hydropower and World's Energy Futures: The Role of Hydropower in Bringing Clean, Renewable Energy to the World, 2000.

milestone for the country. The intention behind this aid was to create tangible infrastructure that would support Tanzania's development. As the Swedish Africanist Hyden Goran has noted, 'the sheer volume of donor aid to African countries won't contribute to development unless it can be effectively transformed into social capital'.

Goran further claimed that;

> *"Development does not only require money and human expertise, but the resources capital and human skills must be converted into something productive on a sustainable basis. The idea of social capital is key to the development process as it encompassed a wide spectrum of activities which people do voluntarily but in a defined and regulated manner".*[383]

The tangibility of Swedish aid in Tanzania was particularly evident in support for the energy sector and the construction of hydropower plants on the Great Ruaha River. Figure 11 below shows the trend in the distribution of Swedish aid to Tanzania's energy sector from 1970 to 1984.

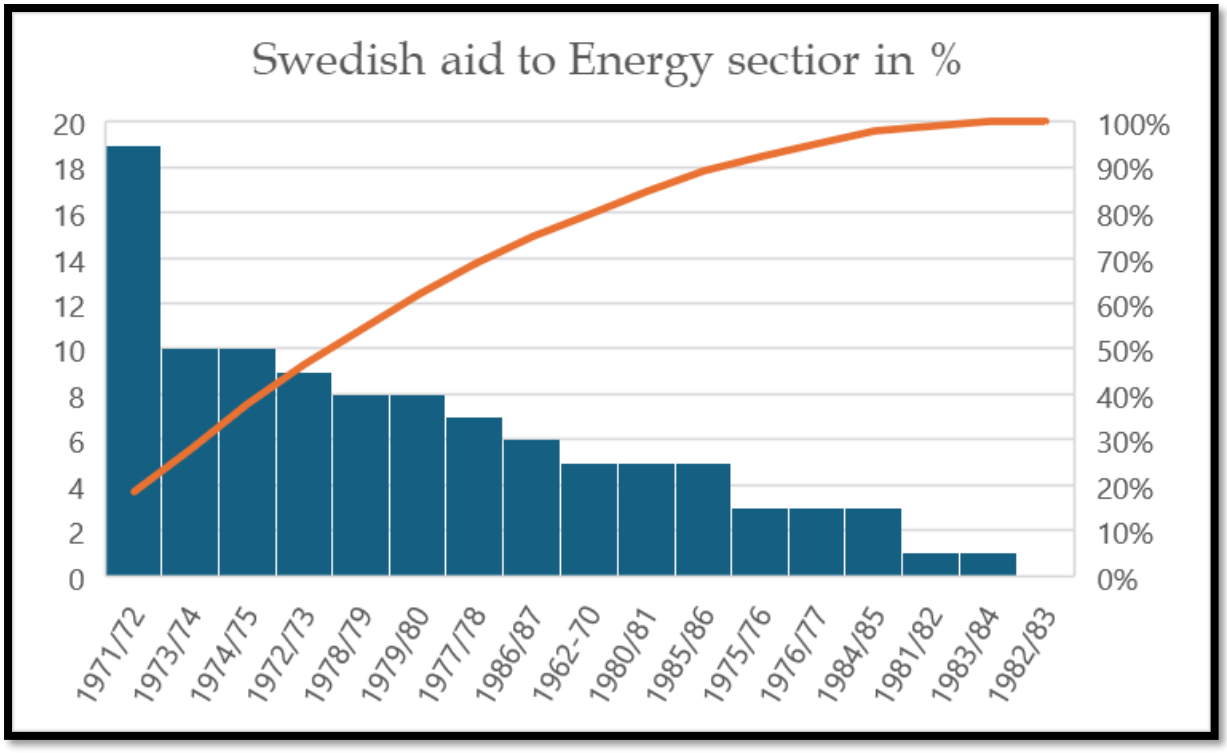

Figure 21: **Trend of Swedish Aid to the Tanzania's Energy Sector, 1970-1984**
Own illustration after Radetzki M.

383 TNA, News Review, "Challenge facing the Donor Community", undated.

In the 1970s, Swedish aid trends reflected a joint effort to promote infrastructure development and technological progress in Tanzania's emerging economy, although the landscape changed in the 1980s with the adoption of structural adjustment policies. In the 1970s, cooperation between Sweden and Tanzania in hydropower development was extensive, as Sweden had already built dams and was seeking overseas partners.[384]

Reflecting the political economy of the time, it was only when SIDA and the World Bank (WB) agreed to finance the construction of the project that the funds were found.[385] Relatively speaking, the funding problems explain why the Stiegler's Gorge project was delayed since it was first recommended in the 1960 reconnaissance survey.[386] Although the country faced a power deficit in the 1980s, it needed to start building new power plants. At the time, it was clear that more droughts were to come and that the price of fuel for electricity generation on the world market was uncertain.[387] These challenges were alluded to in a speech by Al-Noor Kassum, the then Minister of Water and Energy, at a parliamentary session. He was quite optimistic that the dam was timely and would provide the most needed solution to the country's problems. The first new units were required in 1987, and the baseline demand forecast indicated that more than 1,500 MW of new capacity would be needed by 2015. It was against this backdrop of more megawatts that the Stiegler's Dam was planned.[388]

However, the Stiegler's Gorge Dam faced significant challenges during its planning phase. A major obstacle was the lack of donor support, largely due to the political climate of the time. This was a time of increased scrutiny of large dam projects, following campaigns by the World Commission on Dams highlighting their negative environmental impacts. In addition, there seems to have been a debate about the

384 Gabrielle Winai-Ström, *Change in Tanzania, 1980-1998: Political and Economic Reforms as Observed by Four Tanzanian Scholars*, ed. (Stockholm: SIDA, 1995):15.

385 May-Britt Öhman, "On Visible Places and Invisibilized Peoples: Swedish State-supported Hydropower Exploitation of Indigenous Peoples' Territories", Baraldi, Fors & Houltz," *Taking Place: The Spatial Contexts of Science, Technology and Business* (2006): 189-221.

386 EAF UDSM Library: Tanganyika, Annual Report of the Provincial Commissioner, (Dar es Salaam, 1956): 21.

387 JMT, Majadiliano Rasmi ya Bunge, "Hotuba ya Waziri wa Maji na Nishati, akiwakilisha Bungeni Makadirio ya Matumizi Mwaka 1981/1982": 19; Also similar observations were given when the dam was opened, *Daily News,* 20th February 1981.

388 TANESCO, Tanzania Electric Supply Company Limited – Corporate Business Plan 2016/17. Dar es Salaam: TANESCO, 2016.

country's electricity needs. Some argued that Tanzania didn't need much electricity because demand was low. However, this may not be the full picture. For example, the former project engineer, Lars Silseth doubted whether Tanzania needed that much electricity from Stiegler's Gorge and rather called it a "waste of effort".[389] He adds that it was much easier and cheaper to build small power stations on other rivers. He claims.

> *"What Tanzania needs is to bring some order into its agriculture because if you look at all African dams, they are always oversized for their needs and then come all the hidden repercussions. As a result of these enormous investments in unsuitable power sources, the destruction of vegetation and the impoverishment of soils (through the use of trees, bushes, roots and manure for household fuel) has accelerated…"* [390]

More attention was to be paid to agricultural production, which was seen as more beneficial than investing in large dams, which at the time were considered unnecessary, costly, and potentially environmentally damaging. The Cabora Bassa dam in Mozambique, built in the 1970s, is an example that was subjected to the same assessment of whether it could benefit the people of Mozambique. While this massive dam was initially hailed for its hydroelectric potential, its actual impact on Mozambique's energy needs proved limited. Five years after independence, Mozambique was using less than 3% of the electricity generated by the dam. In addition, the dam's significant flood control capacity remained largely unused to benefit Mozambican citizens, according to assessments by consulting engineers Rendel Palmer and Trilton Barbara Gunnel. [391] As a result, major donors shifted their focus to funding smaller dams with less environmental impact.

At a donors' conference in Stockholm, Sweden, in 1982, the third phase of the Kidatu dam was discussed to be implemented by SWECO and WB to meet increased electricity demand caused by severe droughts in the late 1970s. According to the World Bank's assessment, the Kidatu project was the most cost-effective option among several potential sources considered at the time. In particular, it was projected to cost less than

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389 Kai curry Lindahl. (ed), The Hidden Cost of Large Dams in the Third World, in *Now newspaper*, Nov 24, 1980:63

390 Kai curry Lindahl. (ed), The Hidden Cost of Large Dams in the Third World, in *Now newspaper*, Nov 24, 1980:63

391 When will Cabora Bassa Benefit Mozambique? *NCE International Newspaper*, Nov 1980:22-23.

the fuel-fired power plant at Ubungo, Dar es Salaam. [392] The project aimed to meet the increased electricity demand resulting from recent droughts across the country and at the Mtera dam.[393]

Among the organisations and countries represented at the conference were the World Bank, Sweden, Yugoslavia, Norway, the Kuwait Fund, Italy, Canada, France and West Germany. This conference was followed by negotiations for firm commitments to fund the third phase of Kidatu. Towards the end of 1983, it was announced that the World Bank, through the International Development Association (IDA), would give Tanzania 420 million shillings to finance the Mtera dam project. Tanzania was to contribute 1,372 million shillings, while six other donors, namely SIDA, NORAD, France, Italy, the Kuwait Fund and West Germany, were to provide the foreign exchange portion of the total 2,816.4 million shillings. [394] This decision reflects strong aid support and a shift towards smaller projects during this period, balancing environmental concerns with urgent energy needs.[395] More importantly, Tanzania's strong aid relationship with Sweden reflects a shift in emphasis from providing experts to providing financial assistance, a shift that was anticipated during the previous technical assistance period; the increased aid budget necessitated the creation of new financial channels.[396]

The planning of the Stiegler's Gorge project also revealed a "dependency on aid". NORAD aid which played the dominant part may serve to illustrate the aid relationship during this period. NORAD enthusiastically took over the planning in 1971, as Jarle explained;

> *"This project has aroused the interest of the NORAD Director. It could play an important role in Tanzania's development, and it is in an area where Norway had particular expertise."*[397]

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392 SNA, WB Report of 1970. Appraisal of the Kidatu Hydropower Project of Tanzania Electric Supply Company Ltd, Tanzania, 1970: ii.

393 SNA WB Report of 1979. Project Performance Audit Report, Tanzania: Kidatu Hydroelectric Project (first stage).

394 SNA, No. 3248, Tanganyika News Papers Ltd, Dar es Salaam, July 29th, 1983:1.

395 Hilde Selbervik, "Power of the Purse? Norway as a Donor in the Conditionality Epoch 1980-2000," PhD diss., University of Bergen, Faculty of Arts, Department of History, 2003; SNA, No. 3248, Tanganyika News Papers Ltd, Dar es Salaam, July 29th 1983:1.

396 Öhman, "Taming Exoatic":170.

397 Jarle Simensen, The Norwegian -Tanzania Aid Relationship: A Historical Perspective, in Tanzania in *Transition from Nyerere to Mkapa*, (Mkuki na Nyota Publishers, 2010): 63-66.

NORAD expressed interest in supporting Tanzania because of the project's unique profit potential and capacity-building opportunities for consulting firms awarded open-ended contracts. The emphasis was on providing electricity for industry to promote the kind of hydroelectric industrialisation that Norway had experienced. Thus, Stiegler's project focused on maximising electricity production rather than flood control or irrigation.[398] NORAD-funded consulting firms conducted feasibility studies carried out from 1973 to the mid-1980s.[399] A comprehensive examination of Norway's involvement and interests in the planning and development of Stiegler's Gorge can be found in a published article[400], and chapter five of this thesis. This detailed analysis provides insight into Norway's role in this significant project.

Under the impression of looming power shortages further hydropower schemes were discussed and agreed upon with donors, first the rehabilitation and redevelopment of the Pangani Project with Nordic donors (Sweden, Finland and Norway) around the 1990s. The project aimed to revitalise the Pangani Falls hydroelectric scheme. By 1994-1995, power generation at Pangani had reached an estimated 66 megawatts, making a significant contribution to the national grid. Over the years, its contribution increased from about seventeen percent in 1995 to ten percent in 2004.[401] In addition, since 1997, SIDA planned for a post-evaluation of the PFRP to determine the long-term results of the project, considering the experience gained after ten years of operation of the plant. It was also intended to improve the management of water resources and the environmental and socio-economic aspects of the construction of future hydropower plants. Ten years after the completion of the Pangani project in 1995, a post-project review was carried out, the main conclusion of which was that the implementation of the project was technically efficient.

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398 Heather J. Hoag, "Transplanting the TVA? International Contributions to Postwar River Development in Tanzania," *Comparative Technology Transfer and Society* 4, no. 3 (2006): 247-267.

399 Simensen, "The Norwegian Tanzanian aid":57-70.

400 Emma A. Minja, "Imagining Hydropower: Transnational Narratives and Realities of the Stiegler's Gorge Project in Tanzania, the 1960s-1980s." *Zamani: Journal of African Historical Studies* 1, no. 1 (2024): 52-82.

401 Roger Andersson, Fritz Wanseth, Melinda Cuellar, and Ulrike Von Mitzlaff, "Pangani Falls Re-Development Project in Tanzania," *Sida Evaluation. Swedish International Development Cooperation Agency (SIDA), Stockholm (unpublished.)* (2006):5-12.

The Pangani hydropower scheme consisted of three hydropower stations: *Nyumba ya Mungu* (8 MW), Hale (21 MW), commissioned in 1964 and New Pangani Falls 68 MW capacity, commissioned in 1994-95. All three TANESCO plants rely on water from the *Nyumba ya Mungu* reservoir, which has a storage capacity of 800 million cubic metres and is owned by the Tanzanian government and managed by the Pangani Basin Water Board.[402] Although considered a success at the time, the Pangani project soon ran into problems of water scarcity due to seasonal variability and upstream irrigation, which were not resolved by the mandatory creation of the Pangani River Basin Authority.[403]

Several countries and institutions played an important role in the development of hydropower. While former colonial powers were involved, Sweden stood out as a central player in terms of financial support and technology. Norway and the World Bank also made significant contributions to the planning and development of the Stiegler's Gorge dam in the 1970s and 1980s.[404] Brazil and other donors were also involved. Another notable project was the construction of the Kihansi Project only a little later with a wider range of donors (Norway, Sweden and Germany, The European Investment Bank and the World Bank. Kihansi project upstream on the Rufiji River, which was completed in 2000.[405] Despite these efforts, not all projects came to fruition, and even those that did couldn't fully solve Tanzania's energy problems. Here's why the Stiegler's Gorge remained relevant.

As we shall see in chapter five, the conception of the Stiegler's Gorge project coincided with a global interest in hydroelectric power generation. Although initially funded by the US government and modelled on the US Tennessee Valley Authority (TVA), the country's socialist policies and the antagonistic bipolar global political economy led the US to stop funding the project. Although other donors, such as Norway, stepped in and provided substantial funding in the 1970s to mid-1980s, the project never materialised. Funding aside, the Stiegler's Gorge project was highly controversial, particularly

402 TANESCO, "Energy Master Plan and Programme 1990–2005," The Ministry of Water, Energy and Minerals, 1991; TANESCO, Master Plan 2012: Updated Version, The Ministry of Energy and Minerals, 2013.

403 Ann DanaiyaUsher, *Dams as Development: A Political Economy of Nordic Development Thinking,* (London: Routledge, 1997).

404 Usher, "Dams as development".

405 Öhman, "Taming Exotic Beauties":370.

because of its feasibility and environmental and socio-economic impacts.[406] These factors combined to make it impossible for the project to go ahead for six decades.

The aid-driven journey of hydropower development in Tanzania reveals a complex tango danced with aid over these decades. While external support kick-started critical energy projects, it also highlighted the need for sustainable, locally owned solutions. The legacy of that era continues to shape Tanzania's energy landscape with time. I argue that Tanzania's efforts to develop hydropower infrastructure from the 1960s onward were complex and dynamic. While promoting self-reliance, the country relied heavily on foreign aid for financial and technological support. This reliance was shaped by competition among Western donors for export financing, experience and access to cutting-edge technology. At the same time, the ambitious modernisation agenda of post-colonial socialist leaders significantly shaped the development trajectory of hydropower projects in the region.

4.7. Shifting Paradigm to Neoliberalism: Dead Period for Dams?

In the 1980s, neo-liberal policies were adopted in Tanzania, which led to a shift in the discourse on dam construction - from favouring large dams to emphasising smaller ones. In the 1990s and 2000s, however, the country underwent significant socio-economic and political reforms. In particular, the energy sector underwent major changes, including formulating an energy policy in 1992 and its revision in 2003. This revised policy marked a pivotal moment - it was the first time that Tanzania committed itself to actively involving the private sector in the energy industry. Meanwhile, on the global stage, the twenty-first century saw a revival of hydropower dams as a key technology for development.[407]

The proliferation of large dams over the past century reflects broader shifts in international economic policy and global development priorities. As Khagram noted, this phenomenon was not isolated, but rather part of a larger transformation in the

406 Ross Harvey, Damned if You Dam: Tanzania's Energy Dilemmas: Occasional Paper 281. Johannesburg: South African Institute of International Affairs, 2018.

407 Oxford Energy Forum. 2018. "Oxford Energy Forum: Electrifying Africa." Oxford Energy Forum, no. 115: 1–5; Tom Kober, H-W. Schiffer, Martin Densing, and Evangelos Panos, "Global Energy Perspectives to 2060–WEC's World Energy Scenarios 2019," *Energy Strategy Reviews* 31 (2020): 100523.

transnational landscape of development projects. In 1900, there were about 600 large dams, mostly in Asia and Africa. By 1950, this number had risen to nearly 5,000 large dams, with only 10 classified as large projects. By the year 2000, the total number of large dams had risen to almost 45,000 worldwide, of which around 300 were large dams.[408] These figures show a significant increase in the construction of large dams during the 20th century. The rapid increase in the number of dams built worldwide indicates a significant shift in global priorities towards large infrastructure projects, particularly in developing regions. This trend highlights the complex interplay between technological advances, economic factors and geopolitical considerations that drive large-scale development projects.

The proliferation of dams highlights the changing nature of international cooperation and investment in infrastructure development. There is strong evidence of the driving force behind large dams, including improved economic conditions for dam building, with Southern powers such as China, Brazil and India supporting the financing and construction of large dams in Africa.[409] There is also a return of global financial institutions, such as the World Bank, and of European and American donors supporting hydropower projects in Africa. Similar to other African countries with extensive experience in building large hydropower dams, such as Egypt, Cameroon, Ethiopia, Angola and Uganda, Tanzania has seen a resurgence in dam construction.[410]

In the early 2000s, Tanzania underwent significant changes in its socio-economic and political landscape, particularly in the energy sector.[411] During the presidency of Jakaya Mrisho Kikwete (2005-2015), the fourth government implemented a comprehensive development program that expanded during his second term.[412] This included

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408 Sanjeev Khagram, "Dams and Development: Transnational Struggles for Water and Power," In *Dams and Development*, (Cornell University Press, 2018).

409 Barnaby Dye, "Dam Building by the Illiberal Modernisers: Ideological Drivers for Rwanda and Tanzania's Megawatt Mission," *Critical African Studies* 14, no. 3 (2022): 231-249.

410 Barnaby Dye, "The Politics of Dam Resurgence: High Modernist State Building and the Emerging Powers in Africa," PhD diss., University of Oxford, 2018).

411 URT, "Tanzania National Bureau of Statistics, "Energy Access and Use Situation Survey II in Tanzania Mainland 2019/20: Summary of Key Findings." The United Republic of Tanzania, 2020.

412 URT, Transcript; Tanzania's Transformation and Vision 2025: Governing Economic Growth for Social Gain by H.E Jakaya Mrisho Kikwete, President of the United Republic of Tanzania, 31 March 2014.

economic interventionist efforts to promote industrialisation, as well as ambitious corridor development plans in which major infrastructure projects such as roads, bridges, new and upgraded railways, an oil pipeline and hydropower dams were key tenets of development.[413] These developments aimed to modernise Tanzania's infrastructure and stimulate economic growth in various sectors, including energy production and distribution.[414] The reforms were integral to Tanzania's broader strategy to attain middle-income status by 2025, as outlined in the Tanzania Development Vision 2025 and the Five-Year Development Plan (FYDP II).[415] During this period, dam construction saw a transition from hydropower to Independent Power Producers (IPPs) and Emergency Power Producers (EPPs), alongside the development of natural gas-powered plants at Kinyerezi (I–IV) in Dar es Salaam. It was a dead period for hydropower as the diversification of energy sources was evident. The following table illustrates that.

413 URT, The Tanzania Five Year Development Plan 2011/2012-2015/16: Unleashing Tanzania's Latent Growth Potentials, (Dar es Salaam: Planning Commission, 2012).

414 URT, Energy Access Situation Report, 2016: Tanzania Mainland, (Dar es Salaam: NBS and REA, 2017).

415 URT, "Tanzania Development Vision 2025".

Table 2: The diversification of energy sources, 2002-2006

Year	Name	Fuel	Ownership
1967	Hale	Hydro	TANESCO
1968	Nyumba ya Mungu	Hydro	TANESCO
1975	Kidatu	Hydro	TANESCO
1980	Zuzu diesel	Diesel	TANESCO
1988	Mtera	Hydro	TANESCO
1995	Tanwat	Biomass	SPP/IPP
1995	Pangani Falls	Hydro	TANESCO
2000	Kihansi	Hydro	TANESCO
2002	Tegeta IPTL	Heavy Fuel Oil	IPP unit
2004	Songas 5	Natural Gas	IPP unit
2004	Songas 1–4	Natural Gas	IPP unit
2006	Songas 6	Natural Gas	IPP unit
2008	Ubungo I	Natural Gas	TANESCO
2009	Tegeta GT	Natural Gas	TANESCO
2010	TPC	Biomass	SPP/IPP
2011	Aggreko Tegeta	Gas oil	Aggreko, rental
2011	Aggreko Ubungo	Gas oil	Aggreko, rental
2011	Symbion Ubungo	Natural Gas/Jet	Symbion, rental
2012	Mwenga	Hydro	SPP/IPP
2012	Symbion Arusha	Diesel	Symbion, rental
2012	Symbion Dodoma	Diesel	Symbion, rental
2012	Ubungo II	Natural Gas	TANESCO
2013	Nyakato/Mwanza	Heavy Fuel Oil	TANESCO
2015-16	Kinyerezi I	Natural Gas	TANESCO

Source: MEM 2013: 16.

The Big Results Now (BRN) initiative, which occurred in 2013, is rooted in the 2008 Electricity Act, which reaffirmed the goal of unbundling and privatising the sector. According to BRN[416], the mandate of the planning framework under Tanzania's Development Vision 2025 was to transform Tanzania's future electricity landscape.[417]

416 BRN was a programme whose primary objective was to prioritise available resources in strategic areas to achieve significant improvements in various areas. It aimed to accelerate development and deliver tangible results in key areas. It focused on six priority sectors, including energy and natural gas, agriculture, water, education, transport and resource mobilisation.

417 URT, Ministry of Energy and Minerals (MEM) 2014. Electricity Supply Industry Reform Strategy and Road Map 2014– 2015. MEM, Dar-es-Salaam.

This initiative placed particular emphasis on the energy sector, with significant resources allocated to rural electricity generation.[418] The Kikwete government implemented a comprehensive energy development strategy characterised by a dedicated financing approach. This initiative was primarily supported by fuel tax revenues, supplemented by contributions from private donors and government allocations. During this period, there was a notable resurgence of large-scale government involvement in infrastructure projects, particularly in the construction of power generation facilities.[419] Expert interviews with a TANESCO official revealed that the renewed emphasis on large dam construction was largely driven by growing electricity demand in both urban and rural areas. The official said:

> "*Before the 1960s, most of the country was not electrified and only a very small proportion of the population had access to electricity. Then we started to build more hydroelectric plants, but still in the 1970s people didn't know about electricity and most were not demanding electricity or complaining. In the 1980s the situation started to change as more people became aware of the benefits of electricity, and by the 1990s people were demanding electricity and complaining that it wasn't expanding fast enough or that there were shortages"*[420]

As noted earlier, the construction of large hydropower dams has been a focus of attention since Tanzania's independence, with interest increasing over time. The primary motivation for building these massive dams was to meet energy needs and contribute to the country's long-term socio-economic development goals. Hydropower was seen as an environmentally friendly alternative until more sustainable energy generation technologies became available, serving as a transitional step towards cleaner energy sources. [421] As part of its Vision 2025 initiative, which emphasises the need for economic growth supported by reliable and affordable energy, Tanzania identified 23

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418 JMT, Majadiliano Rasmi ya Bunge, Hotuba Ya Waziri Wa Nishati Na Madini Mhe. Prof. Sospeter Mwijarubi Muhongo (Mb.), Akiwasilisha Bungeni Makadirio Ya Mapato Na Matumizi Kwa Mwaka 2013/2014. Dar es Salaam: Wizara ya Nishati na Madini; See also, TANESCO, Annual Report, 2010.

419 Dye, "Dam Building by the Illiberal Modernisers":231-249.

420 Expert interview, TANESCO engineer-during energy congress in Dar es Salaam, 20th September 2023.

421 URT, The Tanzania Development Vision 2025, (Presidents Office, 2002); Rolf Sternberg, "Hydropower's Future, the Environment, and Global Electricity Systems," *Renewable and Sustainable Energy Reviews* 14, no. 2 (2010): 713-723.

hydropower projects as potential future energy development options. [422] While some of these projects were implemented, others remained in various stages of planning or construction. The overall objective of these initiatives was to meet the projected increase in electricity demand while preserving the environment for future generations. [423] Of the ongoing projects, the largest currently under development is the Stiegler's Gorge hydropower station. The following graph illustrates the development of hydropower plants and installed generation capacity in Tanzania over the last six decades, including their original installation dates. [424]

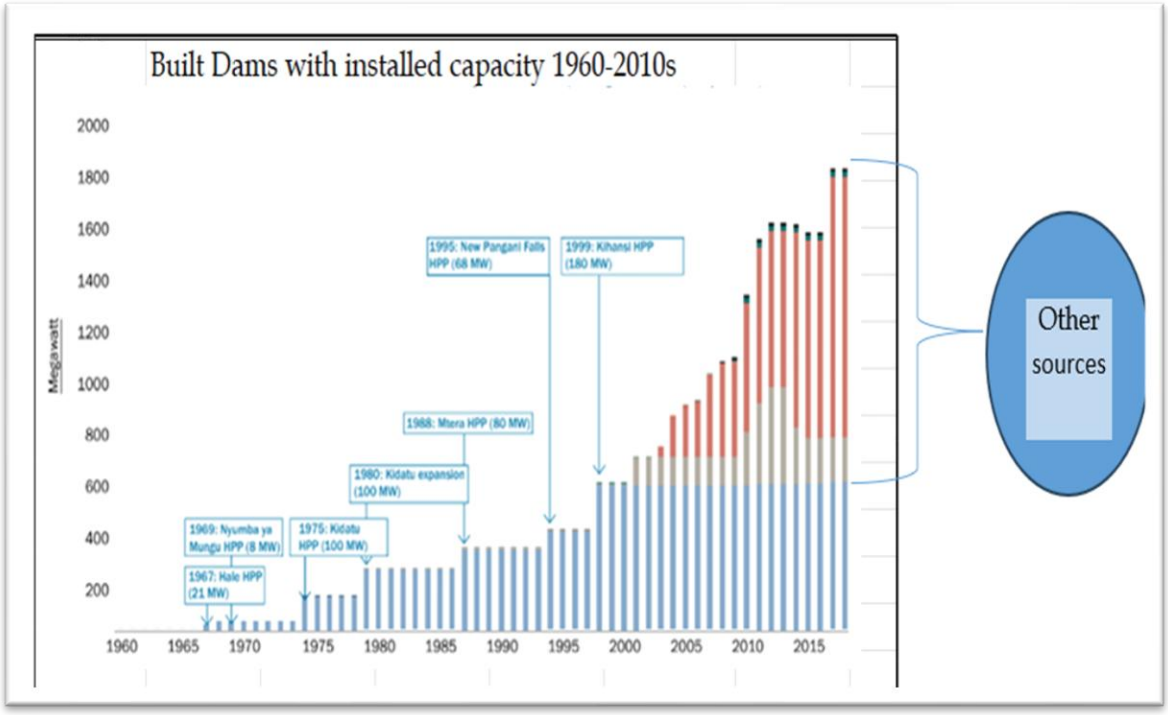

Figure 22: Post-independence Dam Era.
Source: After Kichonge, "Status and Future Prospects, 2018.

The figure shows that, from the 1960s to 2015, the Tanzanian government's efforts to build future dams were remarkable. In general, the 2010-2015 period marked the state's

422 URT, Hansard: Parliamentary Debates, Official Report, Second Session, 17 Meeting from 26 June – 17 July 1969 URT, Power System Master Plan 2016 Update, (Dar es Salaam, Ministry of Energy and Minerals, 2016); URT, Power System Master Plan 2012 Update, (Dar es Salaam, Ministry of Energy and Minerals,2012).

423 TANESCO, Master Plan 2012: Updated Version." The Ministry of Energy and Minerals, 2013; URT, Electricity Supply Industry Reform Strategy and Roadmap,2014-2025, (Dar es Salaam: Ministry of Energy and Minerals, 2014).

424 NORAD, 50 Years Energy Cooperation Tanzania and Norway, (Oslo: June 2021); URT, Power System Master Plan 2009 Update, SNC Lavalin International, August 2009; TANESCO, TANESCO Directors and Accounts Annual Report, 2020.

return to development planning, with an emphasis on industrialisation. The energy sector was seen as a key input necessary for industrialisation to take off. In its first five-year development plan (2011/12-2015/16), the government aimed to increase electricity generation from hydropower and other sources to 2,780 MW by 2015.[425]

While the period from the socialist era until the 2000s was dominated by hydropower dams and, over time, increasingly by gas, from 2010 to 2015, the government shifted its focus to attracting investment in other energy sources. From 2015, Tanzania entered an era of revived development nationalism, characterised by ambitious development projects and deteriorating relations between the state and business. It was a period in which Tanzania became more known for its nationalist policies. An important development slogan of the time was 'an industrialised Tanzania'. This ambitious industrialisation drive was driven by President Magufuli with a strong emphasis on mega infrastructure development. Power generation was seen as necessary for industrialisation and socio-economic transformation. Although the Stiegler's Gorge project did not materialise and other hydropower projects were commissioned depending on the political atmosphere of the time, I argue that not all dormant projects are dead ends. The files for this project were pulled from the shelves in 2017, and the project became a priority under the Magufuli administration. Construction began in 2019 as a flagship energy generation project. As we have seen, this project was conceived in the early years of independence but could not be commissioned for the reasons mentioned in this chapter and further discussed in the following chapter. I argue that postcolonial Tanzania invested heavily in dams as spectacular technological emblems of modernity. The relationship between the political discourse of dam building at the time and international relations played a crucial role in determining development in Tanzania.

4.8 Conclusion

This chapter has shown how hydropower and energy policy reform developed in the post-independence period from the 1960s to the 2000s. Since independence, Tanzania

425 URT, Electricity Supply Industry Reform Strategy and Roadmap, 2015–2025, (Dar es Salaam: Ministry of Energy and Minerals,2014); See also, Dye, "Dam Building by the Illiberal Modernisers":234-249.

has consistently sought to achieve energy security by increasing electricity generation through dam construction. Several conclusions can be drawn from the above discussion. First, both rhetorically and in practice, hydropower became the most important infrastructure for modernisation in this period, more than in the colonial period, although colonial influences remained. Second, post-independence Tanzania manifests a dynamic energy policy. Although the policy governing energy reforms in Tanzania was dynamic, and Tanzania introduced several reforms in the sector, the energy sector remained largely state-centric and continued to be shaped by policies developed under colonial rule. Third, domestic political conditions and the international power structure played a very important role. The Cold War and the politics of modernisation largely shaped the hydropower infrastructure, involving more bilateral and multilateral donors and agencies. This led to competition among Western industrialised countries to export capital, experts and technology to the new post-colonial states, manifesting the travel of ideas. The combination of these actors led to multi-million-dollar donor investments in hydropower schemes, depending on the prevailing discourse. Ultimately, these infrastructures show how hydropower was placed at the centre of development as a catalyst for industrialisation in post-independence Tanzania. However, Tanzania's continued reliance on large dams raises political and economic questions: why do developing countries find it attractive to invest their limited resources in expensive energy projects rather than in relatively cheaper and sustainable renewable energy sources? What political interests influence energy choices? To what extent are factors such as national prestige still as relevant as they were in the 1960s? In the fifth chapter, I focus on the complex realities surrounding the planning of Stiegler's Gorge project. I explore its mysterious abandonment, leading to a state of 'ghosting' and subsequent unexpected revival. Most importantly, I analyse what this delayed project means for both the nation and the local people.

CHAPTER V

STIEGLER'S GORGE DAM IN THE GLOBAL ARENA: DEVELOPMENT DREAMS AND TRANSNATIONAL NEGOTIATIONS

5.1 Introduction

This chapter uses Stiegler's Gorge Dam project as a case to examine the transnational and institutional entanglements that characterise postcolonial development planning. Building on the broader energy history outlined previously, this section examines how stakeholders within and outside Tanzania influenced the project's development since its inception. By focusing on institutional mechanisms, aid dependencies and the 'travel' of development models, the chapter challenges the idea that infrastructure planning is a one-way process, from North to South. Instead, it reveals a more dynamic interaction shaped by negotiation, misalignment and adaptation. The chapter portrays Stiegler's project not merely as a promising project but as a nexus of competing agendas and shifting global ideologies. It explores how, caught between technical ambition and political realities, this infrastructure became both a symbol and a casualty of Tanzania's uneven development path.

The project was conceived as a vision for the future of Tanzania and has been the subject of significant planning and development efforts by the socialist government since the 1960s. Originally conceived to provide irrigation and protect downstream infrastructure, the hydropower aspect took centre stage in the planning process. The project's planning showcases some of the continuities and discontinuities in the transition from the bilateral relationships of colonial rule to the complex multilateral relationships of development aid, encompassing the travelling ideas across borders. However, the planning process for this project faced significant challenges, leading to a delayed kick-off until 2017, when construction commenced. Considering dams' symbolic role in future-oriented development politics as objects of imagination, I use Stiegler's Gorge project as a symbol of promised futures, progress, and modernity to examine how people's agencies, temporalities, processes and demands can change, and how it is not always the case that a failed project is a dead end. The project thus embodies the complexities of development in Tanzania, where the pursuit of economic

growth and modernisation must be balanced with the preservation of environmental integrity and the well-being of local communities. What were these promised futures? Like many other post-colonial African countries, Tanzania saw large dams as agencies of socio-economic development.

They symbolised a break with the former colonial masters and the provision of services that Tanzanians had been denied for nearly half a century of colonial rule.[426] For Nyerere, dams and hydropower stations were "the bricks and mortar evidence of the revolution that our country is consciously and purposefully undergoing." Hydropower infrastructure represented "the application of science to the needs of the people," as a panacea for "the poverty which now imprisons them," and a tool "which will in practice transform our nation." As the then Minister of Industry and Energy, A. Hanga, put it, electricity could boost the progress of the ruined peasantry, power trains, lifting machinery, massive industrial and construction works, and agricultural development. It could also contain all the inherited colonial inefficiencies and inequalities. For Tanzania to develop, therefore, its citizens must seek nothing less than "the horse of large-scale mechanical industry and electrification."[427]

Against this backdrop, Tanzania expanded its foreign borrowing in the 1960s and 1980s to plan and build electrical infrastructure, despite the Arusha Declaration of 1967, which denounced foreign aid as a basis for development. In principle, the declaration denounced over-reliance on foreign aid, especially from the capitalist world, urban-based projects and industry as the basis for development. Instead, it proclaimed agriculture and rural development as the leading sectors, and the use of internal resources, such as rivers and labour, to inculcate self-reliance. River basin planning and *Ujamaa* villages were established to enforce the proper use of labour in agriculture and rural development.[428] Thus, the promised future was embedded in multipurpose river basin planning, which could boost agriculture and rural development by installing

426 Rebecca Hansing Ghanadan, Public Service or Commodity Goods? Electricity Reforms, Access, and the Politics of Development in Tanzania, Doctoral Dissertation, University of California Berkeley, 2008.

427 URT, "National Assembly Official Report, First Session, 2nd Meeting, Sittings from 10th June 1966 to July 1966"; URT, Hansard, Parliamentary Debates in 1964: 909- 914.

428 Goran Hyden, *Political Development in Rural Tanzania*, (East African Publishing House,1969); Paul Bjerk, "Postcolonial Realism: Tanganyika's Foreign Policy under Nyerere, 1960-1963" *The International Journal of African Historical Studies*, 44 no.2(2011), 215-247.

infrastructure for irrigation, flood control, and hydroelectricity, thereby promoting the industrial and national economy. The chapter explores how these complexities are socially constituted, negotiated, and contested, providing a comprehensive understanding of the project's historical, environmental, and socio-economic implications. It also explores the concept of emptying futures, as Tups & Dannenberg have observed, in the sense of emptying super-complex realities and reducing alternatives to a single large project plan, obviously neglecting many concerns and problems.[429] The chapter illustrates the disregard for prior feasibility studies conducted for the comprehensive planning of the entire Rufiji Basin, in favour of newly promised futures that ultimately did not materialise.

5.2 Transnational Engagements over Stiegler's Gorge Planning

In the early years of Tanzania's independence, hydropower planning was characterised by multiple stakeholders and complex dynamics. Different actors played crucial roles in shaping the energy sector in terms of funding: the state, as the primary authority, was responsible for overall policy direction, while experts provided technical knowledge and advice. Ideas and practices initiated during colonial rule continued into the post-colonial era, as the Food and Agriculture Organisation (FAO) report noted.[430] Tanzania navigated between maintaining colonial-era policies and adopting home-grown strategies in its post-colonial transition. The country became more dependent on Western nations than Eastern ones for hydropower development. As seen in chapter four, the British funded the Hale and Nyumba ya Mungu dams. The Great Ruaha project was managed by the British consultancy BB & Company and later by the Swedish company SWECO, and most of TANESCO's power balance studies were carried out by the Canadian company Acres International. The government successfully involved 'friendly' nations in hydropower projects. A notable example of international cooperation was the Stiegler's Gorge Dam project under the Norwegians.

Discussions on Tanzania's economic transformation in the mid-1960s were based on the concept known among development economists as 'aid for development'. A key

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429 Gideon Tups, & Peter Dannenberg, "Emptying the Future, Claiming Space: The Southern Agricultural Growth Corridor of Tanzania as a Spatial Imaginary for Strategic Coupling Processes", *Geoforum*, 123(2021):23-35.

430 FAO, "Rufiji Basin Tanganyika":1-4.

aspect of these discussions revolved around the possibility of using Tanzania's rivers as part of a wider modernisation plan. Although the first Tanzanian development plan advocated the creation of an indigenous secondary industry, the adopted socialist ideology under the Arusha Declaration of 1967 revolved around agricultural modernisation and the transformation of rural communities.[431] Consequently, many decision-makers and planners looked at the river's potential for irrigation and flood control, even though they were fascinated by the large hydropower infrastructures in other parts of Africa, such as the Akosombo Dam in Ghana and the Kariba Dam in the Central African Federation.[432] Although the development plan for 1964-1969 placed little emphasis on large dams, efforts to develop hydropower continued. However, the economic plan of the time focused on small dams, particularly Nyumba ya Mungu. Pending the publication of a comprehensive study of the country's long-term electricity requirements, the plan provisionally estimated that electricity demand would grow by over 12 per cent per annum, compared with 10 per cent per annum between 1953 and 1962. To meet this future demand, the plan called for the doubling of the power line to Dar es Salaam from the Hale Falls hydropower station, which was about to be completed. In addition, the installation of a diesel power station in the Dar es Salaam area, another hydropower station on the Pangani River, or a new hydropower station on the Wami River was to be completed towards the end of the decade.[433] Although the FAO was primarily interested in the area's agricultural potential, it also identified the Stiegler's Gorge hydropower project and the Mtera hydropower project on the Great Ruaha.

The Socialist government's vision for Stiegler's Gorge project was inspired by the spectacular success of the Tennessee Valley Authority (TVA). Created under President Franklin Roosevelt amid the US economic depression of the 1930s, the TVA took on what Müller-Mahn et al referred to as the "symbolic role of infrastructure projects",

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431 URT, "Julius Nyerere, Address to Tanganyika Five-Year Plan for Economic and Social Development, 1st July 1964 - 30th June 1969", (Dar es Salaam: Government Printer, 1964): xiv.

432 Nkrumah Switches on Volta River Power, *The Nationalis*t, January 24, 1966, Also, cited in Hoag, "Transplanting the TVA?":249; Julia Tischler, *Light and Power for a Multiracial Nation: The Kariba Dam Scheme in the Central African Federation*, (New York: Palgrave Macmillan, 2013).

433 URT, The Second Five-Year Plan for Economic and Social Development, 1st July 1969-30th June 1974, Volume 1: General Analysis. Dar es Salaam, 1969: 52. See also Volume II, 57-58.

presenting forward-looking development policies as objects of imagination, vision and hope.[434] The TVA represented a positive model of "state power" for post-colonial nations in Africa and Asia.[435] In April 1966, Iddi Simba, then Chief Planning Officer in the Tanzanian Ministry of Economic and Development Planning, and Jerry Sam Kasambala, former Minister of Industry, Mineral Resources and Energy and Chairman of the Tanzania Development Finance Corporation, were invited to the United States to see the wonders of American River Basin planning.[436] The US-sponsored tour revived Tanzania's interest in developing the Rufiji River Basin.

As stipulated in chapter three, the basin was studied by the FAO - Rufiji River Basin Reconnaissance in the late 1950s, which resulted in a 1961 report on irrigation development. The report also identified potential large hydropower sites in the Rufiji Basin.[437] The report declared, "River basin development is now recognised as an essential feature of economic development."[438] Although several hydropower sites were already under discussion with various local and foreign proponents, the Stiegler's Gorge project was the largest. It was "an example of a type of river basin project that had developed in the United States and been carried by international agencies like the FAO and U.S. Agency for International Development (USAID) to all parts of the world."[439] The Stiegler's Gorge project intrigued Tanzanian officials, not least because of its huge potential for irrigation and flood control, and American engineers because of the prospect of generating up to 2,100 megawatts of firm power each year once the project was completed.[440] After the publication of the FAO study, Stiegler's Gorge became the darling of not only the government but also of many transnational and international development agencies.

In addition to USAID, the Japan External Trade Organisation (JETRO) and the Norwegian Agency for Development Cooperation (NORAD) also became involved.

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434 Müller-Mahn, Mkutu, K., & Kioko, "Megaprojects—Mega Failures?" :1069-1090.

435 Hans Knop, The Tennessee Valley Authority: A Field Study, *IIASA Research Report*, (IIASA, Laxenburg, 1979).

436 Öhman, "Taming Exotic Beauties":157; Hoag, "Designing the Delta":172-73.

437 TNA 257/AN/19/06/A/85, "Minutes of Conference to Plan Rufiji Basin Survey", File 43697 of 26th July 1954; Hoag, "Designing the Delta":89-115.

438 FAO, "The Rufiji Basin Tanganyika":1-5.

439 Hoag, "Designing the Delta":176.

440 Hoag, "Transplanting the TVA?":249.

British agencies were also interested in developing the energy sector in Tanzania and the Rufiji Basin soon after independence. In 1964, for example, a British study by Merz & McLellan Company Ltd provided a long-term estimate of the future electricity market for the whole country.[441] However, as discussed in chapter four of this thesis, the shift away from Britain to other donors was driven by a combination of political, economic, cultural, and ideological factors aimed at establishing the country as a sovereign nation with its own unique identity and development path.

The FAO study served as a basis for potentially developing the entire basin, including the Stiegler's Gorge project. Although its Terms of Reference (TOR) were concerned with flood control and irrigation in the entire basin, the river's hydropower potential was also included in the final report.[442] The FAO study shifted the focus of subsequent studies to hydropower development.[443] Between 1967 and 1968, Japan's JETRO carried out a pre-feasibility study for the hydropower component of the project, which was mainly concerned with building up industrial loads for the projects, for example, from aluminium refining.[444]JETRO noted that the project, with an installed capacity of 600 MW and expected to produce just over four billion kilowatt-hours of energy annually, serves as a cornerstone for Tanzania's economic power. They encouraged the Tanzanian government to undertake energy-related studies, stressing that such studies were essential for the implementation of the Stiegler's Gorge project.[445] Following JETRO's guidelines for hydropower development aimed at industrialisation, Tanzania's government initiated plans to harness Stiegler's Gorge during the country's Second Five-Year Development Plan of 1969. The plan states:

> *"The study of the Stiegler's Gorge project will therefore be carried out during the first years of the new plan in the fight against the long-term industrialisation programmes. As the implementation will take at least seven years, the decisions will be reformed during the second*

441 NAN, 0002- TAN 012. Project Planning Report. Volume 1, 1976.
442 FAO, "The Rufiji Basin Tanganyika":1-4.
443 Havnevik, "Tanzania":267; Hoag, "Designing the Delta":181-82.
444 NAN, NORAD A–1846, TAN 012 - 00808 (1969-72), Report of Preliminary Studies on Stiegler's Gorge Project, Overseas Technical Cooperation Agency Government of Japan, November 1969.
445 NAN, NORAD A–1846, TAN 012 - 00808 (1969-72), "Report of Preliminary Studies on Stiegler's Gorge Project, 1969.

plan period. This project would thus become the main focus of the basic industrial strategy in the 1970s and 1990s".[446]

At the time, the Tanzanian government allocated 10 million shillings to implement the development plan. In addition to JETRO, Kaiser Engineers International, an arm of the US-based Kaiser Aluminium Corporation, also submitted a proposal for the development of aluminium and steel refineries in the Rufiji Basin. Kaiser had been directly involved in Ghana's Akosombo Dam as well as the Hoover and Grand Coulee dams in the United States.[447] The proposal called for an entire integrated agro-industrial development policy for the region which would fit into President Nyerere's concept of socialist development. Unfortunately, the expansion of the Vietnam War and lack of resources prevented the US from following through with the project.[448]

In 1968, USAID sent a team of engineers from the US Bureau of Reclamation to Tanzania. The team assessed the hydropower potential and facilitated funding discussions.[449] Although it was high on the Tanzanian government's wish list, an appraisal of the project was still a long way off. However, the survey and design of a plan, not just for the Stiegler's project in the Rufiji River Basin but for the whole of Tanzania, was underway and two other projects were closer.[450] TANESCO[451], which despite its nationalisation was still indirectly controlled by British interests[452], recommended the Great Ruaha project, which had considerable potential for hydroelectricity, but not for irrigation. The Wami River was another option that had already been studied and included in Tanzania's five-year development plan. As discussed in chapter four, the Wami project was set up as a multi-purpose project for

446 URT, The Second Five Years Development Plan, July 1 1969-30 June 1974, Vol 1,(General analysis, Dar es Salaam, Ministry of Planning, 1974):126.

447 NAN, 0003-TAN 012. Progress Reports RUBADA, 1976-1978.

448 NAN, L0294-Africa:Tanzania.

449 USAID, Rufiji Basin: Land and Water Resource Development Plan and Potential, Prepared for USAID by Bureau of Reclamation, (US Dept. of the Interior,1967).

450 Havnevik, "Tanzania":267; Hoag, "Designing the Delta":81-92.

451 Tanzania Electric Supply Company Limited (before 1968: Tanganyika Electric Supply Company, Limited).

452 TANESCO was not directly controlled by British interests in terms of ownership or management after the nationalization of 1968. However, the wider economic and political environment in which TANESCO operated was influenced by historical links and ongoing relationships with former colonial powers, including Britain.

both hydropower and irrigation and Sweden played a central role in supporting the project.[453]

USAID recommended the creation of a National Water Resources Council to oversee all river basins in the country. They identified the Rufiji River as the most promising site for a TVA-type project and called for the establishment of a Rufiji River Authority as an independent agency based on the TVA model.[454] A bill for the establishment of the Rufiji Basin Development Authority (RUBADA) was tabled before the parliament in Dodoma in mid-1975. With its establishment by the act of Parliament number 5 later in 1975, RUBADA had to promote, regulate and coordinate the development of the basin according to a blueprint by the TVA.[455] RUBADA served as a parastatal organisation under the Ministry of Agriculture, Livestock and Cooperatives and was funded by the government and the European Community. In the agricultural sector, the authority established the Korea-Tanzania Agricultural Company (KOTACO) and the Tanzania-Iran Rural Development Project. The authority also prepared the Usangu Land Use Plan to protect the catchment areas of the Little and Great Ruaha Rivers. In the hydropower sector, RUBADA undertook a feasibility study of Stiegler's Gorge and a master plan study of the hydropower potential of the Rufiji Basin.[456] As we shall see in chapter six the initiative to harness the hydroelectric power of Stiegler's Gorge did not materialise because of financial difficulties and disputes between various entities regarding control over the project. Consequently, the focus was redirected towards agricultural intensification within the SAGCOT corridor during the early 2000s.

Despite other aspects of irrigation and flood control in the basin, the Stiegler's Gorge project was one of the key projects planned to maximise hydropower generation. Uncertainty about Tanzania's electricity demand, however, became one of the main obstacles to the project's materialisation.[457] In the 1970s, Tanzania's power sector witnessed a surge in the use of statistical methods for demand forecasting—a pivotal moment in future-making. This trend resonated across the broader field of future

453 Öhman, "Taming Exotic Beauties":169.
454 A Bid to Develop Rufiji Basin, *Daily News*, 25 June 1975.
455 Daily News, 25 June 1975; NAN, 0003-TAN 012, Progress Reports RUBADA, 1976-1978.
456 NAN, 0003-TAN 012. Progress Reports RUBADA, 1976-1978.
457 TNA File No. A35/1& A35/1/42: Electric Light-General; See Also, Havnevik, "Tanzania":271.

studies, where forecasting plays a starring role.[458] Earlier studies, such as the 1964 British study by Merz & McLellan Company Ltd, had provided a long-term estimate of the future market[459], TANESCO acted and commissioned another consultancy, Acres International Ltd of Canada, to prepare a long-term power sector master plan up to 1995.

Acres International came into the picture because earlier studies had overestimated the load growth.[460] The preliminary draft of the Acres report, published in 1978, shows that power system planning had moved closer to economics as an academic discipline in terms of methodology and concept. The report used a model that related Gross Domestic Product (GDP) to total energy generation and sales to forecast the grid system.[461] The forecasting element is at odds with Jean Beckert's work on how individuals value economic uncertainty and economists' attempts to address it through general equilibrium and rational expectations theory. Despite their strength as analytical methods, these approaches overlook the inherent unpredictability of the future by assuming that market aggregates accurately predict future events. Beckert enriches our understanding of capitalism by showing how hypothetical expectations shape contemporary economies - either fostering stability or precipitating crises when these projected futures fail to reach fruition. It's crucial to understand collectively shared visions of future trajectories because they free economic agents from crippling uncertainty, allowing them to allocate resources and make decisions despite the potential inaccuracy of these forecasts. Beckert distinguishes between fictional expectations and the theory of performativity, which argues that forecasts often become self-fulfilling predictions.[462]

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458 Van der Straeten, "Measuring Progress in Megawatt": 651-674.

459 NAN, 0002- TAN 012. Project Planning Report. Volume 1, 1976; Öhman, "Taming Exotic Beauties":196.

460 TANESCO, TANESCO News Journal: House Journal of Tanzania Electric Supply Company Limited, November–December 1990; EAF Library: A Research Report no. 38, Bureau of Resources Assessment and Land Use Planning, University of Dar es Salaam, by George Joseph, A Econometric Approach to Forecasting Demand for Electricity in Tanzania to the year 2000 A.D undated:11-12.

461 TANESCO, Tanzania Power Sector Study, by ACRES International Limited, Unpublished Draft Report, February 1978; TANESCO, Power Sector Development Plan 1985 to 2010 Report by Acres International Limited, 1985.

462 Jens Beckert, *Imagined Futures: Fictional Expectations and Capitalist Dynamics*, (Cambridge, MA: Harvard University Press,2016).

When the Acres report "*Tanzania Power Sector Study*" was published in February 1978, Tanzanian actors for Stiegler's Gorge project acted. They, however, rejected the report's findings.[463] Other promoters of hydropower technologies and among the major players in Tanzania's electricity infrastructure such as SIDA and SWECO were the first to comment and criticise on the report.[464] The study had concluded that Tanzania would only need 225 megawatts of additional capacity by 1995, which was far too little to prioritise a project as large as Stiegler's Gorge with a projected capacity of up to 1000 megawatts.[465] This demand was developed based on the changes in the economy, increases in population, and Tanzania's ambitions for industrial expansion. This shows that Acres considered the Stiegler's Gorge project to be both technically and economically unviable. Instead, they focused their investment strategy on directly productive activities in rural and urban areas.[466] The Acres report also presented alternative solutions, including proposals for hydropower stations on the Mtera and Kingengena rivers. The report emphasised that TANESCO's failure to implement these measures would result in limited power supply and power outages in towns connected to the national grid.[467] However, stakeholders raised concerns about the proposed power generation technologies.

In mid-1978, RUBADA again initiated a forecasting study, this time by the Department of Statistics at the University of Dar es Salaam, which calculated the demand for electricity in various sectors up to the year 2000. The report of this study was a critique of the Acres report, that it subsumed different types of demand in its aggregate GDP model, and that it was also too conservative on the assumptions about economic growth. The argument was based on the suggestion that Tanzania should expect high growth rates over the next decade because of its investment in basic services and industrialisation drive.[468] Even so, the forecasting studies of the 1970s consolidated a supply-side approach that characterised electricity planning in Tanzania for many

463 Havnevik, "Tanzania":272.
464 SNA, SIDA File F13O:1: SIDA's Comments on the Acres Tanzania Power Sector Study, 1978.
465 TANESCO, "Tanzania Power Sector Development Plan 1985-2000."
466 TANESCO, "Power Sector Development Plan 1985 to 2010."
467 TANESCO, Tanzania Power Sector Study, Draft Report, Acres International Ltd, February 1978.
468 NAN, 0003-TAN 012. Progress Reports RUBADA, 1976-1978.

years.[469] According to the Acres report, Tanzania's decades of socialist development emphasised social and economic infrastructure in rural areas, but in reality, investment in directly productive activities in both rural and urban areas was generally given low priority.[470] Tanzania invested heavily in major infrastructure projects, including the TAZARA railway, the TAZAMA pipeline and the Great Ruaha Power Project, while focusing on agricultural and rural development initiatives. Despite implementing a self-reliance policy aimed at harnessing domestic resources and minimising dependence on foreign aid, the country ultimately found itself locked into a development model that relied heavily on donor funding for large-scale infrastructure projects.[471] As a result, Tanzania became Africa's leading recipient of foreign aid in the 1970s.[472] Eventually, the Stiegler's Gorge project was shelved, leaving Tanzanians in both urban and rural areas with a precarious electricity supply and an over-reliance on traditional energy sources. This made it the leading recipient of foreign aid in Africa in the end.[473] Ultimately, the intended economic transformation of Tanzania failed to materialise. According to Öhman, despite the shelving of Stiegler's Gorge project, the government still wanted a hydropower project and reluctantly agreed to a comparative study with Great Ruaha.[474]

The 1970s to the mid-1980s witnessed an increasing number of foreign experts entering the Rufiji Basin to map its development trajectory, the centrepiece of which was the Stiegler's Gorge Hydropower Project. The information presented in the FAO's 1961 Rufiji Basin Survey served as the baseline data for the project. As discussed in chapter three of this thesis, on the one hand, the Tanzanian government under Nyerere, whose primary concern was water for agricultural irrigation, favoured the Wami project. On the other hand, TANESCO and its in-house British consulting firm, Balfour Beatty & Co. Limited (BB &Co.), were more interested in power generation and therefore

469 Expert interview, Engineer - TANESCO & Engineer from Commissioner for Energy's office-Moe- Dar es Salaam, during energy congress, 21st September 2023.

470 TANESCO, "Tanzania Power Sector Study, Draft Acres Report."

471 TANESCO, "Draft Acres Report."

472 Rwekaza Mukandala, "From Proud Defiance to Beggary": A Recipient's Tale. In G. Hyden & R.S. Mukandala (Eds). *Agencies in Foreign Aid: Comparing China, Sweden and the United States in Tanzania*, (Macmillan Press Ltd,1999).31-36.

473 Mchome, "Blackout Blues":91-93.

474 Öhman, "Taming Exotic Beauties":197-81.

supported the Great Ruaha project. The grand Stiegler's Gorge project was the Tanzanian government's preferred long-term option after the completion of the Wami project, backed by USAID. The start of the construction of the Kidatu plant on the Great Ruaha River in 1969 paved the way for Tanzania's entry into the era of large dams. Both trends continued to shape the country's electrification over the next two decades, until the early 1990s, when the trend shifted to what Schumaker calls the "small is beautiful" ideology. Here, the focus shifted to small, less impactful dams for electricity generation as a driver of industrial growth.[475]

Despite such a shift to small dams, planning for the Stiegler's Gorge project was not abandoned. Due to financial constraints, which worsened at the end of the 1970s and the beginning of the 1980s, Tanzania continued to rely heavily on loans and grants from transnational and international aid agencies for its hydropower development programme.[476] Recognising the potential importance of Stiegler's project to the future of the country, the government asked the government of the Kingdom of Norway for support.[477] On December 10th, 1970, the Norwegian Agency for Development Cooperation (NORAD) assumed responsibility for financing feasibility studies and commissioned the task to another Norwegian company, Norconsult.[478] Norway agreed to support the project because it had an interest in exporting the expertise of its hydroelectric consultants overseas and in sharing its vision of building big dams with the power industry.[479] The socialist ideals of Tanzania's leaders also meshed well with Norwegian visions of a strong state. Nyerere was aware of the role of hydropower in Norway's history as a modern and industrialised welfare state. Indeed, Nyerere had close links with some of the Nordic social democrats in the 1960s and 1970s.[480]

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475 Schumacher, "Small is Beautiful"; The World Bank: The World Bank's Role in the Electric Power Sector; Policies for Effective Institutional Regulatory and Financial Reforms, A World Bank Policy Paper." Washington, DC: The World Bank, 1993.

476 SNA, SIDA,91/JC/has, Economic Co-operation, Norway-Tanzania 1991; Cooksey, B. (2002). The Power and the Vainglory: Anatomy of a $100 Million Malaysian IPP in Tanzania," in *Ugly Malaysians? South-South Investments abused,* ed. K.S. Jomo. Durban: Institute for Black Research.

477 SNA, F1AB 1405, SIDA. Dept. II. PN, Tanzania, Director of Water Development and Irrigation Division (WD&ID), Oct. 22, 1965:4.

478 NAN, 0002- TAN 012. Stiegler's Gorge Project Planning Report. Volume 1, 1976.

479 NAN, TAN 012-008.23. RUBADA, Short Notes on the Implementation of Stiegler's Gorge Power Project, June 1980.

480 NAN, L0292- Africa: Tanzania; Havnevik, "Tanzania"; Simensen, "The Norwegian-Tanzanian Aid Relationship": 57-70.

Hydropower was Norway's starting point for development assistance, as its own industrial and economic development at the time was also driven by the increased use of its abundant hydropower resources.[481] Norway's early support to Tanzania focused on technical assistance for mapping and assessing hydropower potential at Stiegler's Gorge to carry out feasibility studies.[482]

In the 1970s and 1980s, NORAD played a central role in the Stiegler's Gorge project.[483] Among the many Norwegian projects in Tanzania, Stiegler's Gorge project got the lion's share. [484] NORAD's financial records indicate that by the mid-1980s, Norway had allocated over $24 million to the project, with the majority of this funding directed to design and consulting research. It was crucial to NORAD that these studies be conducted predominantly by Norwegian consultancy firms. To determine the required financing, they employed a pricing index known as the "price escalation scale." This method involved calculating all fundamental expenses in US dollars, accompanied by a designated percentage to account for local factors. The conversion rate utilised for these cost calculations was set at 8.00 Tanzanian Shillings (TZS) per 1 US Dollar (USD).[485] The idea was to build a dam of maximum size solely to generate electricity. With cost estimates, it soon became clear that the enormous cost of two billion US dollars would leave Tanzania in debt for many decades to come, and that such a large dam would not be economically viable. A total of 27 major studies were conducted between 1979 and 1982, and many other serious negative and far-reaching consequences were identified.

Initially, the development assistance programme provided technical assistance in public administration, health, and education. With the establishment of NORAD in 1968 as the Norwegian bilateral, and subsequently a NORAD field office in Dar es Salaam, the cooperation expanded by increasing the size of the programme and number of projects with the introduction of a comprehensive country programme based on

481 Hostad Thomas Løding, "The Value of Heritage Silver – The Historical Transformation of Hydropower Management's Legitimation," *Journal of Social Research*, 58 no. 4(2017): 367-388.

482 NAN, TAN 009. Africa: Tanzania General. 1971- 1977; Norway Backs the Poor, *Daily News*, 08th May 1976.

483 NAN, A - 1865, TAN 012. Agreement between the Government of Tanzania and the Kingdom of Norway on Stiegler's Gorge Project, 1971.

484 NAN, A - 1865, TAN 012. "Agreements."

485 NAN, TAN 012- Project Financing Report, Annex ix, 1980.

annual consultations between the two governments.[486] In 1976, a delegation from Tanzania visited Norway to discuss the Stiegler's Gorge power project with NORAD. Norway agreed to fund the initial costs of the project, including experts, as Norway was using 99 per cent of its hydroelectric power at the time. The Tanzanian delegates also had the opportunity to visit the Ferro-silicon industry, which was using more hydroelectric power than any other industry in Norway.[487]

Norway's support for the development of hydropower at Stiegler's was because hydropower would promote industrialisation, as Norway itself had experienced. Thus, the focus of the Stiegler hydropower project was on maximising electricity production rather than other facets of irrigation and flood control.[488] On the one hand, the World Bank conducted a feasibility study and concluded that the project was not feasible due to environmental concerns. NORAD, on the other hand, funded its feasibility study, carried out in 1973 by Norconsult, a Norwegian consulting firm. This was driven by economic interests such as the export of skills and knowledge. In addition, the analysis of these pre-construction studies by various actors fits well with the idea of a model of travel of ideas from the global North to the global South.

Norconsult's preliminary report on "Stiegler's Gorge Hydropower Utilisation" focused exclusively on hydroelectric power generation, suggesting that the electricity would be used mainly in power-intensive industries and only to a limited extent for domestic purposes.[489] The consultants for the study based their argument on the assumption that the other facets of flood control and irrigation would not generate a net benefit for the project in the near future, and thus concentrated on the hydropower aspect only.[490] In fact, money was made to talk. They were interested in the project aspect, which made it easy to compute the monetary value.[491] The report states, "It is a widely accepted axiom that the industrial development of a country is proportional to its consumption

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486 SNA, F52.3(2.32 1-4), KEC, NORDISKA Tanganyika Projektet, 1962-1970.

487 Uhuru, 26 August 1976; NAN, TAN-012-Hafslund, Stiegler's Gorge Power Project Monthly Project Report, Report No. 4, April 1983; See Also, SNA, SIDA,91/JC/has, Economic Co-operation, Norway-Tanzania 1991.

488 Hoag, "Transplanting the TVA?":247-267.

489 NAN, A-1862, TAN 012: Norconsult A.S., Stiegler's Gorge Hydropower Utilisation, Report Prepared for the United Republic of Tanzania, October 1972:123.

490 NAN, A- 1862, TAN 012. Norconsult A.S., Stiegler's Gorge Hydropower Utilisation:63.

491 Öhman," Taming Exotic Beauties"; Van der Straten, "Measuring Progress in Megawatts".

of electricity."[492] The consultants' assumption was significantly overstated, considering their proficiency in hydropower, which would primarily serve their interests. Moreover, the industrial application of power hinges on their capability to spearhead coal and steel ventures in Njombe, Iringa region.[493] International research, independent of government or NORAD affiliation, confirmed these reservations and uncertainties about the expected power requirements in the early 1970s and criticised the project for ignoring these insights.[494]

As the Stiegler's Gorge dam was to be designed to maximise hydroelectricity generation, uncertainty about Tanzania's electricity needs became a major obstacle to the project's realisation.[495]NORAD went ahead and supported the project, mostly the design and consulting studies, and ensured that most of these studies were conducted by Norwegian consultancy firms.[496] NORAD was involved with the Stiegler's Gorge project in the 1970s to mid-1980s to prepare the ground for a large dam and a hydroelectric power station at Stiegler's Gorge, through which the Rufiji River flows.[497] Archival records reveal that funding allocated for the Stiegler's Gorge project initially originated from the Norwegian government, which subsequently transferred the funds to NORAD before they were dispatched to Tanzania.[498] As mentioned earlier, no serious development had ever begun before Norway's commitment to the project, but extensive planning had been carried out by other actors, such as the US, Japan, and the World Bank. Tanzanian authorities wanted a power station and believed this could solve the country's energy problems, and the idea of independence from energy imports was very tempting. Key players in NORAD believed it could be done for a long time, given the amount of money spent on the study.[499] Norwegian companies Hafslund and Norplan were responsible for ensuring that these plans were implemented. Norconsult was the first Norwegian company to conduct feasibility

492 NAN, A- 1862, TAN 012: Norconsult A.S., Stiegler's Gorge Hydropower Utilisation:5.
493 NAN, NORAD A - 1859, TAN 012 - 013.1 Phase II Consultancy in General: Letter, NORAD to Norconsult Regarding the Continuation of the Power Plant Studies, 17 February 1975.
494 Hoag, "Developing the Rivers":196.
495 Havnevik, "Tanzania":270-271.
496 Hoag, "Developing the Rivers":193.
497 NAN, TAN.012. 311. Correspondence: Rufiji River Dam Construction to Start in 1980.
498 NAN, TAN 012. Financing Report: Stiegler's Gorge Power and Flood Control Development, Oslo, Norway, November 1980.
499 NAN, TAN 009. Africa: Tanzania. General. 1971- 1977.

studies in the early 1970s, leading to a single-purpose project. Norplan, newly established, had the same structure as Norconsult. That is, as an umbrella company for several Norwegian companies. They wanted to compete with Norconsult in the Norwegian aid sector. So this first major project was very important to them. Stiegler's Gorge project was perfect in this context; they were given a major assignment with a secure return, as the Norwegian government stood as a guarantor.[500] The following figure illustrates the trend in project cost estimates paid by NORAD in 1980, in millions of USD.

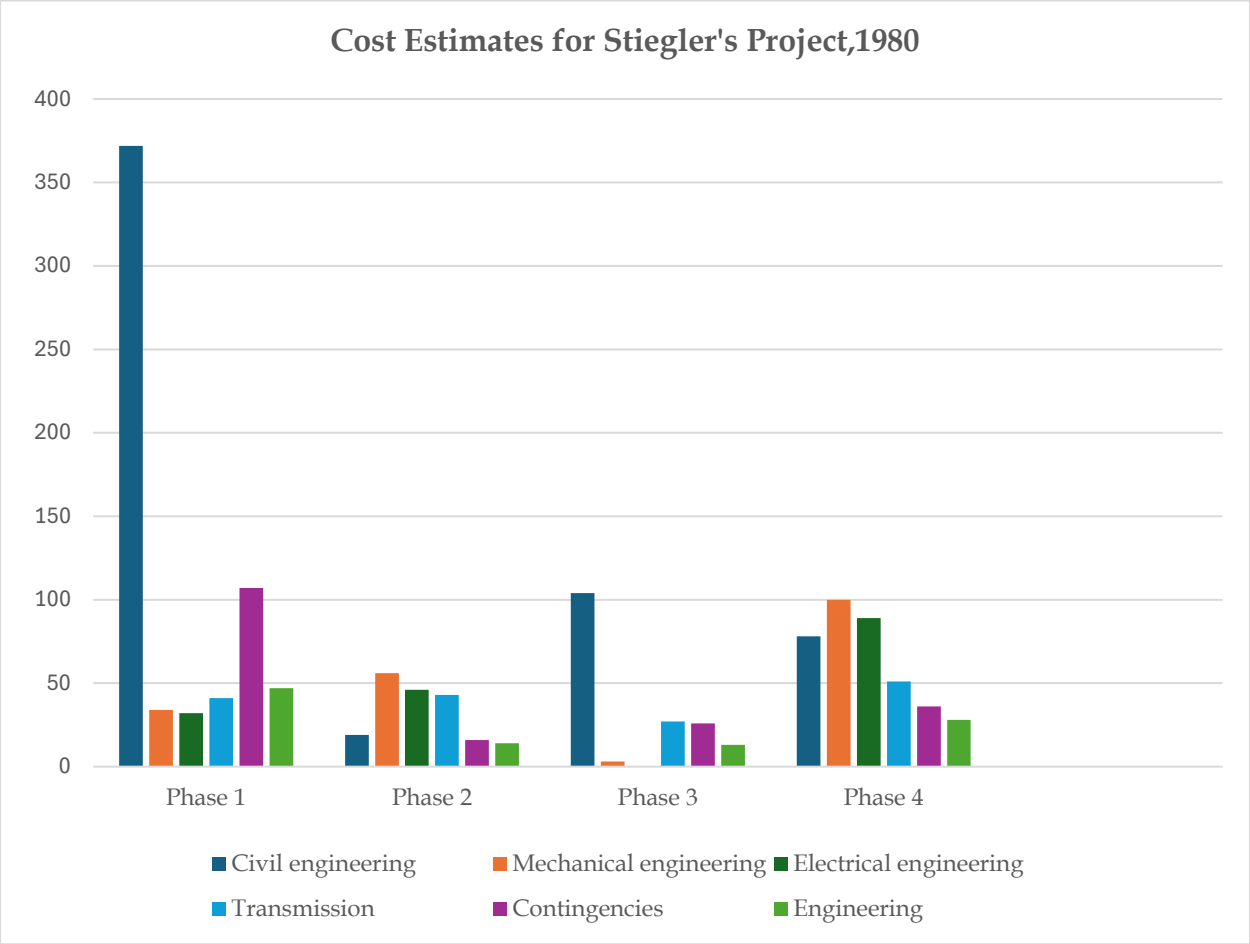

Figure 23: The trend of* Stiegler's *project cost estimates, 1980

The progression of budget estimates indicates that a significant portion of the funds was allocated towards conducting feasibility studies and initiating civil works for the project. Crucially, the project's advancement was secured through Norconsult's

500 NAN, UD 37 4/149: Terms of Reference for Stiegler's Gorge Hydropower Development, Volume 8. Received by the Ministry of Foreign Affairs in October 1975.

subsequent investment in another feasibility study, which addressed concerns initially raised by the World Bank. This new study became the cornerstone upon which the project's progress was built.[501] At the same time, the Tanzanian authorities were eager to implement the plans. Norwegian companies were responsible for mapping the area, building an access road, and establishing a labour camp.[502] Hafslund was responsible for everything related to the dam itself and, therefore, for the largest and most resource-intensive job. Oral testimony and archival data indicate that there was significant activity in the late 1970s, including drilling rock for feasibility studies, with soil samples sent to laboratories in Dar es Salaam for further testing. There were 3 Hafslund helicopters, mainly used to transport soil samples to the laboratories in Dar es Salaam and people for treatment in case of injury. There were mostly Norwegians working with a few Tanzanians on other activities, such as building the workers' camp and the access road to the site.[503] Archival accounts indicate that Norwegian experts worked in Rufiji even before Norway played a major role in Stiegler's Gorge project. For example, Jakob Otnes, the FAO hydrologist, had worked as the state hydrologist in charge of Norway's largest hydrological district and undertaken basin surveys similar to those planned for the Rufiji Basin before being recommended to the FAO by the World Meteorological Office.[504] During NORAD's dominant time, the Tanzanians worked on a contract basis and were paid up to TZS 380 per month. The Norwegian experts conducted extensive planning and research, as well as technical, economic, and environmental studies to assess the feasibility of the project. [505]

The investigation process was so slow because the working environment was so harsh. It is as if Hafslund had no experience of working in such an environment. For example, drilling rocks underwater with crocodiles and hippos was very dangerous, and some

501 NAN, 0001-TAN 012. Generelt Stiegler's Gorge,1971-1979; NAN, NORAD & Hasland Norplan, Executive Summary on Stiegler's Gorge Power and Flood Control Development, Oslo Norway, 1982:20.

502 NAN, NORAD A - 1865, TAN 012 - 021.4. Letter, NORAD to Norconsult, 1971.

503 Focus Group Discussion, Kisaki village, Morogoro Rural, 8th April 2024.

504 TNA 257 AN 19/02/A/204, Letter to Chief Secretary of the Secretariat, Dar es Salaam, 28th July 1955.

505 NAN, 0001-TAN 012: Generelt Stiegler's Gorge,1971-1979; Solomon Toboke who worked with Haslund/Norplan company as a driller at Stiegler's Gorge site in 1978, Interview Kisaki village 8th April 2024.

people were killed while others just disappeared.[506] Evaluation reports show that this was the starting point for Hafslund's engineering activities abroad. So the company stepped in, inexperienced in working in Africa and attracted by the opportunity to export its hydropower expertise, which was exactly the sort of knowledge it wanted to gain in building large dams.[507] Hafslund had known about Stiegler's project from the very beginning and was keen to have a go. However, the company couldn't compete with Norconsult alone, thus it joined forces with Norplan and got the contract.

Figure 24: Construction works in the 1970s.
Source: NAN,0001-TAN 012: "Generelt Stiegler's Gorge"

This was the beginning of Hafslund's business of engineering assignments abroad. The company had been seeking such development for some time, and Stiegler's Gorge helped them get started.[508] The early phase was characterised by great satisfaction at securing such a project for both companies, but at the same time, those involved soon realised that the plans were unrealistic. However, the companies stuck to the contracts they had and took no risks in case of failure, because they still had to profit from the project, even if it wouldn't come to fruition. In the continuation of the planning work, a new set of guidelines was created for the business, called Terms of Reference (TOR).[509] This was built on the TOR document that served as the basis for the feasibility study, but was adapted for the work in the next phase.

506 Interview, 2 Villagers, Kisaki village,08.04.2024.
507 NAN, NORAD, Box 91, 431-TAN 012.5: "Overall Assessment of the Stiegler's Gorge Project" in Lower Rufiji Valley Integration Study, Oslo, 05.12.1983.
508 NAN,0002-TAN 012: Stiegler's Gorge Instructions for Field Laboratory, 1978.
509 NAN, UD 37 4/149: Terms of Reference for Stiegler's Gorge Hydropower Development, Volume 8. Received by the Ministry of Foreign Affairs in October 1975.

The Stiegler's Gorge project exemplifies the challenges inherent in development aid and the potential for multinational corporations to undertake these initiatives with minimal consideration for the host nation's interests. Specifically, in 1975, Norway earmarked 40 million Norwegian kroner for this project, to be disbursed over several years. However, when juxtaposed against the total allocation of 76.5 million kroner for the entire country of Tanzania in the same year, it becomes evident that this particular project significantly overshadowed other developmental efforts within the country. Minutes of meetings between NORAD and the Tanzanian authorities in Dar-es-Salaam show that the budget of 40 million Norwegian kroner was stretched and the whole thing ended up being more than three times as expensive as originally planned.[510] The question thus arises as to why NORAD continued the project to such an advanced level and allocated a substantial amount of money. Despite its success in generating significant financial returns for stakeholders, concerns arise about the project's management and resource allocation. All consulting firms involved were Norwegian, and the materials were sourced from Norway, suggesting that these entities would still benefit substantially even if the project failed to come to fruition. Furthermore, this initiative highlights the challenges faced in efficiently managing finances in large-scale development projects. Internal meeting records suggest that as the project grew in size and complexity, it started competing for resources with other initiatives in Tanzania, particularly due to the increased funding for RUBADA.[511]

This situation was not at odds with what the Tanzanians wanted; the Minister of Finance had previously expressed that Stiegler's Gorge should take precedence over other initiatives. Later, in 1978, when planning was well underway, it became clear that Nyerere wanted Norway to concentrate all its efforts on Stiegler's Gorge.[512] In other words, he was willing to sacrifice all other Norwegian aid to secure development. Nevertheless, the size of the project must have become increasingly difficult for NORAD to defend. This is not least because ideas about development aid changed dramatically in the 1970s, as the focus shifted from industry to rural areas and the

510 NAN, NORAD A - 1853, TAN 012 - 008.08 Phase II. Minutes from Meetings between NORAD and Tanzanian Authorities in Dar-es-Salaam, 16/12 - 19/12 - 1975.

511 NAN, NORAD A - 1853, TAN 012 - 008.08 Phase II: "Minutes from Meetings".

512 NAN, Ministry of Foreign Affairs 37 4/149, vol 14: "Internal Memo, Minister of Foreign Affairs to the Government", 21 July 1978.

general population.[513] While the socialist Tanzanian government envisioned a multi-purpose project in terms of irrigation-based agriculture and flood control, Stiegler's Gorge must be considered an old-fashioned project; after all, the power station was planned to supply a heavy metal industry.[514] This change in the Norwegian view of aid made it impossible to invest as heavily in Stiegler's Gorge as the Tanzanians wanted.[515]

Furthermore, the problem of development assistance is evident in NORAD's execution of the project, which overlooked the potential consequences for the local community. This includes possible effects on individuals, wildlife, the surrounding environment near the dam, and the water movement downstream, potentially leading to unintended negative outcomes. While some people saw the dam as a source of electricity and employment, others viewed it as a threat to the environment and the traditional way of life along the Rufiji River. For the Rufiji people, the dam would have had serious consequences, reducing the availability of traditional medicines, disrupting fishing and interrupting essential wet season flooding, as an interview with a local villager explains:

> *"We feared that the dam would have a devastating effect on the delta - ending the wet season floods that bring fresh water and silt to the river. The mangroves would die, the fish would disappear, and the delta itself would begin to erode into the sea. Rufiji coastal villages downstream, such as Jaja, would be the first to go. But the people in Kisaki and Jaja village and across the delta that I visited had never heard of the dam plan, let alone been consulted."*[516]

Local communities were also concerned about environmental factors and how the dam might affect them. Drawing from the work of Helge Kjekshus (1977), which emphasised the ecological framework as crucial for fostering economic growth, it becomes clear that such projects should consider the broader ecological implications to ensure they contribute positively to both the economy and the environment.[517] At the time, the planning of Stiegler's Gorge project was also subject to criticism from external sources due to the absence of an impact assessment. The realisation of the project would have

513 NAN, Ministry of Foreign Affairs 37 4/149, vol 14: "Internal Memo".
514 NAN, Ministry of Foreign Affairs 37 4/149, vol 14: "Internal Memo".
515 NAN, Ministry of Foreign Affairs 37 4/149, vol 14: "Internal Memo".
516 Interview with a villager in Kisaki village Morogoro, 29 April 2024.
517 Helge Kjekshus, *Ecology Control and Economic Development in East African History*, (Berkeley: University of California Press, 1977):4-15.

resulted in the construction of a dam above the gorge, which would have had a significant impact on the water flow below. This would have had far-reaching consequences for people, animals and the ecology. This issue was not addressed in the work of the first half of the 1970s, even though such considerations were becoming an increasingly important aspect of development assistance in principle. In 1977, the Norwegian Institute of International Affairs (NUPI) and the Forum for Development Studies dedicated an issue to the Stiegler's Gorge project, prepared by Helge Kjekshus. Kjekshus sought to elucidate the multifaceted consequences of the development, with a particular focus on the impact on the inhabitants of the surrounding areas.[518] The article was highly critical of the one-sided nature of the project and highlighted the lack of support for local farmers and fishermen.[519] Kjekshus expressed concern that the project, as originally conceived, would have a detrimental impact on the communities downstream.[520]

At the Ministry of Foreign Affairs, there was a growing sense of doubt about the viability of the plans for the Stiegler's Gorge project. In September 1977, the Ministry, represented by Minister Karl Skjerdal, took the opportunity to express concerns about aspects of the process. [521] In 1979, Skjerdal called for a halt to planning and a review of the project's financial viability, as was sceptical that sufficient funds would be raised to finance the development.[522] Skjerdal also criticised the Directorate for accepting Norconsult's development in one stage without the necessary industrial criteria being in place. Furthermore, the case was presented to the Cabinet in Oslo in 1978, where it was determined that Tanzania was solely responsible for financing the project.[523] A delegation went to Tanzania to negotiate the conclusion of the project. Edwin Mtei[524], who was appointed as finance Minister in 1977, initially enjoyed a cordial relationship with Nyerere, who had personally selected him for the role. However, differences of

518 NAN, Helge Kjekshus, "Økologiske aspekter ved Stiegler's Gorge-prosjektet", in Forum for utviklingsstudier,nr 10, 1977.
519 Kjekshus, "Økologiske aspekter ved Stiegler's Gorge."
520 Kjekshus, "Økologiske aspekter ved Stiegler's Gorge."
521 Kjell Havnevik, The Stiegler's Gorge Multi-purpose Project: 1961-1987. *DERAP Working Papers*: A 131. Bergen 1978.
522 Havnevik, "The Stiegler's Gorge Multi-purpose Project."
523 Havnevik, "The Stiegler's Gorge Multi-purpose Project."
524 The then Politician and Minister of Finance who played an important role in the discussions surrounding the Stiegler's Gorge project.

opinion regarding economic policy led to Mtei's resignation in 1979. Mtei was also held in high regard by Norwegian aid bureaucrats, and it was to him that they sought to appeal (because of his position and reputation)when they wished to finalise plans for Stiegler's Gorge in 1978. At the time, he had expressed cautious reservations about the plans.[525] However, the delegates were confronted with the obligations of a signed contract and persuaded by new calculations and financial plans. As concerns regarding the environmental impact of the project intensified, a report by the Christian Michelsen Institute (CMI) in Bergen was commissioned to analyse the ecological consequences. By this point, the CMI report had also become highly sceptical about the project and repeatedly advised NORAD against proceeding with the plans.[526] This case therefore illustrates interesting institutional aspects of the aid relationship and conflicting views on both sides.

Despite the project's inability to progress, the Tanzanian government remained committed to harnessing hydropower. Aligning with the evolving preference for smaller dams during that era, the government opted to focus on the Great Ruaha Project. Öhman's work shows how the planning process for the project neglected the local communities inhabiting the basin, downplaying the need for resettlement, and linking it to the Tanzanian government's resettlement programmes of the 1970s.[527] Paradoxically, the forced resettlement programme removed the scattered farm settlements with traditional agriculture that could have benefited from flood control. Construction began in 1976, and the dam was inaugurated in 1981, a few years before the reservoir reached its full capacity. In 1989, an 80 MW hydropower plant was added.[528] But even with this addition, the dam could not meet demand, and the government dreamed of a much larger hydropower project, with the most promising being again the development of the power potential of Stiegler's Gorge. In the Second Five-Year Development Plan for 1969-1974, the government emphasised its preference for the largest of all potential dam projects in the country. It admitted that to justify the

525 Edwin N. Mtei, *From Goatherd to Governor: the Autobiography of Edwin Mtei*, (Mkuki na Nyota Publishers, 2008): 149-156.

526 NAN, TAN 012, Chr. Michelsen Institute (CMI)"Norwegian Development Research Catalogue, NORAD and CMI, Bergen 1981.

527 Öhman, "Taming Exotic Beauties":293-313.

528 Öhman, "Taming Exotic Beauties":296.

project, a very high rate of growth in demand would be required during the 1980s.[529] As with the Volta River Authority in Ghana, the construction of the Stiegler's Gorge dam would have to be accompanied by the creation of an energy-intensive industry from scratch. As such, the project lent itself perfectly to the industrialisation paradigm that dominated development discourse in the early and mid-1960s.

Stiegler's Gorge was a large project compared to the Great Ruaha Power Project, and the proposed dam represented a profound intervention in the entire Rufiji Basin complex. As a result, the project called for a comprehensive planning process that would assess the benefits and potential impacts at multiple scales. However, in the book *The Limits to Development from Above*, Kjell Havnevik calls Stiegler's project a "striking example of a large-scale, multi-purpose project for which single-purpose planning of hydropower generation has been carried out"[530] and analyses numerous feasibility studies produced about the project.[531] Havnevik suggests that the reason for the inability of the studies to grasp the multi-dimensional nature of their subject was the limited availability of reference studies rather than the quality of the research carried out.[532] The feasibility studies were carried out by different foreign and internal actors on various aspects of the project between 1961 and 1984. In short, the feasibility studies say more about the prejudices and interests of the organisations and individuals who designed them than about the skills of those who carried them out.[533] However, an analysis of some of the Terms of Reference (TOR), used in the major studies shows that many of them were hastily produced and formed the basis for all further work.[534]

Apart from that, the World Bank questioned the need for Stiegler's dam, given its calculations of limited growth in Tanzania's demand for electricity.[535] It questioned whether Tanzania needed so much electricity or whether it was a waste of effort and urged investment in smaller dams, which were much simpler and cheaper. This was

529 URT, Second Five-Year Development Plan for Economic and Social Development", 1 July 1969 – 30th June 1974, Vol. 1: General Analysis. Dar es Salaam: Government Printer, 1969:126.
530 Havnevik, "Tanzania":282.
531 Havnevik, "Tanzania":263-83.
532 Havnevik, "Tanzania":266.
533 Hoag, "Designing the Delta":174.
534 NAN, TAN 012-301.1, NORAD- I 06431- Kjell Havnevik- Evaluating Av Norconsult on Stiegler's Gorge Rapport, Bergen, October 1975.
535 Havnevik, "Tanzania":274-75; Hoag, "Developing the Rivers":196.

exacerbated by other African dams that seemed oversized for their needs and had many hidden impacts.[536] Criticism of Stiegler's Gorge was not limited to doubts about the demand for the electricity it would produce.[537] Other actors in the 1970s and 1980s including scientists affiliated with the Bureau of Resource Assessment and Land Use Planning (BRALUP) at the University of Dar es Salaam voiced worries regarding both the environmental and societal effects of the project. A notable instance was Sandberg's report, which analysed the socio-economic study of the Lower Rufiji Floodplain and assessed how Stiegler's Gorge Dam influences farming in the Rufiji Floodplain.[538] A series of studies by international researchers, apart from those working for the government or NORAD, confirmed these concerns in the early 1970s.[539] Their findings accused the project developers of ignoring these concerns. In fact, the 1976 terms of reference for a comprehensive study to be carried out by Hafslund A/S did not refer to these studies and continued to focus on the hydroelectric aspect.[540] By this time, however, growing criticism of the ecological and human risks had led the US government and the WB to reconsider their policies on large dams. The US government require that large dam projects undergo environmental impact assessments before construction, a requirement that was soon followed by the WB. In 1977, the WB informed NORAD that it would not approve a single-purpose project for funding.[541]

NORAD attempted to rectify the project planning, which was at a very advanced stage in terms of the technical design of the dam but largely ignored its downstream impacts. However, the subsequent ecological impact study was overshadowed by the developer's attempt to exclude the unsupportive institutes of the University of Dar es Salaam from the planning process.[542] What was originally intended to be a capacity-building programme for Tanzanian institutions became a more or less closed loop

536 "The hidden costs of large dams in the third world," *Now Newspaper*, October 24th,1980.

537 Havnevik, "Tanzania":269-70.

538 Audun Sandberg, A. Socio-economic Survey of Lower Rufiji Flood Plain. Rufiji Delta Agricultural System, *BRALUP Research Paper* No. 34, (University of Dar es Salaam, 1974a); Audun Sandberg, The Impact of the Stiegler's Gorge Dam on Rufiji Flood Plain Agriculture, *BRALUP Research Paper* No. 74/2, (University of Dar es Salaam,1974b).

539 TNA, Tanganyika, no. 3248, Dar es salaam, July 29th, 1983.

540 NAN, TAN 012 ToR (1976). Terms of Reference (ToR), The Hafslund Study, 1976.

541 Havnevik, "Tanzania":275.

542 Havnevik, "Tanzania":276-279.

between external consultants, RUBADA and NORAD.[543] The primary funding for this project came from financial aid and technical support provided by NORAD and the Norwegian government. In January 1975, discussions in Norway regarding Tanzania's proposal resulted in a meeting to discuss furthering the partnership.[544] By the end of the year, the Norwegian government officially announced its commitment to supporting Tanzania's strategic planning with a contribution of 40 million Norwegian kroner and overseeing the planning phase before construction began.[545] During a visit to Tanzania, Norwegian Prime Minister Trygve Bratteli affirmed Norway's role in the project's planning. Despite reaching an agreement, uncertainties remained between the two parties.[546] However, when NORAD published the "Lower Rufiji Valley Integration Study" in 1984, in a last-ditch effort to bring the project planning back on track, the international funding agencies' enthusiasm for Stiegler's project had dissipated.[547] In addition to the growing criticism of large dams, the worsening economic crisis in Tanzania made it even less likely that the country's industry would consume the dam's electricity in the foreseeable future.[548] As a result, the government postponed the construction of the Stiegler's Gorge project.

Although the Stiegler's Gorge project was ultimately shelved in the mid-1980s due to insufficient demand for industrial electricity, this did not mark a total loss, particularly for international development partners. Development agencies were able to derive substantial economic and strategic gains despite the project's non-implementation. By the time the project was suspended, over 28 local and international studies had been conducted at the site[549], contributing to a dramatic cost overrun exceeding the original estimated budget up to 14 times the planned cost of about 80 million US dollars in the 1970s-1980s.[550] NORAD alone invested over 150 million Norwegian Kroner (NOK),

543 Hoag, "Developing the Rivers":197-198.
544 NAN, NORAD A - 1871, TAN 012 B.P 13 - 3: Minutes, NORAD Meeting, 10 January 1975.
545 NAN, Ministry of Foreign Affairs 37 4/149, Volume 8: Press Release Issued by NORAD, 29 September 1975.
546 NAN, Ministry of Foreign Affairs 37 4/149, Volume 8: Internal letter from the Ministry of Foreign Affairs, Development Office to the Legal Office, 13 August 1975.
547 Hoag, "Developing the Rivers":198.
548 Hoag, "Developing the Rivers":199.
549 Hoag, "Developing the Rivers":198.
550 Jarlie Simensen. The Norwegian-Tanzanian Aid Relationship – A Historical Perspective. In K. Havnevik K. & A. C. Isinika (Eds). Tanzania in Transition: From Nyerere to Mkapa (2006). Mkuki na Nyota: 65.

equivalent to 24 million USD in the 1980s. More telling, however, is that Norwegian hydropower firms exported technologies valued at 820 million NOK (128 million USD in 1980s currency), and Norwegian consultants and contractors earned hundreds of millions through expatriate services linked to the project.[551] These figures underscore a striking asymmetry: while Norway secured substantial economic returns and global positioning in hydropower consultancy, Tanzanian taxpayers were left to shoulder the costs of planning a project that was never built.

While the shelving of Stiegler's Gorge may appear on the surface as a planning setback, it also exposes the deeper structural contradictions of Tanzania's socialist development model. The project's failure to take off was not solely due to technical shortcomings but also reflected broader issues within the socialist economic path.[552] By the 1980s, Tanzania lacked the industrial base needed to absorb the planned electricity output. Socialist planning had focused on import-substitution industries and basic infrastructure, but failed to stimulate robust, productive economic activity, particularly in rural areas. This development trajectory, though rhetorically committed to self-reliance, increasingly depended on foreign aid for large-scale infrastructural investments such as the Freedom Railway, Tanzania-Zambia Oil Pipeline, and Great Ruaha Power Project.[553]

In retrospect, the Stiegler's Gorge episode illustrates how donor-driven megaprojects, though framed as developmental, could reinforce external economic interests while deepening dependency on the recipient country. The country emerged from this era with unreliable power supply, ongoing reliance on traditional energy sources, and an unfulfilled vision of socialist transformation. As such, the legacy of the project raises important questions not only about infrastructural planning, but also about the geopolitics of aid and the unintended consequences of externally financed development.

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551 NAN , NORAD,L0376- Africa: Tanzania. TAN 012 Stiegler's Gorge, 1977-1980; NAN, TAN 012-Project Financing Report, Annex ix, 1980.

552 Scott, *Seeing Like a State*

553 TANESCO, Power Sector Development Plan 1985 to 2010 Report by Acres International Limited, 1985.

Furthermore, the mid and late 1980s global economic crisis had a profound impact on Africa, hitting countries like Tanzania particularly hard. During this period, hydropower development declined significantly due to the widespread economic turmoil. The crisis led to the collapse of Tanzania's post-colonial development model and necessitated the implementation of Structural Adjustment Programmes (SAPs). These measures were adopted in response to demands from the international donor community to stabilise the economy amid a challenging global financial landscape.[554] Despite their successes in terms of service provision, two decades of state-led development left Tanzania largely unprepared to deal with the market reforms that were imposed on the country in the 1990s.[555] The SAPs emphasised economic liberalisation, privatisation and cost-recovery principles, leading to a decline in donor support for large-scale hydropower projects and an increased focus on small-scale, decentralised renewable energy projects.[556] Nyerere was one of the earliest and most ardent opponents of the SAPs. He saw some of the International Monetary Fund's demands for spending cuts as an attack on essential parts of his national budget, especially in education and health.[557] The standoff between Nyerere and the IMF lasted for five years until the mid-1980s, during which time the Tanzanian government could barely carry out its basic functions. Attempts by the Tanzanian government to attract support from more sympathetic donors failed when the Nordic countries aligned themselves with the IMF/WB conditionality.[558]

In 1985, Nyerere stepped down as president, paving the way for a president who would implement the demands of the international donor community.[559] His successor, Ali Hassan Mwinyi, soon developed a reputation for having little agenda of his own, earning him the nickname *Mzee ruksa*, meaning "Father of anything goes".[560] Under

554 Roger Nord, Yuri Sobolev, David G. Dunn, Alejandro Hajdenberg, Niko Hobdari, Samar Maziad, and Stéphane Roudet, "Tanzania: The Story of an African Transition," *IMF Departmental Paper* No.002(2009).

555 Lipumba, "Foreign Aid":72.

556 SNA, Biständskontoret, F6:1, SIDA: Tanzania Development Cooperation Report, 1987-1991; Dye, "Dam Building by the Illiberal Modernisers": 231-249.

557 Rebecca Hansing Ghanadan, Public Service or Commodity Goods? Electricity Reforms, Access, and the Politics of Development in Tanzania, (PhD diss., University of California, Berkeley, 2008):64-65.

558 Ghanadan. "Public Service or Commodity Goods?":65.

559 Havnevik, "Tanzania":287-90.

560 Ghanadan, "Public Service":66.

Mwinyi's leadership, the government adopted the WB and IMF-backed Economic Recovery Programme (ERP). The ERP aimed at increasing exports and industrial capacity utilisation, rehabilitating physical infrastructure, and restoring external and internal balances through prudent fiscal, monetary and trade policies. Although the reforms brought about macroeconomic changes, they were also marred by growing corruption among public officials who were well placed to benefit from privatisation, land reform and property liberalisation. The reforms were also criticised for their technocratic design, which left little room for building the necessary capacity in Tanzania.[561] During this time, the Stiegler's Gorge project lost international support when both its environmental concerns and the limited demand for the electricity it would generate became apparent, and the general enthusiasm for large hydropower construction began to cool. However, what remained of the plethora of load forecasts, power sector studies and development plans of the period was the abstract modelling of electricity as a function of economic growth and the top-down planning processes that dominate the discourse on hydroelectricity.

In this section of the thesis, I have situated the basin's transnational development planning and execution within its historical framework, drawing parallels between this study and the initial comprehensive survey of the basin carried out by FAO, published in 1961. Since then, incremental developments have taken place to fit the puzzle created by the FAO, while further efforts have continued to unlock the basin's full potential. Earlier developments for the basin were the development of the Great Ruaha River Valley, the construction of the Mtera and Kidatu hydroelectric dams, the development of the Kilombero Valley and the development of the Rufiji Agricultural Schemes. These were part of the recommendations in the FAO report, some of which were implemented and some of which remained on paper for a long time. While the Stiegler's Gorge project was shelved in the 1980s despite its transnational benefits, the analysis in this chapter suggests that the interplay of foreign actors for the project was conflictual. Foreign actors brought with them interests that differed from those envisioned by the Tanzanian socialist government for the multi-purpose project in the Rufiji Basin. On the one hand, the implementation of the project will mean the completion of the proposed

561 Havnevik, "Tanzania":290.

recommendations and the full socio-economic use of the basin, but on the other hand, it raises the question of whether it will serve the same objectives as envisaged in the 1960s or create new ones. Using the Stiegler's Gorge project as an example, I have shown that Tanzania was at the mercy of transnational and international financial actors and their changing imaginations, which in turn were derived from the common terms of the global development discourse. Its conceptualisation as a political-economic entity and its impact on economic indicators led to a bias in the planning of dam projects. Ultimately, these actors imposed their versions of 'development' on the Rufiji Basin and Tanzania's development sectors.

5.3 Key Tanzanian Actors in the Development of the Stiegler's Gorge Project

This section examines the primary actors on the Tanzanian side who played pivotal roles in the planning and promotion of the Stiegler's Gorge hydropower project. Chief among them is the Ministry of Energy and Minerals, whose involvement, although it was not the official project developer, was both substantial and influential. The Ministry's central role underscores the persistence of a top-down implementation model, a legacy rooted in the colonial administrative structure. As the government body responsible for overseeing energy planning and project preparation, the Ministry exercises authority over budget allocations, generation technology preferences, and the overall strategic direction of the energy sector. Moreover, it significantly influences project development decisions, including the issuance of essential permits and approvals. In large-scale projects such as Stiegler's Gorge, the Ministry also played a key role in providing financial guarantees, further cementing its position as a powerful actor in Tanzania's energy governance landscape.[562] Despite the existence of an authority legally responsible for overseeing development in the Rufiji Basin, the Ministry also played a significant role in this regard. Secondly, TANESCO. As the sole transmitter of electricity within Tanzania, the company has a monopoly on distribution for the foreseeable future. It was therefore to be a key partner in Stiegler's project as a buyer of electricity for Tanzania and as a transmitter to power purchasing countries or companies. TANESCO also played an important technical role in the planning of the

562 URT, Power System Master Plan 2012, Dar es Salaam, Ministry of Energy and Minerals,(Updated May 2013).

energy system.[563] Third, the Water Act of 2009 introduced a new management system in Tanzania, proposing that water be managed on a regional scale and in a more participatory manner through River Basin Water Authorities under the Ministry of Water. These authorities consisted of both government and Water User Association representatives. The Rufiji Basin Development Authority (RUBADA) was the relevant institution responsible for granting water user permits and overseeing the terms contained within. Additionally, it was tasked with managing a project of national interest: the Stiegler's Gorge.[564] Fourth, the Ministry of Water and River Basin Authorities (Rufiji River Basin Authority). The Water Act of 2009 instituted a new regime in Tanzania where water was proposed to be managed on a regional scale and in a more participatory manner by River Basin Water Authorities. The authority was made up of government and Water User Association representatives. RUBADA was the relevant institution in charge of granting a water user permit and the terms contained within. In addition, it was responsible for a project of 'national interest', the Stiegler's Gorge. Fifth, the Ministry of Environment and the National Environmental Management Council (NEMC). The 2004 Act and subsequent government decrees made environmental impact assessments mandatory in Tanzania. For a large project such as Stiegler's Gorge, a full EIA was required, including a public consultation phase. The assessments were then submitted to the NEMC to assess the technical quality of the EIA. The NEMC then forwards them to the Minister of the Environment, who grants or refuses permission. Lastly, the Ministry of Natural Resources and Tourism and Wildlife Division/TAWA. The Ministry oversees the Wildlife Division, reorganised as the Tanzanian Wildlife Authority (TAWA) and is responsible for managing Tanzania's protected areas (as distinct from national parks). These institutions played crucial roles in the development of the energy sector and Stiegler's Gorge project at different levels. However, following the government's decision in 1975, RUBADA assumed primary responsibility for overseeing the overall development of the entire Rufiji Basin, as detailed in the following section.

563 URT, The National Energy Policy, (Dar es Salaam, Ministry of Energy and Minerals, Dar es Salaam, 2003):26.

564 URT, Water Act. Ministry of Water and River Basin Authorities, (Ministry of Water, Dar es Salaam, Tanzania, 2009).

5.3.1 RUBADA and the Making of Futures

One of the main recommendations of the 1967 USAID report was for the creation of an organisation to oversee the strategic planning and development of resources within the Rufiji Basin. This proposal echoed similar sentiments expressed in the 1974 CMI report. The USAID report states;

> *"Development of power-oriented industries to absorb a substantial part of electricity, becoming available from Stiegler's Gorge will represent an entirely new dimension of the industrial development in Tanzania. It represents a challenge to the first order of the government of Tanzania to establish an institutional framework which shall be necessary to handle all sides of planning, establishment and operation of large enterprises and cooperation which in this context becomes necessary with external institutions"*[565]

In 1974, the government of Tanzania established a statutory body, RUBADA by the act of Parliament number 5 of 1975.[566] The main goal of RUBADA was to monitor and regulate the development of resources within the Rufiji River Basin. This included initiatives such as the generation and distribution of affordable hydropower, the management of the Ruaha-Rufiji River floods, and the maximisation of agricultural benefits, particularly in the basin's delta region. Its core functions included the generation and distribution of hydroelectric power, the implementation of flood management strategies and the promotion of various economic sectors such as agriculture, fishing, manufacturing, tourism, transport and environmental conservation through forestry.[567] The parliamentary legislation that established RUBADA gave it the power to contract, secure, protect, manage and supervise projects within the Rufiji Basin. Crucially, it was tasked with overseeing hydropower generation and transmission. Over time, however, its role evolved to include a wider range of responsibilities. Specifically, RUBADA played a multi-sectoral role, charged with promoting, managing, coordinating and enabling sustainable and harmonious long-term environmental and socio-economic growth.[568]

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565 USAID, " Report on Stiegler's Gorge Project":13.

566 URT, RUBADA Act no. 5,1975.

567 EAF UDSM Library: "RUBADA, Brief Information about RUBADA" undated.

568 NAN, TAN 012-008.23. RUBADA, A Brief Memorandum of the Stiegler's Gorge Power and Flood Control Development, Report No.2,1981.

The organisation was set up when the Tanzanian authorities decided to go ahead with the full development of the power station, as proposed in Norconsult's first report. The plan was for RUBADA to coordinate further work on the project and to be an administrative organisation for the development of the entire Rufiji area. NORAD first heard of the new organisation during negotiations for the continuation of the project in December 1974.[569] At a board meeting held within the NORAD directorate, RUBADA was subsequently recognised as the organisation to oversee all aspects of resource development and utilisation within the Rufiji Valley. However, the primary responsibility was clearly to support the operation of the Stiegler's Gorge power station. It was also essential to determine how this power would be utilised and to implement strategies to ensure that energy-intensive industries could benefit from any surplus power generated. This role encompassed a wide range of responsibilities and placed her at the centre of all issues relating to future development.[570]

RUBADA worked with NORAD from the outset, asking NORAD to provide a civil engineer to liaise with RUBADA's consulting team. This arrangement was mutually beneficial, allowing NORAD to oversee the work of external consultants on the project while allowing RUBADA to play a key role in the future planning of the Stiegler's Gorge project.[571] The involvement of RUBADA, tasked with managing the project from a Tanzanian perspective, ensured localised oversight and facilitated regular monitoring of progress. In addition, both parties recognised the need for increased expertise within Tanzania to ensure the operation of a future power plant and saw this collaboration as a stepping stone towards achieving these goals.[572] The original plan was for the Tanzanian government to contribute financially to the establishment of a new organisation, with NORAD providing a limited number of staff and eight million kroner.[573] However, as RUBADA struggled to meet its financial obligations, the situation necessitated increased reliance on foreign aid. In August 1976, concerns about

569 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting," 18.09.1975.
570 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting,"18.09.1975
571 NAN, NORAD A - 1859, TAN 012 - 013.1 "Phase II Consultancy in General: Isaksen, Memo", 23.03.1976.
572 NAN, NORAD A - 1853, TAN 012 - 008.08 "Phase II: Meeting Minutes, Dar es Salaam," 12 December 1974.
573 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting," 18 September 1975.

RUBADA's financial stability were communicated to the Tanzanian authorities by Director Arne Arnesen. This resulted in NORAD increasing its assistance to meet the objectives for which it was originally intended.[574]

Arnesen urged the Tanzanian government to allocate significantly more funds than had been budgeted for 1977 and 1978. Subsequently, it became apparent that RUBADA's operations would be jeopardised by Tanzania's economic conditions.[575] Confidential communications within NORAD revealed that they had been privately informed that RUBADA might not be able to meet its commitments.[576] At the board meeting in December 1976, it was mentioned that the development of the Stiegler's Gorge project was progressing more slowly than expected. From NORAD's point of view, it was clear that the organisation could not fulfil its intended role and that it required additional staff and financial support. As a result, this situation placed an additional financial burden on NORAD amid escalating funding competition.[577]

During the end of the 1970s, Tanzania faced major economic challenges that significantly hampered RUBADA's ability to fulfil its extensive tasks. Individuals closely involved in the planning aspects on the Norwegian side, such as at NORAD and Hafslund, including Bjørn Lunøe, a project manager for NORAD from 1978 to 1979 and Nils-Isak Fossen who was a project manager for Hafslund throughout this period, indicated that RUBADA's efforts were ineffective.[578] They pointed out that the organisation was set up in haste, resulting in unstable leadership, with three leadership changes during the process. The historical record from Hafslund's perspective portrays RUBADA as a liability rather than a beneficial participant in developing Stiegler's Gorge project.[579]

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574 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting," 18.09.1975.

575 NAN, NORAD A - 1871, TAN 012 - 123.1: "Letter, Arne Arnesen to the Tanzanian Ministry of Finance", 18 August 1976.

576 NAN, NORAD A - 1871, TAN 012 - 123.1: "Letter, Arne Arnesen to the Tanzanian Ministry of Finance,"18 August 1976.

577 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting," 2 December 1976.

578 NAN, NORAD A - 1870, TAN 012 - 311.1, "Phase II: Letter, NORAD to the Ministry of Foreign Affairs Regarding Discussions in Dar es Salaam," 1-9 November 1977.

579 NAN, NORAD A - 1870, TAN 012 - 311.1, "Phase II: Letter, NORAD to the Ministry of Foreign Affairs,"

In Tanzania, the initial pool of expertise was concentrated within the Tanzania Electric Supply Company (TANESCO), the exclusive entity operating in the sector at the time. Oral evidence suggests that TANESCO's top experts were mostly trained in Norway or received Norwegian scholarships.[580] However, the government was hesitant to grant them significant roles in major projects, such as Stiegler's Gorge, due to concerns that this could lead to an imbalance of power.[581] Additionally, May-Britt Öhman suggests that TANESCO was not highly regarded among Tanzanian politicians who had participated in the independence movement. This lack of recognition can be attributed to the fact that TANESCO was established during the colonial era and maintained strong connections with the UK. Furthermore, as mentioned in chapter three of this thesis, the company was overlooked during the Swedish-led development efforts for the Great Ruaha project.[582]

An analysis of RUBADA's involvement in the Stiegler's Gorge project reveals a significant lack of technical and administrative capacity within the organisation, particularly on the Tanzanian side, but also involving contributions from NORAD. This suggests that setting up such an organisation quickly would have been challenging, regardless of financial circumstances. This perspective echoes former Tanzanian Finance Minister Edwin Mtei, who highlighted state organisations as a source of problems within Tanzania. Following the Arusha Declaration of 1967 and subsequent policies such as nationalisation, numerous similar organisations emerged, many of which were characterised by ineffective leadership, obsolete equipment and inadequate financial resources. In addition, the Ministry of Finance provided substantial loans to underperforming companies that were still struggling to meet their obligations, resulting in many unfinished projects across Tanzania. This pattern was repeated in other initiatives, including those in Sao Hill and Mbegani, where there were significant difficulties in working with Tanzanian state-owned enterprises.[583] It can be inferred that despite these challenges, RUBADA was given broad responsibilities, including

580 Expert Interview, TANESCO Engineer, Dar es Salaam, 21st April 2024.
581 NAN, NORAD A - 1863, TAN 012 - 011.22: "Minutes, Board Meeting," 2 December 1976.
582 Öhman, "Taming Exotic Beauties": 16.
583 Mtei, "From Goathead to Governor": 162-163.

coordinating the development of multisectoral activities in the entire Rufiji Basin[584], addressing energy use issues, and facilitating the transfer of surplus power to industrial sectors. This indicates a lack of clarity about the organisation's intended outcomes.

RUBADA's primary role was much more limited than might have been expected. Its main contribution from when it was established to the 1980s was to provide labour support to Norwegian experts who played the dominant part in the development of the Stiegler's Gorge project. Crucially, RUBADA established a campsite at Stiegler's Gorge, adjacent to the Norwegian camp, where Tanzanian workers were housed. Oral testimony suggests that these Tanzanian workers performed tasks that the Norwegians could not do, underlining their critical importance.[585] In addition, RUBADA took on the task of monitoring the impact assessments carried out in the early 1980s. In light of these circumstances, one could contend that RUBADA intended to play an important role in the planning work but encountered difficulties in carrying out its duties primarily due to ambiguous goals, both internal and financial limitations, lack of sufficient expertise, and issues within the team dynamics. These interconnected challenges significantly impaired RUBADA's capacity to successfully execute the Stiegler's Gorge project.

Due to the poor and dismal state of the country's economy in 1980, the government of Tanzania decided to shelve the Stiegler's Gorge project. The emphasis shifted to rehabilitating existing electricity-generating installations and improving industrial sector performance. However, RUBADA's hydropower planning activities for the Stiegler's Gorge project including NORAD's financial support for such planning were not frozen since the end of 1984. RUBADA painfully adjusted to agriculture project planning for the development of the Rufiji Basin. Though agriculture is an important sector in Tanzania's economy, it is not the focus of this study. At the political level, it seemed that Stiegler's Gorge project did not die completely because there were continued efforts behind the doors to secure funds for the project. There were also

584 The Rufiji Basin area covers 117,000km2 or 20% of the country comprising whole or part of eight regions of Coast, Morogoro, Dodoma, Ruvuma, Mbeya, Lindi, Singida and Ruvuma (RUBADA Annual Conference Report, 5th March, 1984).

585 Interview with a Villager, Kisaki Village, Morogoro, 8th April 2024; Interview with 2 villagers, Kisaki Village, Morogoro, 9th April 2024.

official contacts between Tanzania and donors geared to explore possibilities of cooperation in the energy sector including joint development and utilisation of the Stiegler's Gorge project.[586] The project's delayed execution and impact on the local community is the subject of discussion in the next chapter of this thesis.

From 1975 to 1985, RUBADA primarily functioned as an intermediary in the awarding of contracts, mainly to foreign consultancies. Among these consultancies, Norconsult A/S, a major Norwegian consortium known for its expertise in economics, engineering and architectural design, held a dominant position. For example, in the Rufiji Hydropower Master Plan study conducted by Norconsult from 1982 to 1984, the consultants themselves formulated the terms of reference, indicating the unscientific practice of high modernist planning. This approach resulted in incomplete terms of reference and repetitive studies. In essence, this dynamic of dominance and subordination inadvertently promoted the economic interests of foreign private firms, particularly those from Norway, over similar global competitors, thereby neglecting the promotion of Tanzanian interests.

The foregoing discussion has revealed that throughout the planning stages of Stiegler's project, there was minimal involvement of local consulting firms, particularly in areas where their expertise could have been valuable, such as working with the University of Dar es Salaam. This lack of engagement with local technological capabilities, combined with insufficient financial resources, led RUBADA, the organisation tasked with developing the Rufiji Basin, to prioritise foreign expertise. As a result, RUBADA negotiated from a disadvantaged position due to these constraints. Beyond RUBADA, other local scientific and technological institutions and highly qualified personnel had limited involvement in the extensive studies associated with Stiegler's Gorge project. For example, BRALUP was only marginally involved in assessing the impact of wildlife and productive activities in the Rufiji Basin, while NIMR conducted a small-scale study of the health impacts, particularly concerning malaria and other water-borne diseases associated with the project. The heavy reliance on Norwegian expertise led to dissatisfaction among local experts and increased dependence on foreign knowledge

586 Global Infrastructure Development and Finance Ltd, "Proposal to Develop a Multipurpose Rufiji Power, Water and Irrigation Project at Stiegler's Gorge", 15 July 2008.

and skills. Moreover, since the failure of the project in the 1980s, the organisation was relegated to a marginal role. Its importance, staff and funding declined, and it was transferred from the President's Planning Office to the less important Ministry of Agriculture, then disbanded after its role was no longer considered important.

5.4 New Actors and the Adoption of a New Model in the 2000s

As previously discussed, although there were both internal and external efforts to support the planning and design of the Stiegler's Gorge project since the 1960s, the initiative did not commence as planned. Consequently, the project was put on hold until its revival in the 2000s. This situation coincided with the resurgence of large dam projects after a period dominated by smaller dams. During this time, new players entered Stiegler's project planning process.[587] According to Dye, over the past three decades, there has been an impressive comeback in dam construction across Africa, with initiatives underway in countries such as Liberia, Ghana, Rwanda, Tanzania and others. This resurgence has been driven by several factors, including the availability of technical expertise, financial support from actors such as Brazil, China, India and the Gulf Cooperation Council (GCC) countries, and the desire of some African nations to replicate the successes of their counterparts in Asia in using infrastructure to enhance both political and economic independence.[588] Billions of dollars have been spent on new or upgraded dams, and partly as a result of this competition from (re-)emerging powers, the World Bank has also reprioritised infrastructure in Africa.[589] In Tanzania, Stiegler's Gorge project exemplifies a failed anticipation of transnational, international aid and local actors in the mid-1980s because it was a project in the imaginations of the actors rather than in practice. The project plans remained on hold until 2007, when the prevailing regime ushered in an era of economic expansion, marking the resurgence of what Dye refers to as "illiberal modernisers." This period saw the revival of a robust

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587 Barnaby, Dye, "The Return Of 'High Modernism'? Exploring The Changing Development Paradigm Through a Rwandan Case Study of Dam Construction," *Journal Of Eastern African Studies* 10, No. 2 (2016): 303-324.

588 Dye, "The Return of 'High Modernism'? ":303-324.

589 Dye, "The Return of 'High Modernism'?"305-324; Harry Verhoeven, "The Party And The Gun: African Liberation, Asian Comrades and Socialist Political Technologies," In *Marx And Lenin in Africa And Asia*, (UK: Routledge, 2021):112-133; Alexandra O. Zeitz, "Emulate or Differentiate? Chinese Development Finance, Competition, and World Bank Infrastructure Funding," *The Review of International Organizations* 16, no. 2 (2021): 265-292.

modernist approach, highlighted by the commencement of long-delayed dam construction projects. [590]

At this time, new actors came into the picture to provide support for the development of the project. Stiegler's was conceived as a public-private enterprise where one side was Odebrecht, a Brazilian company, while on the other was the government authority, RUBADA. This arrangement did not work out as financing became a challenge for both parties. Dye's study linked these failures to changes in leadership in Tanzania and inconsistent policies in both Tanzania and Brazil, suggesting that international involvement in dam construction projects has been negatively impacted due to fluctuations in foreign relations.[591] In an ongoing commitment to bolster the project, the government of Tanzania enacted a policy focused on infrastructure development to stimulate economic expansion. The policy aimed to achieve a significant expansion of electrification, high-quality roads, a standard-gauge rail network, and advanced seaports. The goal was to integrate the country internally, regionally, and globally. To achieve this, the government adopted the Integrated Industrial Development Strategy 2025.[592] The strategy aimed to transform the nation into a middle-income country by 2025. With the fourth regime in power (2005–2015), these infrastructure projects began moving forward and even vigorously with the (2015-2021) regime.

The idea behind dam resurfacing was rooted in the belief that it could stimulate economic growth by providing affordable and reliable electricity. The initiative gained momentum in 2005 when the planning phase for the Stiegler's Gorge Dam project was revived. As a result, the government embarked on a search for civil engineering companies capable of undertaking the construction on a private basis. South African and Canadian companies, as well as China's Sino-hydro, submitted bids, but the Brazilian Odebrecht company made the most attractive offer and won the tender. Odebrecht Limited, Brazil's largest civil engineering company, proposed to both

590 Dye, "Dam Building by the Illiberal Modernisers": 232-249.

591 Barnaby Dye, What Holds Back Dam Building? The Role of Brazil in the Stagnation of Dams in Tanzania. Future DAMS Working Paper 006, (Manchester: The University of Manchester, 2020):1-20.

592 URT, Integrated Industrial Development Strategy 2025, Dar es Salaam, Ministry of Industry and Trade, 2004.

finance and build the project, and would be repaid through the sale of electricity.[593] The Brazilian President, Lula da Silva, visited Tanzania in 2010 to promote economic and political cooperation between Africa and Brazil during his first term as president (2003-2010).

From the 2000s onwards, the need for, and the existence of, old forms of transnational energy aid were themselves called into question. New financiers such as China, India and Brazil entered the global energy scene, marking a shift from the conventional North-South divide to a more multipolar terrain.[594] RUBADA and the Brazilian Company Limited, Odebrecht joined forces to make a second attempt to build the Stiegler's Gorge dam. It was Latin America's largest construction conglomerate and has a good track record of being able to design and build functional projects. The company planned to build a 130-metre-high and 800-metre-long concrete-faced rockfill dam across the 8-kilometre-long and 100-metre-deep Stiegler's Gorge in the Selous Game Reserve. In addition, four-saddle dams totalling 14 km were to be built upstream. The reservoir would eventually hold 22 million m3 and cover an area of over 1,200 km2. The proposal included an installed capacity of 2,100 megawatts. In addition, 400 km of transmission lines and 220 km of roads were planned.[595]

In 2010, the Stiegler's Gorge project was again inspired by its realisation from different actors. According to the RUBADA director, financial support from South Africa's Infrastructural Development Finance (IDF) and Canada's Energem was ready to back the initiative. This collaboration was formalised through an agreement signed between IDF and RUBADA in 2007. In contrast to these developments, the historical record shows a significant setback. On 4 December 2007, RUBADA received a communication from the Ministry of Agriculture, Food and Cooperatives. This contained a directive from the Tanzanian President to terminate the agreement on the grounds of illegality and procedural irregularities. Consequently, the Ministry asked RUBADA to cease all activities related to the implementation of the agreement.[596]

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593 Dye." What Holds Back Dam Building?":12-15.

594 Dye, "What Holds Back Dam Building?":19-20.

595 Dye, "What Holds Back Dam Building":18-20.

596 JMT, RUBADA "Mkataba wa Mwekezaji Kuzalisha Umeme Mto Rufiji (Stieglers Gorge)," Dar es Salaam, Wizara ya Kilimo, Chakula na Ushirika, 4.12.2007.

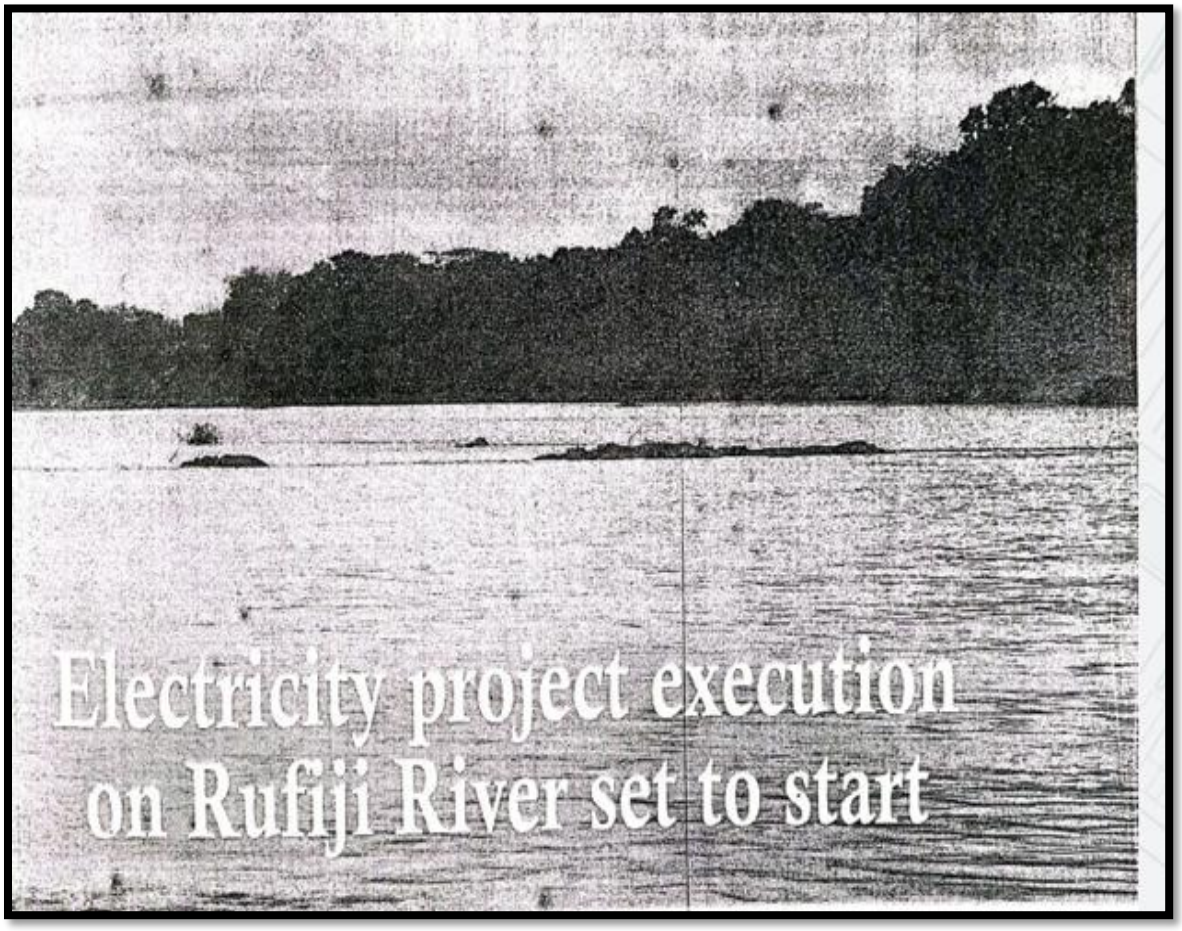

Figure 25: Plans to Revive the Stiegler's Gorge project
Source: Guardian 17th January 2010

In 2011, the *Express* newspaper heralded a headline *'a solution to power problems in sight'*. This was about the power shortages that Tanzania was facing at the time, and how the completion of the Stiegler's Gorge Power Project, would make blackouts a thing of the past. Speaking to journalists, the then Director General of RUBADA, Aloyce Masanja, revealed that a Brazilian company, Odebrecht, had shown interest in undertaking the project and that a team of experts had already visited Tanzania to conduct an assessment. Odebrecht concluded that the project was viable, easy to implement and could produce significant electricity.[597] As a sign of the government's commitment to the project and to finding a sustainable solution to the country's energy problems, then Prime Minister Mizengo Pinda led a delegation of experts from RUBADA and other government officials to Brazil, partly to learn from their experience in hydropower

[597] The Express, 10th November 2011.

generation.[598] This was because more than 85 per cent of the power in that country was produced by hydroelectricity.[599] The Stiegler's Gorge project was expected to be completed and generate electricity by 2015, bringing huge relief to the country's experience of power crises.[600] Masanja said, "If all goes well, serious power shortages could be history shortly following the completion of the Stiegler's Gorge Power Project, which has the potential to generate 2100 MW and, once completed, will occupy only three per cent of the reserve".[601]

As part of the government's efforts to find a lasting solution to Tanzania's power blues, another team of experts from Odebrecht Company Limited were invited to visit Tanzania. On both visits, the dam experts visited the gorge and other parts of the Rufiji River. The purpose of the second visit was to gather data on the feasibility of the project before signing the Memorandum of Understanding (MoU). The final expert report was expected to be published before the end of 2011, while the MoU between the company and RUBADA on behalf of the Tanzanian government was expected to be signed before January 2012. During the visit, Odebrecht's then-senior consultant, Jean Comtesse, said they were in Tanzania for the second time, mainly to contribute to the technical improvement of Stiegler's project. He said: "Having the best technical solution will have an impact on the final character of the project and its environment, which everyone knows is very critical".[602]

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598 The Express, 10th November 2011.

599 Stiegler's Kutatua Tatizo la Umeme, *Tanzania Daima*, 08.11.2011; Mwananchi, Mradi wa Umeme Rufiji Kumaliza Kero Nchini, *Jambo Leo*, 08.11.2011; RUBADA: Ufumbuzi wa Umeme Kupatikana,08.11.2011; *Habari Leo*, Stiegler's Gorge Kuanza Uzalishaji Umeme 2015, *Majira*, 07.11.2011; Brazil set to Build New Power Station, *The Citizen*, 07.11.2011.

601 Rufiji Basin to Produce 2100MW Power, *The African*, 8th November 2011.

602 Stiegler's Gorge Project could end Power Blues, *Daily News*, 21.12.2011.

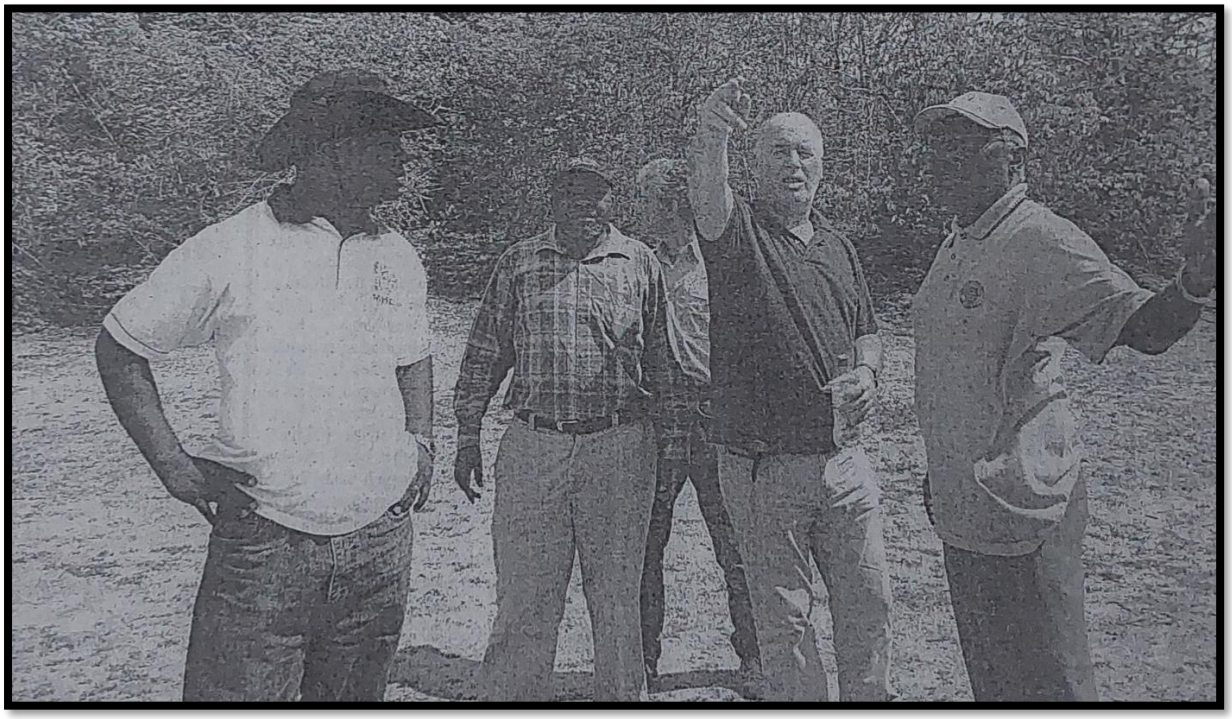

Figure 26: Odebrecht's Brazilian engineering director Anthonio Lucas(second right)shows RUBADA board chairman Raphael Mwalyosi (right)how power will be generated at Stiegler's Gorge when a team of Brazilian energy experts visited the project area.

Source: The Guardian, 28th November 2011.

During the dam-building boom of the previous era, RUBADA was formed and decided to revive Stiegler's project, which could generate up to 2100 megawatts and become one of the largest dams in Africa. In 2012, Tanzania and Odebrecht, Brazil company signed a Memorandum of Understanding (MoU) deal to advance the project with feasibility analysis.[603] Despite meticulous planning, a corruption scandal involving President Lula and Odebrecht brought operations to a complete halt, Lula was jailed and Odebrecht filed for bankruptcy. [604] The corruption scandal forced Odebrecht to abandon the project, leading to another halt in progress.

Odebrecht estimated the investment cost of the dam at US$3.6 billion, excluding the power lines needed to connect it to the national grid. The company provided technical planning and even advised on how to deal with opposition to the dam from the World

603 Daily News, 21.12.2011.

604 Brazil's Odebrecht Corruption Scandal, *BBC News*, 17th April 2019.

Heritage Committee and conservation NGOs.[605] When the time came for Odebrecht to withdraw from the project, the Tanzanian government suggested that Ethiopia could fill the gap. Despite this, the plans continued and on 22 October 2018, Egyptian media announced that Arab Contractors, a leading Egyptian construction company, had been selected to undertake the development of Stiegler's Gorge. This announcement was followed by the formalisation of the construction contract, worth US$3 billion, on 12 December 2018. In this iteration, the model shifted as African entities began to support the initiative, with particular interest from Egyptian companies. Egyptian President Abdel Fattah el-Sisi was spearheading a major economic growth plan for his country, with an infrastructure-focused strategy. The contract to build the dam was awarded to the Egyptian company Arab Contractors, with El Sewedy handling the electrical aspects. Generators and transformers were supplied by China's Dongfang Electric Company. El Sisi highlighted the project as one of Egypt's most important endeavours, demonstrating his commitment to supporting the Nile Basin countries in their quest for energy development.[606]

Although Stiegler's proposal had been conceptualised over a long period, it remained primarily in the realm of theoretical exploration rather than practical implementation. Looking back at the development of the Rufiji Basin Project and drawing on the findings of the Food and Agriculture Organisation (FAO) surveys initiated in the late 1950s, it becomes clear that the strategy adopted for this project was overly simplistic. Extensive studies were undertaken to assess the social impacts of the project, in addition to its primary focus on power generation. The original intention of the dam was multifaceted: to alleviate flooding, promote agricultural growth, generate electricity and stimulate industrialisation. However, most consulting firms only focused on the electricity aspect, which means hydropower was more enchanting thus, neglecting other facets of the project. This was because they had nothing to lose, whether the project was realised or not. The project became a center for donors to sell their technology and expertise in the name of development, while RUBADA became a

605 Odebrecht, Stiegler's Gorge Hydropower Project; Report and Proposal of Development, (Grand Cayman: Osel Odebrecht Services no Exterior Ltd, 2013); Barnaby Dye, "Brazil's Boom and Bust in Tanzania: A Case Study of Naivety? *Brazil-Africa Relations in the 21st Century: From Surge to Downturn and Beyond* (2021): 73-93.

606 Daily News, 21.12.2011

house for giving tenders. Eventually, RUBADA shifted its attention to agricultural development in the lower Rufiji and Kilombero valleys because there was no tangible results achieved from the activities it was to perform. As the report from the auditor general indicated, RUBADA was not able to undertake the activities it was assigned to:

> *"It has now come to light that the controller and audit general had proposed a way back that RUBADA did not have the financial muscle to undertake the 2.4 billion dollars hydropower plant. It was the reason why the national assembly endorsed in its latest session a bill to disband the authority after it came to light that it had outlived its purpose"*[607]

The decision included the transfer of its assets and debts to the ministry responsible for development and planning. In addition, the workers were to be transferred to other government institutions, with those deemed redundant receiving their benefits and being dismissed. Presenting these changes in Parliament, the Attorney General, Mr George Masaju, assured that all contracts previously entered into by RUBADA would be honoured and fulfilled.[608]

5.5 Conclusion

This chapter has explored the complex interplay between ambitions, historical backgrounds, and the intricacies of actual outcomes, focusing specifically on the evolution of hydropower in the Rufiji Basin at Stiegler's Gorge from the 1960s to the 2010s. It not only illuminates the various forces that shape large-scale infrastructure initiatives but also offers crucial insights into the underlying challenges that can obstruct the journey towards sustainable development. The chapter underscores several key factors that played a pivotal role in the Stiegler's Gorge project's development. It suggests that inadequate preparation led to significant issues that were either concealed or disregarded during decision-making processes by both involved parties. It is crucial to emphasise that this lack of transparency was likely unintentional, reflecting common patterns observed in large-scale development endeavours in hindsight. Efforts to rectify these issues aimed at salvaging the project ultimately fell

607 Tanzania: RUBADA Have no Financial Muscle to Undertake the Stiegler's Power Plant, *Daily News*, 27th September 2017.

608 Government Proposes Disbanding RUBADA, *The citizen*, September 12, 2017.

short. Consequently, the Stiegler's Gorge project and its international involvement serve as a case study illustrating the reverse flow of ideas from the Global South to the Global North through the lessons derived from this experience. These lessons highlight the necessity of comprehensive planning and impact assessments before undertaking large-scale aid projects, the value of establishing achievable objectives rather than overly ambitious ones (a lesson Stiegler's Gorge did not learn regarding feasibility studies), the importance of learning from past errors and the experiences of similar projects and other financiers, and the critical need for improved resource management and financial oversight in large-scale aid projects.

More importantly, the chapter exposes the multifaceted character of energy visions and aid interventions by local stakeholders in the Global South, viewed through a historical perspective and informed by transnational and traveling theories. The findings underline the substantial influence of donor programs and bilateral relationships in moulding hydropower infrastructure projects and policy discourses. They also reveal the shortcomings of local support bodies' failures leading to aid dependence. While transnational backing offered prospects for collaboration and advancement in Tanzania's hydropower vision, it is essential to note that support alone doesn't ensure materialisation. Despite being envisioned in the 1960s with robust donor support and domestic backing as a cornerstone of Tanzania's quest for a sustainable energy source to bolster industrialisation, Stiegler's Gorge can only be deemed a failure of development aid and domestic support in Tanzania's planning. Acknowledging the benefits reaped by transnational actors, especially consulting firms, from the project, it was determined that the private sector should be encouraged to participate in development aid more broadly. Therefore, these transnational entities, offering technologies, expertise, and export finance under the guise of development assistance, bear significant responsibility for the project's failure. Ultimately, one might argue that Stiegler's Gorge wasn't a failed project per se, but rather a venture too risky due to its foundation in the imaginations of those involved rather than practical application.

CHAPTER VI

FROM DELAYED FUTURE TO REVITALISATION: THE TEMPORAL POLITICS OF STIEGLER'S GORGE DAM

6.1 Introduction

This chapter turns to a conceptual and empirical exploration of delayed futures, focusing on Stiegler's Gorge Dam project. It examines how infrastructure can become suspended in time, being repeatedly planned, postponed and revived, while leaving tangible social and political traces. The concept of a "ghost"[609] in this study is used to describe the peculiar afterlife of the dam as both a dormant vision and a recurring national aspiration. Through historical analysis and local perspectives, the chapter examines the various reasons for the project's prolonged delay, including shifting development paradigms, ecological disputes, geopolitical changes, and planning inconsistencies. It also explores how the project's eventual revival signifies more than just the continuation of an old plan; it represents a reconfiguration of its meaning and urgency. In doing so, the chapter highlights how dormant projects can resurface with altered logics that reflect evolving political conditions and renewed efforts to inscribe modernity on the landscape.

Dam projects are complex, multi-year endeavours involving extensive design and construction phases. Such projects are often subject to numerous design changes and delays, which can sometimes lead to project failure.[610] Several factors contribute to these delays, including assessing environmental impacts, ensuring equitable benefit sharing and balancing industrial growth with the conservation of available natural resources. The timeline illustrates the impact that such a project has on local communities in the surrounding downstream area. As discussed in previous chapters, the Stiegler's Dam project was planned and re-planned since the colonial period, with

609 The aspect of 'ghosting' of infrastructures is addressed in detail in a published paper. See "Emma Minja, & Detlef Müller Mahn, "Reviving a Ghost Project: The Long History of Nyerere Dam in Tanzania," *TWQ*, 2025.

610 Bent Flyvbjerg, "Policy and Planning for Large-Infrastructure Projects: Problems, Causes, Cures," *Environment and Planning B: planning and design* 34, no. 4 (2007): 578-597.; Müller-Mahn, Mkutu, & Kioko, "Megaprojects—Mega failures?"1069–1090.

visions based on flood control, agriculture, the country's energy needs, and aspirations for industrial growth.

For decades, plans for the project existed only on paper and in people's minds, with no visible progress on the ground. This changed dramatically in 2017, when political pressure suddenly revived the project. The renewed interest in the project as a major electricity supplier in the country was accompanied by tensions between different actors, local and global pressures, conservation concerns and Tanzania's future aspirations. Projects such as Stiegler's Gorge dam raise questions about how we envisage the future, both locally and nationally, and how these plans are received and implemented. This project serves as a focal point for analysing the temporal dynamics inherent in large-scale infrastructure development. In particular, the current chapter highlights the long planning periods involved in such projects, as exemplified by large dams. This lengthy period introduces considerable uncertainty as the project evolves from an abstract idea into a tangible reality through the collective vision of planners, policymakers, and the local community. During the lengthy preparatory phase, the proposed dam embodies a potential future, loaded with expectations, aspirations and fears. Against this backdrop, the chapter explores the temporality of megaproject development as a critical factor. By analysing the correlation between the lengthy delay and the sudden commencement of the project, the chapter also highlights the relationship between contemporary notions of modernisation and the past.

6.2 Delays and Setbacks on the Implementation of Stiegler's Gorge Dam

By definition, projects have a beginning and an end. However, due to the financial and logistical planning of mega-projects, including the imagination of planners, politicians, and local populations, they often require a long time. Quite often, such projects extend beyond the planned timeline, and in some extreme cases, lead to uncertainty. During this extended phase, the dam becomes part of an imagined future associated with promises, hopes, and fears. Like a ghost project or a delayed anticipation, the dam remains in a state of indeterminacy, neither definitively established as a reality nor categorically declared impossible. Stiegler's Gorge provides a quintessential example of such a project that existed in limbo, spanning for over a century. Nothing can be seen

at the designated construction site, yet people already feel its presence and act accordingly.

Stiegler's Gorge project as a delayed future can be refined by relating this concept to the broader framework of sociotechnical imaginaries. This connection draws inspiration from the work of Sheila Jasanoff and Sang-Hyun Kim, particularly their work on "dreamscapes of modernity." These sociotechnical imaginaries play a significant role in shaping spatial development patterns in the Global South.[611] Socio-technical imaginaries serve as a bridge between the abstract realm of technological possibilities and the concrete realities of social, political and economic life. They encompass both the imaginative aspects - how societies dream about what might be possible through science and technology - and the normative aspects - how these dreams translate into visions for social, political and technical change. Framing the Stiegler's Gorge Dam project through the prism of socio-technical imaginaries reveals it as more than a mere physical structure. Rather, it emerges as a spectral presence haunting the landscape, embodying technological aspirations, unrealised dreams, and lingering uncertainties. Moreover, socio-technical imaginaries can also account for moments of rupture within and divergence between socio-technical assemblages by emphasising the importance of imaginative labour and shared cultural resources alongside material infrastructures and social practices.[612] This suggests that infrastructure delays arise from the tension between the material and imaginative aspects of socio-technical projects, with the latter determining the direction and pace of infrastructure development.

Stiegler's Gorge Dam represents a longstanding vision that has shaped infrastructure ambitions for over a century. Its protracted development raises important questions about the factors contributing to its delay. Understanding these delays requires an examination of the interplay between internal and external stakeholders, shifting priorities, and the evolving landscape of dam infrastructure. While many unbuilt or

611 Jasanoff, and Kim, "Sociotechnical Imaginaries":189–196; Müller-Mahn, "Envisioning African Futures": 115:156-159.

612 Synne Movik, and Jeremy Allouche, "States of Power: Energy Imaginaries and Transnational Assemblages in Norway, Nepal and Tanzania," *Energy Research & Social Science* 67 (2020): 101548.

abandoned projects fade into obscurity, [613] others such as Stiegler's Gorge, remain dormant neither entirely forgotten nor fully realised. Their historical roots continue to influence current and future development efforts. In the following section, I explore the main reasons for these delays, highlighting the challenges and forces that have shaped the project's trajectory.

6.2.1 **Internal Politics and Divided Nature of Big Actors**

The Stiegler's Gorge project attracted both local and international attention. While this attention should have worked in favour of the dam's completion, it ultimately led to widespread scepticism, delays and challenges, and ultimately to a slowdown in implementation. The attention of many actors was based on the reasons why the dam was conceived. The need for irrigation water, flood control and hydropower generation were key. In the colonial era, agriculture took precedence over hydropower. The production of raw materials in the colonies for overseas industries was an important agenda for colonialism, especially before the Second World War. However, the need for growth in the wake of self-determination forced the post-independence government to embrace a high level of development that left little room for prioritisation. In the case of dams, the post-colonial government in Tanzania had to consider both irrigated agriculture and hydropower. Stiegler's dam remained an important project to the post-colonial government just as it was to the colonial government. Initial efforts towards the dam's development were made in the early years of independence. However, serious planning and transnational engagement to pursue the project began earnestly in the 1970s. At the time, nevertheless, local scepticism was notable. In 1976, for instance, the Tanzanian Minister of Finance, Amir H. Jamal, expressed concern that the size and potential of the dam were too large for the country's needs. He was also concerned that the area where the power would be used had not been clarified.[614] At the international level, the then Deputy Director of NORAD, Vidkunn Isaksen, was also unsure whether the right course had been chosen, in response to a comment from the

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613 Ashley Carse, and David Kneas, "Unbuilt and Unfinished: The Temporalities of Infrastructure," *Environment and Society* 10, no. 1 (2019): 9-28.; Flyvbjerg, "Policy and Planning for large Infrastructure Projects": 578-597.

614 NAN, Ministry of Foreign Affairs 37 4/149, Volume 8: Internal letter from the Ministry of Foreign Affairs, Development Office to the Legal Office, 13 August 1975.

Christian Michelsen Institute (CMI) that the terms of reference (TOR) for the planning process were unfavourable from the start in 1971. It was pointed out that the TOR made it clear that only Stiegler's Gorge was to be investigated. The TOR did not allow for a wider investigation of the Rufiji area, which could potentially have provided alternative plans for more appropriate developments.[615] Isaksen also expressed scepticism about NORAD following the Norconsult reports, which led to his decision to write a memo. He emphasised the need for more careful planning and the need to solve the problems associated with energy-intensive operations.[616] This period was marked by NORAD's crucial role in supporting the project. More scepticism was raised in 1976 and beyond. The survey that was conducted concentrated around the dam area rather than the whole basin. The whole basin evaluation study came in the mid-1980s almost ten years later. It is important to note that Tanzania underwent significant political and economic changes during these years. Growing awareness of the environmental and social impacts of large dam projects raised concerns among both local communities and international stakeholders.[617] Critics highlighted the potential negative impacts of the dam on local ecosystems, fisheries and the livelihoods of people living in the basin.[618] This growing awareness led to discussions about the need for more thorough assessments, looking not just at the dam site but at the entire river basin. Despite earlier concerns about power shortages, Tanzania had existing and approved power projects by 1982. However, the projects proved insufficient to meet the country's electricity needs over the next decade as economic challenges, declining agricultural production and high inflation affected the development of the power sector. In this context, NORAD took on the task of mapping the hydropower potential of the entire Rufiji area, to propose a long-term plan for harnessing its hydropower.[619] The NORAD Directorate's experience with Stiegler's Gorge made it easier to get started. In November 1984, the Rufiji Basin Hydropower Master Plan was published. The plan had investigated and identified all the possibilities for hydroelectric power generation in

615 NAN, NORAD A - 1870, TAN 012 - 311.1 Phase II Consultancy Activities in General: Report of Discussions with Tanzanian Authorities, by Vidkunn Isaksen, 15 March 1976.

616 NAN, NORAD A - 1859, TAN 012 - 013.1 Phase II Consultancy in General: Letter, NORAD to Norconsult Regarding Continuation of the Power Plant Studies, 17 February 1975.

617 Mwalyosi, "Environmental Impacts of the Proposed Stiegler's ":250-254.

618 Havnevik, "The Stiegler's Gorge Project in Tanzania": 105-116.

619 NAN, NORAD, Box 91, 431-TAN 012.5: Lower Rufiji Valley Integration Study, Oslo, 05.12.83.

the Rufiji area of a certain size. The study was carried out by Norconsult.[620] Just such an overall evaluation of the Rufiji area was carried out under the auspices of NORAD with Norconsult as a consultant, it concluded that Stiegler's Gorge was one of the development options that should come last in a long-term plan to utilise the power potential of the Rufiji area.[621] However, the delays to the Stiegler's Gorge project were the result of a complex interplay of factors: First, as awareness grew of the potential negative environmental impacts of the dam, including impacts on local wildlife, fisheries and water availability, stakeholders began to demand more comprehensive environmental assessments. This increased scrutiny slowed down the planning process and raised doubts about the feasibility of the project.[622] Second, Tanzania faced significant economic challenges in the late 1970s and early 1980s, including inflation, food shortages and a heavy reliance on foreign aid. These economic difficulties strained government resources and shifted the focus to more immediate, smaller-scale development initiatives, leading to setbacks for major infrastructure projects such as Stiegler's Gorge. Third, the political landscape in Tanzania was also evolving, with officials reassessing priorities in response to domestic challenges and international pressures. The willingness to commit to large-scale projects diminished as the government reflected on its development strategies and the need to balance competing interests. Fourth, local communities and civil society organisations such as BRALUP and the University of Dar es Salaam became more vocal about their concerns regarding the Stiegler's Gorge project. There were fears that the project could disrupt local livelihoods, particularly those dependent on fishing and agriculture. This social backlash highlighted the need for more inclusive planning processes that consider the needs and rights of those affected.[623] Additionally, the project required substantial financial investment, which faced significant challenges due to shifting donor priorities

620 NAN, NORAD, UD 37 4/149, Volume 25: Draft Agreement on Hydropower Potential in the Rufiji River Basin, 20 October 1982.

621 NAN, NORAD A - 1871, TAN 012 B.P. 13 - 31: Minutes, Board Meeting, 22.01.1971; Sandberg, "The Impact of the Steigler's Gorge Dam":2; NAN, NORAD, Box 262, 45-Main Report/Executive Summary: Rufiji Basin Hydropower Master Plan, November 1984.

622 NAN, NORAD A - 1853, TAN 012 - 008.08 Phase II: Minutes from Meetings between NORAD and Tanzanian Authorities in Dar-es-Salaam 16/12 - 19/12 – 1974; NAN, Ministry of Foreign Affairs 37 4/149, Volume 14: Memo, Minister of Foreign Affairs to the Government, 21 July 1978.

623 Havnevik, "Tanzania," 275-276.

and changing perceptions of development assistance. As funding became less certain, the implementation and planning of Stiegler's Gorge faced further delays. [624] Critics argued that such large-scale industrial projects were more likely to generate government revenue than create jobs for ordinary people.[625] Despite growing doubts about the project's viability, several factors supported its continued planning. Consultancy firms and technology providers expected a profit regardless of the project's success. In addition, political interests in Tanzania favoured its continuation as a symbol of modernisation and progress. Archival records show that while some Tanzanian authorities, including Nyerere, supported the project, other donors, such as the World Bank, remained sceptical, contributing to further delays in its implementation.[626] To conclude this section, Stiegler's Gorge Dam project exemplifies Andrew Ross Sorkin's concept of 'too big to fail' and its potential negative impact on the wider economy. This concept highlights the interconnected nature of large-scale economic ventures, where government involvement can greatly influence the trajectory of a project. Economic stability often depends on the success of such large and interdependent initiatives, as their failure could disrupt entire financial systems. Government-backed projects often fall into this category due to factors such as government support, market dynamics, systemic importance and international involvement.[627] Despite the substantial financial investment, the Tanzanian government viewed Stiegler's Gorge project as more critical to national economic stability than other projects. This perception is consistent with the notion of 'too big to fail', as the collapse of the project would have had far-reaching economic consequences. However, both internal challenges and external pressures ultimately contributed to the failure of the implementation of the project. Much like institutions deemed 'too big to fail', Stiegler's Gorge project received substantial international and domestic support, positioning it as a cornerstone of Tanzania's post-independence modernisation

624 Usher, "Dams as Aid": 4; NAN, NORAD A - 1859, TAN 012 - 013.1 Phase II Consultancy in General: Isaksen, Memo, 23 March 1976.

625 NAN, NORAD A - 1846, TAN 012 -00808 (1969-72): Report of Preliminary Studies on Stiegler's Gorge Project.

626 NAN, NORAD A - 1870, TAN 012 - 311.1 Phase II Consultancy Activities in General: Report of Discussions with Tanzanian Authorities, by Vidkunn Isaksen, 15 March 1976.

627 Andrew Ross Sorkin, *Too Big to Fail: The Inside Story of How Wall Street and Washington Fought to Save the Financial System--and Themselves*, (Penguin, 2010).

strategy. While it may seem unfair to label the project a failure, given that it remained largely conceptual from the 1960s until the 2010s, a closer analysis reveals a fundamental flaw in its design. It is this flaw that, despite the perceived importance of the project and the extensive support it received, ultimately led to its stagnation and eventual cancellation.[628] As preparations for the project progressed in 1978, it became clear that stakeholders within Tanzania were equally invested in the project's success. However, political pressures and priorities had grown the project to such an extent that withdrawing from it risked significant political repercussions.[629] While international agencies were interested in incalculable benefits, for Nyerere and Tanzania, "Stiegler's Gorge was a matter of faith, and calculations of profitability were not his strong point".[630] Tanzania was "more interested in the implementation and status of large projects than in their subsequent profitable operation."[631] Thus, when it became clear in the 1980s that electricity demand would fall short of projections, international development partners withdrew their support for the dam. Despite the existing fears, Nyerere encouraged more aid and urged that internal resources be concentrated on this particular project above others. He believed that electricity could transform the country's "economy from a peasant activity to a modern and highly developed one."[632] This appeal was echoed by the American team when they stated that the Stiegler's Gorge project should be the government's "first priority" as it "offers the greatest potential for single hydroelectric development in the Rufiji River Basin and possibly the whole of the Republic of Tanzania,"[633], it was also supported by Norway. This appeal for support was closely linked to Nyerere's standing; his popularity among left-wing Western governments positioned him as a potential mediator between the Eastern and Western blocs during the Cold War. These governments viewed him favourably,

628 Heather J. Hoag, and May-Britt Öhman," Turning Water Into Power: Debates Over The Development Of Tanzania's Rufiji River Basin, 1945–1985," *Technology and Culture* 49, no. 3 (2008): 624-651.

629 NAN, UD 37 4/149, Volume 14: Memo, Minister of Foreign Affairs to the Government, 21.07.1978.

630 Simensen, "The Norwegian Tanzanian Aid Relationship":65.

631 Havnevik, "Tanzania":21.

632 "Power for the Nation: Electricity Helps Industrialisation," *The Nationalist*, 26 September 1966.

633 USAID, "Rufiji Basin: Land and Water Resource Development Plan and Potential," 110.

seeing him as a beacon of hope amid the geopolitical tensions of the time.[634] As a result, Nyerere was inclined to prioritise the advancement of Stiegler's Gorge project over other initiatives. The trajectory of Stiegler's Gorge project serves as a poignant illustration of how ambitious undertakings can evolve to a stage where failure becomes untenable and highlights the complexities involved in managing large-scale developments. I contend that the primary driver behind the government's initial and substantial engagement with Stiegler's Gorge project was the perception of electricity as a modernising force for economic development and industrial advancement.

6.2.2 Differing Views of Tanzania's Top Political Figures

In October 1980, Tanzanian Trade Minister Ibrahim Kaduma penned a letter to Finance Minister A.H. Jamal, expressing his regrets for the delayed start of the Stiegler's Gorge project. This setback was attributed to the negative feedback from experts participating in the project's development.[635] Despite some experts advocating for coal-based power generation, Kaduma maintained a different perspective, viewing coal as a depleting resource and emphasising the importance of harnessing hydropower due to its renewable nature. Based on Kaiser's early reports on Stiegler's project, as mentioned in chapter four, he argued that it was the cheapest source of energy at the time that they had ever been involved in construction.[636] Although the price for construction of the dam went up and was expected to rise again, Kaduma had the feeling that in the long run, Tanzania stood a better chance to harness the power. He said, "….I suggest therefore that, despite the huge sum involved in constructing this project, it may be in our long-term interest to give it the highest priority."[637]

The project planning phase was prolonged due to the differing views of Tanzania's top political figures. These disagreements stemmed from the multifaceted, phased development and funding issues. As noted above, external critics targeted the planning

634 NAN, TAN-001. "Nyerere Visits"; Cranford Pratt, *The Critical Phase in Tanzania 1945–68, Nyerere and the Emergence of a Socialist Strategy*, (Cambridge,1976).

635 NAN, "Internal Memo from the Ministry of Trade to the Treasury on Stiegler's Gorge Project", 1980.

636 NAN, "Internal Memo from the Ministry of Trade to the Treasury on Stiegler's Gorge Project", 1980.

637 NAN, "Internal Memo from the Ministry of Trade to the Treasury on Stiegler's Gorge Project."

phase of Stiegler's Gorge for its lack of impact assessment.[638] To the critics the completion of Stiegler's Gorge would have led to the construction of a major dam above the gorge, significantly altering the flow of water downstream, with profound implications for both humans and wildlife, as well as the wider ecosystem. Unfortunately, these concerns were not addressed in the projects undertaken in the early 1970s, despite a growing recognition within the development community that such environmental considerations should be integral to all aid efforts.

Although Nyerere was rarely directly involved in the project's negotiations, he was a strong supporter of the project and saw it as an important part of Tanzania's ambitious development plans. Notable among others who supported was Alnoor Kassum, who at the time held the position of Minister of Water, Energy and Mineral Resources. He was a prominent supporter of the Stiegler's Gorge project and expressed confidence that the initiative would be beneficial, despite the potential need for self-funding by the Tanzanian people.[639] However, the presence of critics like Amir Habib Jamal, who voiced concerns about the project's viability and funding, introduced a significant obstacle. His criticism, especially regarding the lack of internal and external funding from Norway, highlighted financial challenges that could hinder the project's progress. Jamal, who worked as a minister of finance from 1973 to 1977 and later a minister for communication and labour was an open critic for the project.[640]

Another key player was the governor of the Bank of Tanzania (BOT)Edwin N. Mtei. Mtei held key positions such as the governor of BOT from 1966 to 1974, secretary-general of the East African Community from 1974 to 1977 and finance minister from 1977 to 1979. Despite holding such key positions, Mtei had disagreements with Nyerere over economic policies, particularly on socialism and market liberalisation. While Nyerere championed Ujamaa, which advocated state control and collectivisation, Mtei

638 JMT, Majadiliano Rasmi ya Bunge: Hotuba ya Waziri wa Maji, Nishati na Madini, Al Noor Kassum, Bungeni, Mwaka 1984/85." Dar es Salaam: Wizara ya Maji, Nishti na Madini, 1984; Al Noor Kassum, *Africa's Winds of Change: Memoirs of an International Tanzanian*, (London 2007).

639 Al Noor, "Africa's Winds of Change."

640 JMT, Majadiliano Rasmi ya Bunge (Hansard): Hotuba ya Waziri wa Maji and Nguvu za Umeme katika Bunge la Jamhuri ya Muungano wa Tanzania, Mwaka 1973/1974, Wizara ya Maji na Nguvu za Umeme, 1973, JMT, Majadiliano Rasmi ya Bunge, Mkutano wa 12; Kikao cha 18 Mwaka 1976.

favoured a more market-oriented approach with private sector involvement. He opposed excessive nationalisation and sought IMF-backed reforms to address Tanzania's economic problems, but Nyerere opposed these measures, fearing they would undermine the country's sovereignty and socialist ideals, particularly regarding socialism and market liberalization. While Nyerere championed *Ujamaa*, advocating for state control and collectivization, Mtei favoured a more market-oriented approach with private sector involvement. He opposed excessive nationalization and sought IMF-backed reforms to address Tanzania's economic struggles, but Nyerere rejected these measures, fearing they would undermine the country's sovereignty and socialist ideals. Mtei's tenure as a minister was marked by significant economic challenges, including the need for effective management of the country's finances amidst a backdrop of economic difficulties and the impacts of the global oil crisis.[641] Mtei expressed cautious reservations about the planning of the project. Even when Norwegian bureaucrats wanted to withdraw their support and end the planning for Stiegler's project, they appealed to him.[642] Mtei's relationship with other Tanzanian officials, particularly Al Noor Kassum, became strained despite his support for certain projects. Kassum, a strong advocate for the Stiegler's Gorge project, expressed dissatisfaction with NORAD's hesitations regarding the project's financing and planning. However, Mtei's cautious approach reflected broader concerns about the project's feasibility and sustainability. His cautious approach and eventual disagreement with Nyerere over economic policies further complicated the situation. It is such disagreement that culminated in Mtei's resignation as Finance Minister in 1979.

Mtei's influence, particularly his role in financial decisions and his appeal to Norwegian bureaucrats to reconsider their withdrawal of support underscored the project's vulnerability to internal political tensions and external funding uncertainties.[643] These interactions with NORAD illustrate the complexities of international development cooperation at a time of significant economic challenges in Tanzania. Although the project did not start during his time, his ability to navigate these relationships while

641 Mtei, "*From Goatherd to Governor*":149-158.

642 NAN, UD 37 4/149, vol. 14: Letter, Ambassador Niels L. Dahl to the Tanzanian Ministry of Finance, 30 November 1978.

643 NAN, Ministry of Foreign Affairs, 37 4/149, volume 14: Letter, Myklebust to NORAD, with a copy to the MFA, 13 December 1978.

advocating for sound economic policies left a lasting impact on Tanzania's development trajectory.

6.2.3 Crossing Economic Expectations

By 1982, despite initial concerns about insufficient power capacity, Tanzania had amassed a substantial portfolio of existing and approved hydropower projects capable of meeting electricity demands for another decade. In light of this, NORAD undertook a comprehensive mapping of the hydropower potential in the entire Rufiji area to devise a long-term strategy for harnessing hydropower in the region.[644] This initiative benefited significantly from the directorate's experience gained from the Stiegler's Gorge project.

In November 1984, the Rufiji Basin Hydropower Master Plan was unveiled to identify and evaluate all feasible opportunities for producing hydropower in the Rufiji area. The study, conducted by Norconsult, systematically assessed various possibilities and prioritised them according to Tanzania's needs. Key findings of the master plan included recommendations to develop six smaller power stations before proceeding with Stiegler's Gorge, and that 2025 would be an optimal year to initiate construction of Stiegler's Gorge.[645] These conclusions reflected a shift in dam-building discourse towards embracing smaller dams, potentially making Stiegler's Gorge less appealing to funders. Furthermore, this timeline underscores that project delays were not coincidental, as evidenced by documentation in national archives.

In a letter to NORAD, RUBADA highlighted some key conclusions from the report and claimed that the project would still be feasible. However, it was recognised that the dam would cause environmental problems, but that these were not serious enough to interrupt the process.[646] The letter from February 1984 shows that there was hope and determination in Tanzania to proceed with the project right up until then. However, the report concluded that it was the power part of the project was feasible. The other parts of the project, however, those that made it a multi-purpose project, were deemed

644 NAN, UD 37 4/149, Volume 25: Draft Agreement on Hydropower Potential in the Rufiji River Basin, 20 October 1982.

645 NAN, NORAD, Box 262, 45-Main Report/Executive Summary: Rufiji Basin Hydropower Master Plan, November 1984.

646 NAN, NORAD, Box 91, 431-TAN 012.5: Lower Rufiji Valley Integration Study, Oslo, 05.12.1983.

not to be dependent on the dam being developed. The anticipated benefits for tourism, irrigation for agriculture, and fishing were deemed to offer minimal advantages from the development of a dam and power plant. The conclusion was that this could be done more cheaply and efficiently on its own and not in conjunction with Stiegler's Gorge.[647] Accordingly, NORAD director, Arnesen travelled to Tanzania in 1981 to personally emphasise that nothing came of the plans. Arnesen died in 2010. Nevertheless, we can see that there was still hope in Tanzania that Norway would contribute to development right up until 1984. As noted in chapter five, Norway had decided not to contribute to any development from 1978. It was even claimed that the dam would hurt agriculture.[648]

Going forward, the Tanzanian government's reshuffling of ministers played a role in the development of Stiegler's Gorge project. As noted in chapter five, the plans for the project were put on hold, but later revived during Kikwete's tenure as part of an industrialisation drive.[649] Such ambitious visions for development and attempts to instil a centralised implementation culture were furthered by the 2012–2015 Big Results Now initiative. The energy sector was a key focus where substantive effort was put into electrification, orchestrated by the new Rural Energy Agency(REA), a relatively effective enclave somewhat insulated from government ministries and political disruptions. It had a ring-fenced budget from fuel taxes topped up by donors and the government.[650]

Importantly, in 2010, the Confederation of Tanzania Industries (CTI) revealed that the lack of reliable power was diminishing the country's business competitiveness which prompted the energy and minerals minister to pledge reliable supply by 2012. The CTI chairman, Felix Mosha said that power cuts were damaging electrical types of equipment and increased running costs due to using generators. In addition, he was also concerned about the high electricity charges including three per cent which was

647 NAN, NORAD, Box 89, 431-TAN 012, 02.24.1984.

648 NAN, NORAD, Box 91, 431-TAN 012.5: 'Overall Assessment of the Stiegler's Gorge Project' in Lower Rufiji Valley Integration Study, Oslo, 5 December 1983.

649 Hazel Gray, *Turbulence and Order in Economic Development: Institutions and Economic Transformation in Tanzania And Vietnam*,(Oxford University Press, 2018): 181-185.

650 URT, Hansard: Sospeter Muhongo, "Introducing the National Assembly, the Estimates and Review Expenditure for the Year." Speech of Minister of Energy and Minerals presented at the Parliament United Republic of Tanzania, Dodoma, May 22, 2006.

levied for the Rural Electrification Agency (REA) and the poor customer services provided by TANESCO.[651] In response to Parliament, Minister of Energy and Mineral Resources William Ngeleja assured that power rationing and blackouts would end as the government had secured a $400 million soft loan from the Chinese government to implement power projects, including Stiegler's Gorge, which had also received funding commitments from South Africa and Canada. In addition, several memorandums of understanding (MoUs) were signed between RUBADA and the Brazilian company Odebrecht in 2012, following the appointment of a new chairman in 2006.[652] Despite these efforts, however, all plans eventually stalled. This is in line with the regime's ideological priorities and its approach to infrastructure development. According to Dye, states tend to focus on the modernisation potential of electricity rather than the dam itself, often overlooking the broader transformative impact of such infrastructure and its ability to manipulate water.[653] The state also embraced a new vision of modernity, framed by planning reforms, the concept of sustainable development and a greater emphasis on the private sector. This shift was closely linked to the replacement of Energy Minister William Ngeleja by Sospeter Muhongo, who was sceptical of hydroelectricity and promoted gas as a more environmentally friendly energy source.

6.2.4 Navigating the Complex Web of Intensification and Hydropower Development

Since German colonial times, agricultural development in the Rufiji Basin was prioritised for increased crop yields, often to meet tax obligations.[654] Planning for the Stiegler's Gorge project reflected conflicting views on whether the dam should prioritise hydropower, flood control or irrigation, resulting in numerous planning documents and impact studies.[655] After independence, the *Ujamaa* policy aimed to

651 SNA SIDA File F13O: 1: Letter from S. L. Mosha to Principal Secretary of the Treasury, dated 15 November 1978; "Ngeleja: Power Woes Over by 2012," *The Citizen*, 1 April 2010.

652 The Citizen, 1 April 2010.

653 Barnaby Dye, "The Politics of Dam Resurgence: High Modernist State Building and The Emerging Powers in Africa," PhD diss., (University of Oxford, 2018).

654 Hoag & Öhman, "Turning Water into Power":624-651; Jonathan M. Jackson, Past Futures: Histories of Development in the Kilombero Valley, Tanzania, (PhD Dissertation, Universität Zu Köln, 2022).

655 Havnevik, *Tanzania:* 265-270; Simon R. Nkonoki, "Planning for Hydropower Development and Industrialisation: The Case of Stiegler's Hydropower and Flood Control Project in the Rufiji

create a society based on collective farming and economic self-reliance. *Ujamaa* was anchored in villagisation, which later involved forcibly relocating rural populations into planned settlements and villages designed for agricultural purposes. The ultimate goal was to promote rural development, with agriculture serving as the primary focus.[656] In terms of budgetary allocations, agriculture received the largest share of resources, and regarding the implementation of the policy, some villages failed while others continued to develop and succeeded.[657] Comprehensive plans were also outlined specifically for the agricultural sector, further emphasising its importance in the overall economic strategy.[658]

Tanzania's development strategy historically emphasised agriculture over dam infrastructure for electricity generation, despite some mention of dams' potential role in boosting industrialisation.[659] The country's Development Vision 2025, in particular, outlined an ambitious plan for Tanzania's agricultural sector: modernised, commercialized, highly productive, and profitable. This vision aimed to make sustainable use of natural resources while serving as an effective foundation for inter-sectoral linkages. The strategy sought to actively involve the private sector along agricultural value chains, spanning from production to processing and marketing. Specifically, the private sector was expected to contribute in several ways such as increasing production and productivity, improving product quality, promoting the development of agro-processing industries, accelerating technology transfer from large-scale investors to smallholders through contract farming and other outsourcing models and encouraging large-scale investments to build efficient value chains and facilitate access to markets.[660]

River Basin, Tanzania," *DERAP Working Paper* A 296,(Chr. Michelson Institute, Bergen, Norway, 1988).

656 Jannik Boesen, "Tanzania: From Ujamaa to Villagization," In *Towards Socialism in Tanzania* edited by Bismarck Mwansasu and Cranford Pratt, (Toronto: University of Toronto Press, 1979):125-144.

657 Emma Minja & Maximillian Chuhila, "Ujamaa in the Kilombero Valley: Msolwa and Signali Villages as Symbols of a National Project, ca. 1967–1990s," *Tanzania Zamani* 14, no. 1 (2022): 45-79.

658 FAO, "Rufiji Basin Tanganyika":9-10.

659 Andrew Coulson, Agricultural Policies in Mainland Tanzania, 1946–76, In *Rural Development in Tropical Africa*, (Palgrave Macmillan, London, 1981).

660 URT, Answers to the PFIA Questions in March 2012 and Meetings in May 2012, Ministry of Food Security and Cooperatives, 2012).

This development was instrumental in shifting the focus from hydropower to agricultural intensification., although the Stiegler's Gorge project remained on the planners' radar. This shift reflected Tanzania's colonial historical emphasis on harnessing its agricultural potential as a cornerstone of national development while recognising the importance of infrastructure projects such as dams in supporting broader economic growth. In 2009, for example, a joint venture partnership was established between Tanzania and South Korea to train 50,000 modern farmers in the Lower Rufiji Basin.[661] The primary objectives of this initiative were to assist farmers in transitioning from small-scale to large-scale farming, thereby doubling their income through increased production of rice and other cash crops. This approach was designed to enhance food security, generate employment opportunities, and fortify economic ties between both nations. Furthermore, a significant program for agricultural investment, known as the *Kilimo Kwanza* - Agriculture First Policy, was introduced in 2009.[662]The initiative was designed to drive a green revolution and modernise agriculture, transforming it into a commercially viable sector. This ambitious project included several key strategies. It aimed to expand agricultural credit and strengthen farmers' cooperatives. The plan also increased concessional lending through banks and insurance companies. Additionally, it promoted public-private partnerships in infrastructure development.[663] In his speech presenting the budget for the 2012-2013 financial year, the then Minister of Finance, William Mgimwa ensured that all the pillars of *Kilimo Kwanza* would be adhered to. He announced that USD 121 million would be allocated to the programme to ensure timely delivery of agricultural inputs, develop demonstration farms for extension workers, strengthen irrigation systems, support the newly established Cereals and Other Crops Board, and conduct land surveys and formalise land rights for local and foreign investors. Also welcomed on board was the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), an

661 "RUBADA, South Korea in Joint Venture to Create 50,000 Modern Farmers", *The Guardian*, 27th November 2009; RUBADA Yazindua Kampeni ya Kilimo Kwanza Kivitendo Moro, *Tanzania Daima*, 18th August 2009.

662 Mwaisakila, Stephen Richard, and James Kalimanzila Matemani. "Tanzania Towards Industrialization; Kilimo Kwanza Policy Towards Economic Growth and Self-Sustaining." *Jurnal Magister Administrasi Publik* (JMAP) 1, no. 2 (2021): 92-101.

663 URT, "Kilimo Kwanza, Ten Pillars of Kilimo Kwanza – Implementation Framework", 15 September 2009.

international public-private partnership initiative that aimed to catalyse large volumes of private investment to increase agricultural productivity and develop commercial agriculture in the southern corridor, with major benefits for food security, poverty reduction and climate change resilience.[664]

The SAGCOT initiative inspired RUBADA to focus on the agricultural sector.[665] The focus on agriculture was not new in Tanzania. Nyerere had previously envisioned a reformed agricultural sector within the *Ujamaa* villages and through collective production schemes. In his speech in 1982, he insisted on prioritising agriculture as part of development planning. He states.

> *"We must now stop this neglect of agriculture. We must now give agriculture the central place in all our development planning. If we go on treating it as if it were a peripheral to our development, then Tanzania will continue to be a peripheral country, and Tanzanians will continue to be peripheral people. For agriculture is needed the foundation of all progress."*[666]

Although Tanzania needed electricity, the economy was still dependent on agriculture for growth. The reliance on agriculture paved the way for green growth initiatives aimed at commercial agriculture, inspired by countries such as China and India that have prioritised agriculture and achieved high levels of development. Agriculture was also seen as an important economic sector for sustainable development.[667] It should be noted that, in President Kikwete's second term in office, the *Kilimo Kwanza* policy after 2009 went in hand with the SAGCOT initiative as well as the Big Results Now (BRN) initiative after 2013.[668] According to Rene Vesper how Tanzania envisioned the agricultural sector between 2009 and 2015 was different. The agrarian policy envisioned

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664 Southern Agricultural Growth Corridor of Tanzania (SAGCOT), Appendix III: Land Development, Draft, (2010).

665 RUBADA Nayo Yajitosa Kilimo Kwanza, *Mtanzania*, 21st October 2009.

666 URT, Nyerere chair of CCM at the opening of the national conference Dodoma, 22nd October 1982.

667 RUBADA na Mkakati wa Kuhamasisha Kilimo cha Umwagiliaji," *Tanzania Daima*, 25th August 2009.

668 Organisation for Economic Co-operation and Development (OECD), Promoting Sustainable Investment in Tanzania's Agriculture, (OECD Investment Policy Reviews: Tanzania 2013) http://dx.doi.org/10.1787/9789264204348-en accessed 20.12.2024; SAGCOT, Concept Note, May 2010.

an agrarian revolution or green revolution by attracting international capital, which would help to modernise the industry and create hundreds of thousands of new jobs.[669] While hydropower was to play a crucial role in modernising industrialisation, agriculture became the main driver of economic development.

SAGCOT initiative proposed a corridor approach based on clusters of commercial farms and agri-businesses in areas with high agricultural potential and access to backbone infrastructure such as the Kilombero Valley. The programme identified relevant areas, analysed the constraints on commercial agriculture and ways to address them, established a partnership organisation to support good targeting and coordination of public and private programmes and investments, and supported new financing mechanisms of commercial agriculture under the condition that smallholders would incorporate and local communities' benefit from investments.[670] Oral articulations in the Kilombero Valley revealed that the SAGCOT program had good intentions, but it created an opportunity for more land grabbing and the delay of other development plans like hydropower.[671]

669 Rene' Vesper, Contesting Rural Futures Political and Agrarian Change in Tanzania's Kilombero Valley during the Presidency of John P. Magufuli (2015 - 2021), (PhD Dissertation, Universität Bonn, 2023): 161.

670 SAGCOT, Concept Note, May 2010.

671 Interviews with Former Ujamaa truck driver at Signali Village, Kilombero, 20.09.2019.

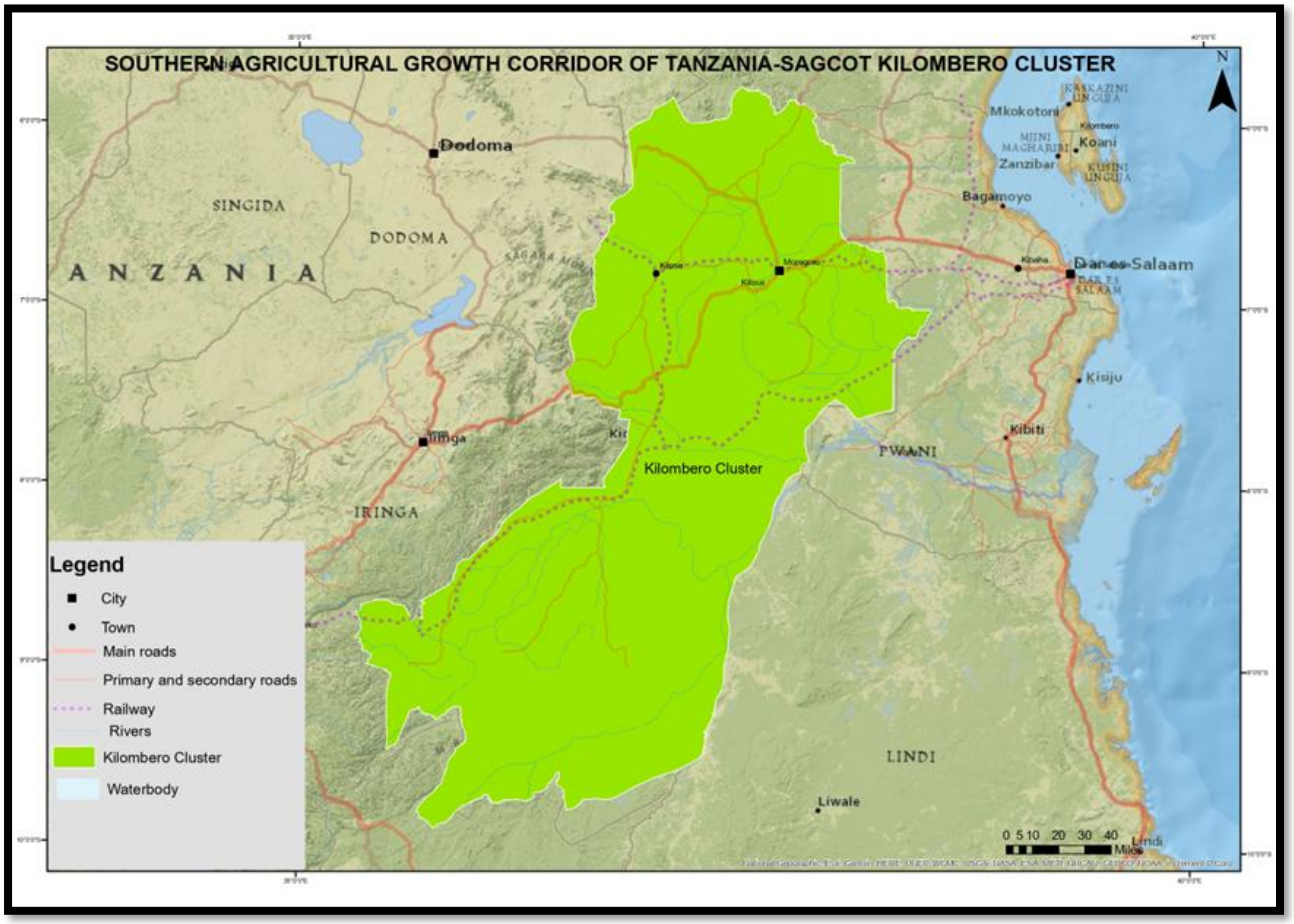

Figure 27: A map of the growth corridor of Tanzania.

Source: SAGCOT official website, accessed 18.12.2024

Different visions of economic transition underpin national policies in post-independence Tanzania. While President Kikwete envisioned an economic transition facilitated by foreign capital, public-private partnerships, and increased agricultural productivity, Magufuli envisioned a transition best initiated through large-scale infrastructure development and industrialisation.[672] Both transitions imply different development paths. However, the conflict between agriculture and hydropower dates back to colonial times, when agriculture was considered more important than electricity. The Nyerere's Arusha Declaration of 1967 and its *Ujamaa* policy also envisioned agriculture with greater emphasis on village life. Although electricity was crucial to the electrification of these villages, construction of the Stiegler's Gorge dam

672 Provident Dimoso, Hosea Mpogole and Hozen Mayaya. "Industrial Development: The Past, Present and Future." in Maliamkono T.L. and Mason H.L. (ed) *The Game Changer: President Magufuli's First Term in Office* (Tema and Siyaya, 2020): 311-312.

could not begin. I argue that the regime in power and international power structures play a role in deciding which project to undertake and when. While both colonial and post-colonial leaders wanted the dam project, it was not pursued until the fifth regime, which marked the return of the high modernist strategy in Tanzania in terms of infrastructure development.

Coulson's work reminds us that Marx and Engels (1848) argued in the Communist Manifesto that peasant agriculture would not survive in the long term and would be destroyed either by capitalist agriculture, industrialisation and processes of proletarianisation. In Tanzania, where most land is communally owned, managed and farmed, the processes of privatisation, commodification, accumulation and proletarianisation did not unfold as Marx had analysed for the English path.[673] The question in the transition from agriculture to industry is to what extent 18th-century Europe can be compared to Tanzania's agrarian path in the 21st century. This ideational transition in Tanzania meant that spatial and temporal development priorities, leadership styles and the ideologies of the regime in power played a major role in the development trajectories of the Rufiji Basin.

Although the visions of the future under the various regimes in power differed in key areas, the future became an instrument of power under all regimes. As discussed in Chapter Four, state plans, agricultural fairs and exhibitions of critical infrastructure were used as platforms for future-making in post-independence Tanzania. According to Arjun Appadurai, the concept of the future possesses both temporal and spatial dimensions. This spatial temporality varies significantly across different locations. Some areas exhibit high dynamism, characterised by visions extending far into the future, while others display low dynamism, appearing less attractive and thus receiving limited consideration for future development. The attractiveness of a space is closely tied to its perceived potential for enhancement. Spaces that fall outside the spheres of interest of elite groups tend to be overlooked when envisioning the future. This disparity highlights how the perception and planning of future possibilities can be

673 Andrew Coulson, Small-scale and Large-scale Agriculture: Tanzanian Experiences. In: Stahl, M. (ed.): *Looking Back, looking Ahead: Land, Agriculture and Society in East Africa,* A festschrift for Kjell Havnevik, (Uppsala, 2015): 44–73.

influenced by factors such as economic status, political power, and social standing.[674] Appadurai's theory highlights the complex relationship between spatial considerations and temporal projections in shaping our understanding of potential futures. It suggests that the way we conceptualise and plan for the future is not uniform across regions or communities but rather reflects existing power structures and economic interests.

According to Tups and Dannenberg's idea of emptying the future, Nyerere's approach to regime change was to create an ideological vacuum about Tanzania's future. This vacuum was then filled with either homegrown concepts or specially imported ideas.[675] However, it is not the initial emptiness of the future that is crucial, but rather the control exercised over it. Since independence, the power to shape Tanzania's future rested with the TANU/CCM party, the government and the state apparatus. The ability to declare a future as empty says more about the power dynamics at play than about any inherent lack of potential futures. This declaration serves as a manifestation of political influence rather than an objective assessment of possibilities. Through various tactics and strategies, alternative visions for the country's development were systematically pushed out of mainstream political discourse. As a result, a single narrative about the future was perceived as the only legitimate one. In this context, the future was materialised, while other potential development paths were effectively contained and marginalised.

6.2.5 Realities of Selous Game Reserve

The development of Stiegler's Dam on the Rufiji River, as discussed in chapter three within the context of the Selous Game Reserve, introduced a potentially devastating element to the already precarious ecosystem in the 1980s. The project development plan ignited heated debates surrounding the delicate balance between economic growth and environmental conservation. Designated as a protected area since colonial times, the reserve gained international recognition as a UNESCO World Heritage Site in 1982. Consequently, attempts to develop the area, including the proposed dam, encountered strong resistance. Both local and international pressure resulted in substantial delays to the project. Significant concerns emerged regarding the dam's environmental impact,

674 Appadurai, "The Future as Cultural Fact":285–300.
675 Tups, & Dannenberg, "Emptying the Future":23-35.

particularly its potential effects on the reserve and local ecosystems.[676] Social issues also arose due to the potential displacement of downstream communities and the loss of arable land. These concerns prompted calls for more comprehensive assessments and community engagement, ultimately leading to further delays in the project's progress.[677]

Environmentalists cautioned that the construction of the dam downstream would destroy surroundings, result in fragmentation of ecosystems, [678] and displacement of wildlife populations, including endangered species such as elephants, white colobus monkeys, and black rhinos.[679] However, the activists and conservationists overlooked Tanzania's primary goal of generating electricity to benefit the entire population. While they acknowledged electricity's importance in Tanzania's development, no alternative solutions to dam construction were proposed. The designation of the heritage site underscores the global environmental philosophy that prioritises on conservation of natural resources without reflections on the immediate communities surrounding the affected areas. The site also addresses sustainability in the planning to ensure that wetland conservation considerations are included in the decision-making process for the development of projects.[680] Sustainable environmental management often prioritises long-term ecological viability over local community interests. Conservation efforts frequently overlook crucial questions such as whose interests these measures serve and what conservation means for local resource utilisation around protected areas. Key concerns in environmental management typically focus on enhancing sustainability, even when it doesn't directly benefit the broader population. This

676 NAN, NORAD, Box 262, 45-Main Report/Executive Summary: Rufiji Basin Hydropower Master Plan (Executive Summary), November 1984; UNESCO/NC/CLT/WHC/OC/19/61: "Report on State of Conservation of Selous Game Reserve World Heritage Property" (N 199), 30th January 2020.

677 NAN, 003-TAN 012. Stiegler's Gorge: Recommended Location for Power Plant.

678 WWF Report, "The True Cost of Power, the Facts and Risks of Building Stiegler's Gorge Hydropower Dam Selous Game Reserve, Tanzania," Worldwide Fund for Nature, (Gland, Switzerland. 2017):10.

679 UNESCO/NC/CLT/WHC/OC/19/61: "Report on State of Conservation of Selous Game Reserve World Heritage Property" (N 199), 30th January 2020.

680 UNESCO/NC/CLT/WHC/OC/19/61: "Report on State of Conservation of Selous Game Reserve"

approach led to promoting hunting tourism as a means of income generation, regardless of the local impact of whatever is implemented.[681]

According to spatially distributed biodiversity data, twelve endangered species are found in the immediate vicinity of the park. These include the African bush elephant, the Masai giraffe and the hooded vulture, according to Christina Orieschnig, a hydrology researcher and remote sensing engineer with the Environmental Investigative Forum.[682] Despite the environmental and social concerns raised, the fifth Tanzanian government under the late President Magufuli vigorously pursued the Stiegler's Gorge Dam project, citing the need to address the country's chronic energy shortages and stimulate economic development.[683] Proponents argue that the dam would provide a reliable source of electricity, support industrialisation efforts, and create jobs, thereby improving living standards and reducing poverty in Tanzania.[684] The project represents a contentious issue at the intersection of energy development, environmental conservation, and social justice in Tanzania. While proponents argue that the dam would bring much-needed electricity and economic growth, critics raise concerns about its potential environmental and social impacts, particularly in the context of its location within a UNESCO World Heritage Site.[685] It is important to note that the coexistence of conservation and economic development cannot be neglected if the former is to be sustained, as conservation alone is meaningless if it does not bring

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681 A.A Mamboleo, "Analysis of Wetlands as Sustainable Tourism Destinations: A Case of Kilombero Valley Ramsar Site in Tanzania," *Eastern African Journal Of Hospitality, Leisure And Tourism* 2, No. 1 (2014): 23-40; Felister Michael Mombo, Stijn Speelman, Guido Van Huylenbroeck, Joseph Hella, Munishi Pantaleo, and Stein Moe, "Ratification of the Ramsar Convention and Sustainable Wetlands Management: Situation Analysis of the Kilombero Valley Wetlands in Tanzania," *Journal of Agricultural Extension and Rural Development* 3, no. 9 (2011): 153-164.

682 Infoline Report, Uncovering Threats to Wildlife and Mangrove Forests From the Rufiji Dam Project in Tanzania, 19 May 2023 Available at https://rainforestjournalismfund.org/stories/uncovering-threats-wildlife-and-mangrove-forests-rufiji-dam-project-tanzania, Accessed 27 November 24.

683 URT, Hansard: Hon Sospeter Muhongo, "Introducing the National Assembly, the Estimates and Review Expenditure for the Year" Speech of Minister of Energy and Minerals presented at the Parliament United Republic of Tanzania, Dodoma, 22nd May 2016.

684 URT, "A Report on the State of Conservation of Selous Game Reserve World Heritage Property," no.199, Submitted by the Government of Tanzania to the UNESCO World Heritage Centre, 30th January 2020.

685 Kjell Havnevik, "The Stiegler's Gorge Multipurpose Project: 1961- 1978," *DERAP Working Paper* No A 131, (Che. Michelsen Institute, Bergen, December 1978):5; Barnaby Dye, and Joerg Hartmann, "The True Cost of Power: The Facts and Risks of Building the Stiegler's Gorge Hydropower Dam in the Selous Game Reserve, Tanzania," (WWF: UK, 2017):36-53.

added value to the general population. Against this backdrop, an intriguing question arises: Was the Selous Game Reserve utilised as a battleground to sabotage the dam? The foregoing analysis reveals that the reserve indeed played a crucial role in delaying the project's implementation. However, it is important to note that this factor alone did not render the project obsolete. Instead, it temporarily suspended progress, leaving lasting impacts on both local communities and the nation at large.

As the project got underway, the Environmental Investigation Agency (EIA), a private, non-governmental organisation based in London and Washington, D.C., formally requested that UNESCO delist the Selous Game Reserve as a World Heritage. The move was seen as a deliberate challenge to the Tanzanian government, which reorganised the reserve in 2019. First, a northern section, now known as the 30,000km² Nyerere National Park, where the dam project was under construction. Second, a southern section, retaining the name Selous, was reduced from 50,000 km² to 44,000 km², resulting in a net increase in the actual protected area.[686] Oral statements from local communities suggested that the government made an informed decision. According to these accounts, wildlife protection would be enhanced compared to previous measures, as no hunting would be permitted within the national park boundaries. Simultaneously, this initiative was expected to ensure sufficient electricity supply for the country.[687] Nevertheless, this was not the case for everyone. To others, the reorganisation meant further land encroachment in their area and more destruction of crops and properties as animals drew closer. One interviewee in a focus group discussion revealed:

> *"Most of us moved here during Ujamaa and we were happy because we were free to do our farming and even hunt in the reserve. We used to call it Granny's farm – "Shamba la Bibi." Now we are not allowed to go near the national park, and wild animals are coming to our area, destroying*

686 Environmental Investigation Agency(EIA), "World Heritage Dammed," (EIA UK UNESCO: Selous Briefing Report), July 2021; Barnaby Dye, "Heritage Dammed: Water Infrastructure Impacts on World Heritage Sites and Free Flowing Rivers; Civil Society Report to The UNESCO World Heritage Committee and Parties of The World Heritage Convention," (2019).

687 Focus Group Discussion, Kisaki Village, 10th April,2024.

crops and properties and we cannot do anything about it. We benefit more from our produce than from that project."[688]

The reorganisation of the Selous Game Reserve (now partly renamed Nyerere National Park) is likely to have altered wildlife movement patterns, leading to increased interactions with nearby villages. The changes have affected the movement of animals, making their presence in villages more frequent.

Figure 28: Wild animals in nearby villages following the reorganisation of the Selous Game Reserve.

Source: Photo taken by the author at Kisaki village

More significantly, UNESCO Director-General Audrey Azoulay expressed concern about the potential impact of Stiegler's project: "We are concerned that proceeding with the construction of this project could have a devastating and irreversible impact on the reserve's unique ecosystem."[689] This statement was made in support of the EIA.

688 Focus Group Discussion, Kisaki Village, 8th April,2024.

689 UNESCO- World Heritage Convention. "UNESCO Reiterates its Grave Concern over Planned Dam Construction within Selous Game Reserve World Heritage Property (United Republic of Tanzania)," Wednesday, 12 December 2018; Evaristo Longopa, "Legal Dimension on Protection of Outstanding Universal Value Properties in Tanzania: A Dilemma for Development Activities in the Selous Game Reserve," *The Eastern African Law Review* 42, no. 2 (2015): 104-124.

UNESCO eventually withdrew its support for delisting the reserve following strong opposition from the Tanzanian government and African representatives on UNESCO's World Heritage Committee, including those from South Africa, Ethiopia, Nigeria, Mali and Uganda. These largely pro-development delegations had significant interests in large dam projects in their own countries.[690] Tanzania presented two main arguments in favour of the dam project: first, the economic benefits of tourism in the Selous Game Reserve. The second was the need for sufficient electricity to supply the entire population and drive industrialisation. These arguments were central to Tanzania's decision-making process on the dam project.

Ultimately, using the case of the Stiegler's Gorge project and the Selous Game Reserve, I argue that the processes of infrastructuring in the form of dam construction are often characterised by delays that can have multiple causes. Reasons for the delay of Stiegler's Gorge can be found in the wider geopolitical context and are revealed through an explicitly historical lens that highlights the long-standing roots of practices and ideas of future-making in post-independence Tanzania. As the foregoing discussion revealed, the dam project was historically entangled in competing national and international interests, with power struggles over environmental concerns related to ecosystem preservation and biodiversity. This conflict posed a significant challenge in balancing industrial development with the protection of the Selous Game Reserve, ultimately causing the project to stagnate for decades. The delays were not purely destructive, however, and had constructive effects on communities previously excluded from the processes of shaping the future.

6.2.6 Contestations Over Water Use

Disputes over water rights within the Rufiji Basin complex were one of the factors hindering the timely implementation of the Stiegler project. Apart from the dam, water from the basin supports a variety of uses, including irrigation upstream and downstream, watering livestock in the Usangu plains and Kilombero Valley, and providing habitat for wildlife in the Ruaha and Udzungwa National Parks. The Mtera and Kidatu dams have also provided hydropower since independence. This section

690 UNESCO, "UNESCO Concern over Planned Dam Construction within SGR".

examines how contested water uses in the basin negotiate multiple interests, considering upstream and downstream water uses, and how this has led to delays in the implementation of other developments in the basin. I suggest that the construction of the dam, among other impacts, would have necessitated the redefinition of previous uses to accommodate the new ones. Tracing water use from the Mbarali plains to the Ruaha River, Mtera and Kidatu dams, I argue that the Rufiji Basin contains the real sense of how resources can be contested and negotiated.

Over the past two decades, East Africa has witnessed numerous resource-related disputes reflecting a wave of modernity. Projects such as the Standard Gauge Railway (SGR), the LAPSSET corridor development and geothermal developments in Kenya illustrate how multiple interests in land-related issues are contested and negotiated.[691] The three initiatives stood as major projects intended by government authorities to transform the country's economy through massive investments in infrastructure. Within the framework of actualisation, emerged criticisms and activism regarding how the projects were put into force. Authorities were criticised for taking less into the board about the interests of other contending members regarding resource use.[692] Such massive projects are signs of modernism in the global south and carry with them lots of travelling ideas about modernity and state anticipations to improve the well-being of their people. The 21st century also has experienced a large number of such developments some of them coming as ghost projects, abandoned projects and delayed futures since they were first planned, and they are spread in what has come to be termed as 'African development corridors'.[693] Development of the Stiegler's Gorge

691 Johannes Theodor Aalders, "Building on the Ruins of Empire: The Uganda Railway and the LAPSSET Corridor in Kenya," *Third World Quarterly* 42, no. 5 (2021): 996-1013; Elliott Hannah, "Planning, Property and Plots at the Gateway to Kenya's 'New Frontier'," *Journal Of Eastern African Studies* 10, no. 3 (2016): 511-529; Charis Enns. "Infrastructure Projects and Rural Politics in Northern Kenya: The Use of Divergent Expertise to Negotiate the Terms of Land Deals for Transport Infrastructure," *The Journal of Peasant Studies* 46, no. 2 (2019): 358-376.

692 Kennedy Mkutu, "Anticipation, Participation and Contestation Along the LAPSSET Infrastructure Corridor in Kenya," (2021): 43; Chris Alden, Sergio Chichava, Lu Jiang, Bradley Murg, Guanie Lim, and Yu-Shan Wu, "China-Driven Port Development: Lessons from Kenya and Malaysia," *SAIIA Policy Briefing* 257 (2021).

693 Jessica Thorn, Diego Juffe Bignoli, Ben Mwangi, and Robert A. Marchant, "The African Development Corridors Database: A New Tool to Assess the Impacts of Infrastructure Investments," *Scientific data* 9, no. 1 (2022): 679.

Dam in the Rufiji basin serves such a perceived modernisations that characterise development discourses in the continent.

The dam project demonstrates how large-scale undertakings can become contentious goals, resulting in both anticipated and unforeseen outcomes. The construction of Stiegler's Dam was seen as having a significant impact on resource use within the basin, particularly in terms of land and water management. Various stakeholders vied for control over these resources for purposes such as agriculture, fishing, wildlife conservation, hydroelectric power generation, and domestic use. Despite delays, Stiegler's Dam represents a long-held aspiration that finally started materialising in 2018.[694] This section of the chapter builds upon the foundational research conducted by FAO, focusing not solely on the dam itself, but rather on its role in exacerbating water-related conflicts throughout the entire Rufiji Basin. Since the initial FAO survey, incremental developments have occurred, gradually filling the gaps identified in their report while striving to maximise the basin's potential.[695] Previous initiatives in the region include development projects in the Mbarali and Usangu plains, expansion of the Great Ruaha River valley, construction of the Mtera and Kidatu hydroelectric dams, development of the Kilombero valley and implementation of various Rufiji agricultural schemes.[696] These projects were part of the recommendations outlined in FAO's report, with some being implemented promptly while others remained conceptual for extended periods. Notably, Stiegler's Gorge was never realised. Still, the recent construction has fulfilled the remaining recommendations, bringing the basin under comprehensive socio-economic utilisation after six decades of anticipation and gradual accomplishment. Thus, the development of the Rufiji basin is a complex and contentious undertaking, deeply intertwined with the multifaceted interests of various stakeholders. Each actor claims ownership and identifies strongly with their traditional way of life within the basin. This section has examined how national visions shaped the development of the entire basin and influenced various uses in strategic areas. The

694 Dye, and J. Hartmann, "The True Cost of Power":10-20.

695 FAO. "The Rufiji Basin Tanganyika": 45; Hoag, and Öhman. "Turning Water into Power: 624-651; Mwalyosi, "Resource Potentials":16-20.

696 Jackson, "Past Futures": 35-46.

foregoing discussion suggests that upon completion of the Nyerere power plant, increased contestation over basin waters is likely.

6.3 Local Perceptions on the Delayed Realisation of Stiegler's Project

The delayed realisation of the Stiegler's Gorge project has had a significant, but often neglected, impact on the local population. While the project promised to provide much-needed electricity and economic benefits, its delayed implementation provoked mixed reactions from local communities. Over six decades, from the 1960s to the 2010s, the prolonged uncertainty and numerous delays of Stiegler's dam project have left an indelible mark on the communities around the proposed site and along the lower reaches of the Rufiji River. This prolonged period triggered a wide range of emotions among local people about the project and its potential impact on their way of life, ranging from optimism to concern. The interviews conducted during this study revealed a range of emotions. These included excitement about the potential benefits, fear of displacement and scepticism about the feasibility of the project. Economically, in the 1960s and 1970s, many local communities and stakeholders initially saw the Stiegler's Gorge project as a potential catalyst for economic development. There were hopes the project would create jobs, improve infrastructure and provide reliable electricity for domestic and industrial use, thereby improving local businesses and livelihoods, as one interviewee explained:

> *"At the time, I saw a brighter future for Stiegler's project. I hoped that once completed, it would change everything for the better in terms of electrifying our homes, bringing jobs, a police station to improve security, a health centre and improved road access to better connect us to the rest of the country and create opportunities in various sectors. In addition, the dam could boost our local economy through fishing and agricultural activities. For us, we saw the project as a great blessing that would bring hope and development to our area."*[697]

The sentiment of the above cited interviewee reveals significant concerns about the timing of the project and its impact on the expectations of the local people. The delayed

[697] Interview with former Hafslund/Norplan workers for Stiegler's Gorge project, Kisaki village, 08.04.2024

implementation caused considerable frustration, particularly among those who had been eagerly anticipating the project's benefits. This frustration stems from a notable discrepancy between the initial expectations and the eventual unfulfilled expectations as another interview revealed:

> *"As a result of the delays to the dam, we were traumatised, because we were subjected to power cuts, high transport costs, delays in the movement of goods and a low level of development in our community. In short, we couldn't benefit from the fruits of this development project as we expected."*[698]

For planners, Stiegler's Gorge Project was anticipated as the government's "first priority" as it "offers the largest potential for single hydroelectric power development in the Rufiji River Basin, and possibly the country.[699] This was evident in a speech by Al Noor Kassum, Minister of Water, Energy and Minerals and Chairman of the Board of the Rufiji Basin Development Authority, who said that he expected local benefits from Stiegler's Gorge in terms of "lighting up the country" and that "donors with experience in dam construction would do the same for Tanzania."[700]

Contrasting views emerged between residents living upstream and downstream of the gorge. Downstream residents along the Rufiji River expressed significant concerns regarding the dam's potential negative impact on their homes and agricultural land. From their perspective, construction delays represented preferable circumstances, as they anticipated adverse effects on their livelihoods.

> *"I was happy that the dam wasn't built in the 1970s because I was afraid of more flooding in our area, which has come true since the dam was built. You see, the whole area is now flooded, and we are forced to move to another place to live. I wish the money were used to build roads."*[701]

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698 Interview, villager, Kisaki village, 08.04.2024

699 USAID, "Rufiji Basin: Land and Water Resource Development Plan and Potential," 110.

700 URT, Opening Speech by Hon. Al Noor Kassum, M.P. Minister for Water, Energy and Minerals and Chairman of the Board of Directors of the Rufiji Basin Development Authority on the Occasion of Meetings between Hafslund, NORAD and Tanzanian Officials on the Stiegler's Gorge Multipurpose Project, Kilimanjaro Hotel Dar es Salaam, 20th November 1979:13.

701 Interview with a resident of Rufiji in Kisaki village, 11.04.2024.

Similar concerns were raised by an ecologist who said he had written an article about the dam's potential impact on the environment and downstream communities, and in particular its potential to cause flooding despite its intended purpose of flood control, due to failures such as structural weaknesses, extreme weather conditions or operational errors. "When a dam suddenly releases large volumes of water, it can cause catastrophic flooding with little or no warning to downstream *Warufiji* communities."[702] These are the ones that have lived with the "devastating and beneficial floods" for millennia and whose lives will be mostly affected by the dam when finalised. In April 2024, there was another devastating flood, despite the near completion of the dam, and the political discussion on how to operate the dam mounted again, in particular among the downstream population. Heavy rainfall overwhelmed the dam's storage capacity during ongoing construction works, forcing TANESCO to release excess water. This controlled discharge affected twelve wards, causing widespread flooding despite the dam's original purpose of preventing such disasters along the Rufiji River.[703] Historically, the Maji Maji Uprising (1905-1907) arose in response to German colonial efforts to impose cotton cultivation on the Rufiji floodplain. Its brutal suppression led to widespread depopulation in southern Tanganyika and deep-seated resentment of imposed development. Between 1968 and 1974, the *Ujamaa* resettlement programme moved Rufiji farmers to higher ground, disrupting their flood-adapted agriculture, particularly the '*masika*' and '*mlau*' systems. This led to labour shortages and loss of micro-environmental knowledge.[704] Meanwhile, the Dar es Salaam food market shifted production from staples such as rice, maize and cotton to local crops such as mangoes and vegetables. Political promises of flood control from the Rufiji Dam influence farmers' risk calculations.[705] But while the flooding of the Selous Game Reserve sparked global opposition, other environmental concerns remain. Altered water flows threaten the Rufiji Delta's mangrove forests, which are vital for coastal protection, and endanger fisheries. Reduced river flushing

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702 Interview with an Ecologist in Dar es Salaam, 20th April 2024.

703 Hundreds Displaced, Crops Destroyed in Rufiji as Dam Releases Water, *The Citizen*, 4th April 2024; Building Resilience: Mitigating Future Floods in Tanzania, *The Citizen*, 7th December 2024.

704 Bantje, "Floods and Famines: A Study of Food Shortages in Rufiji District", Bantje, "The Rufiji Agricultural System: Impact of Rainfall, Floods, and Settlement"

705 Focus group discussion, Warufiji residents, 28 April 2024, Dar es Salaam.

risks saline intrusion into the fertile delta fields, while silt build-up in the reservoir would reduce its storage capacity, as seen at the Mtera and Kidatu hydroelectric projects.

Studies show that even well-designed flood control dams can cause significant flooding when extreme weather events, such as heavy rainfall, exceed the capacity of the reservoir. The need for controlled releases, while necessary to prevent dam failure, can still cause widespread damage downstream.[706] Similarly, the situation in the Rufiji District, where Stiegler's Gorge Dam was still under construction and faced overwhelming rainfall, shows how the best-laid plans can still lead to negative outcomes in the face of unpredictable environmental and climatic forces. As experts have noted, "no dam is flood-proof", emphasising the importance of robust safety measures and emergency preparedness.[707]The current design of the dam is probably for maximum hydroelectric production, but the 2024 flood disaster shows that the operational strategy is therefore to keep the reservoir as full as possible at all times, depriving downstream farmers of beneficial floods but not preventing catastrophic floods in years of heavy rainfall.

Conversely, inhabitants of the upstream area perceived fewer negative impacts and expected greater benefits from the project. Even though the dam was delayed for so long, they imagined it as already built and foreseen the potential benefits it could bring to their community and the country. This pattern also applies to how both groups perceived the impact of the dam project on their property, particularly their land holdings.

> *"This village is close to the site. We wanted the construction to start immediately because we knew it would not only give us electricity but also a lot of economic benefits, such as our children getting jobs and providing for us, but it did not happen. I also anxiously waited for a job, so I had to*

706 Byungil Kim, Sha Chul Shin & Du Yon Kim, "A Resilience Loss Assessment Framework for Evaluating Flood-Control Dam Safety Upgrades," *Nat Hazards* 86, (2017): 805–819; Dore, Mohammed Dore, "Climate Change and Changes in Global Precipitation Patterns: What do we Know?" *Environment International* 31, no. 8 (2005): 1167-1181.

707 Zulfikar Abbany, Deadly Dam Failures: Cause, Effect and Prevention, *DW in Focus*, 20th September 2023.

move to Mwanza to look for another job because it was taking so long for this project to start."[708]

Similar sentiments were expressed by another villager who owns a hardware store, who said that he had taken over the store from his father, who opened it when he moved to the village in 1982, and assumed that if the project had been built, he could have used it as a market for the building materials he sells and made a profit. He also wanted to invest more in guesthouses to provide accommodation for the immigrants who were expected to settle in the area. Nevertheless, the trend in the interview showed a shift from fantasy to reality after the project's revival, when he secured a job. The job he got at the construction site has enabled him to build a three-bedroom house in Namtumbo and buy a motorbike (*bodaboda*). He said, "I have a house, and my family is now assured of better meals compared to the situation before I came here for the JNHPP. "[709]

The Stiegler's Gorge Dam project illustrates how delayed infrastructure initiatives continue to have a profound impact on society through interconnected social, economic and emotional dimensions. As Beckert's theory of fictional expectations demonstrates, these projects create lasting social impacts despite their physical incompleteness or delay, while Aalders' work on ruination shows how such developments contribute to what the study calls the 'ruins of empire'.[710] These studies show how the dam continues to shape Tanzania's modernisation trajectory, functioning as both a material artefact and a symbol of future aspirations. Similarly, through Müller-Mahn's study, we see how such delayed projects anchor debates about socially constructed futures, demonstrating that incomplete or delayed infrastructure maintains active agency in shaping collective futures and influencing development strategies.[711] Ultimately, Stiegler's Gorge Dam serves as more than a mere physical structure - it is a living embodiment of societal hopes, economic strategies, and political visions of the past that continue to shape both present conditions and future possibilities.

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708 Interview with a Villager, Kisaki Village, Morogoro 19th April 2024.

709 Interview with a villager, Kisaki Village, Morogoro 20th April 2024.

710 Jens Beckert, *Imagined Futures: Fictional Expectations and Capitalist Dynamics*, Harvard UP (2016);Theodor Johannes Aalders, "Building on the Ruins of Empire: The Uganda Railway and the LAPSSET Corridor in Kenya," *Third World Quarterly* 42, no. 5 (2021): 996-1013.

711 Detlef Müller-Mahn, "Envisioning African Futures: Development Corridors as Dreamscapes of Modernity," *Geoforum* 115 (2020): 156-159.

Developments in the management of Tanzania's protected areas posed far-reaching consequences, sparking intense debate and raising significant concerns among local communities. One of the most notable changes was the transformation of the controversial Selous Game Reserve into Nyerere National Park.[712] While supporters argue that the change was intended to improve conservation efforts and increase tourism revenues, others argue that it led to increased restrictions on land use and access. The change in turn fuelled fears among local people about possible future land expropriation. Interviews with local people revealed that many are concerned that the national park designation could lead to stricter regulations and enforcement, potentially limiting their traditional rights to land and resources within the area. As a result of these concerns, some people viewed the project with scepticism, fearing that the benefits of tourism and conservation may not outweigh the costs of restricting the use of the land on which they depend:

> *"I wish this project remained unbuilt. During the days of Ujamaa, we settled on this land and claimed ownership. However, recent construction projects have resulted in part of our land being incorporated into a national park, restricting our access. Elephants and warthogs are also a major threat to our security and crops. Although we cannot defend ourselves against these animals, we are forced to inform the park rangers of their presence, which takes time before they arrive."*[713]

This development highlights the wider challenges of multi-user protected area management in terms of balancing conservation objectives with human rights and addressing concerns about land tenure security for local communities.

Several people also expressed concern about the government's decision to proceed with the project, citing potential drawbacks such as increased costs, environmental impacts and diversion of resources from other pressing needs. Some argued that there were alternative solutions that could achieve similar objectives more efficiently. Others felt that the scope of the project was too ambitious given current economic constraints and societal priorities. While supporters believed that the initiative would stimulate

712 Dan Brockington, and Christine Noe, *Prosperity in Rural Africa? Insights into Wealth, Assets, and Poverty from Longitudinal Studies in Tanzania*, (Oxford University Press, 2021).

713 Focus group discussion with 8 villagers, Kisaki, Morogoro, 8th April 2024.

innovation and job growth, critics warned about long-term sustainability and potential risks to public services. As the interview reveals:

> *"I am very concerned about the massive environmental impact of the project. It seems that there could have been alternative approaches that would have allowed widespread access to the area. Now it's relatively easy to go there, hunt elephants and leave. This seems to have been driven by economic interests, with a few companies profiting at the expense of a struggling state that can barely pay its debts. However, I believe that this dam project may not be as productive as expected. Data from decades ago cannot accurately reflect current circumstances"*[714]

Similarly, an interview with an environmental scientist also raised concerns about the obstacles posed by the lack of Environmental Impact Assessments (EIAs) for dam projects. These assessments are a crucial part of the development process. Without them, the Stiegler Dam project team's attention was diverted to exploring the potential negative impacts of constructing such a massive hydroelectric facility in the fragile ecosystem of the Rufiji Delta:

> *"In the 1960s, Environmental Impact Assessments (EIA) were virtually unknown in Tanzania. As an ecologist, I played a pivotal role in introducing EIA practices to the country. My efforts began at the Institute for Resource Assessment (IRA) and later expanded through collaboration with the London-based International Institute for Environment and Development (IIED). These initiatives contributed significantly to the development of guidelines and training programs for EIA in Tanzania. Despite initial scepticism about the impact of a power plant on the Rufiji Delta, our work underscored the critical importance of protecting sensitive environments like the Rufiji Delta."*[715]

The ecologist emphasised the importance of EIA and highlighted Stiegler's potential environmental impact. He believed that Nyerere had made a wise decision to shelve the project because of fears of significant ecological damage, particularly to the Rufiji River downstream.

714 Expert interviews with an engineer in Morogoro, 05.01.2024.

715 Expert interview with an ecologist in Dar es Salaam, 8th April 2024.

Another interview with one of the Morogoro District Members of parliament expressed optimism about the positive impact of the dam project, highlighting its potential economic benefits for local communities and Tanzania as a whole.

> *"There is no doubt that the completion of the Stiegler's Dam will help us to secure Tanzania's future. The future is built on and through infrastructure. The railway (SGR) is ready, all it needs is electricity. Other projects include an expressway from Dar es Salaam through Morogoro to Dodoma and a plan to build more industries, which will need electricity."*[716]

The Member of Parliament made it clear that the primary purpose of the dam was to serve national interests. However, he emphasised that local communities will also benefit from a substantial corporate social responsibility fund of about 300 billion Tanzanian shillings (equivalent to about one billion US dollars). This fund is meant to support various community development projects. Despite these assurances, concerns remain as to whether expectations will be met as planned, or whether the project will face further delays and frustrations.

The MP explains that the dam serves primarily the national interest, but that local populations would also benefit through the corporate social responsibility fund amounting to almost 300 billion Tanzanian Shilling (approximately one billion USD). This money is supposed to support community projects. Despite this, other stakeholders viewed the project as not being a genuine problem solver due to climate concerns. One respondent made this observation:

> *"With today's technology, do we still choose this type of infrastructure to generate electricity? Blackouts are inevitable due to ongoing global climate change, not to mention the impact the dam will have on people downstream."*[717]

The primary motivation for building the project was to generate electricity. However, archival records show that the dam's design has capabilities beyond power generation.[718] Contrary to earlier studies, which suggested that the government was only interested in the dam's ability to deliver over 2000 MW within five years, the

716 Expert interview with MP, Morogoro, 29.12.2023.
717 Expert interview with former TANESCO engineer, Dar es Salaam, 23.12.2023.
718 NAN, TAN 009. Africa: Tanzania. General. 1971- 1977; Hafslund-Norplan Report 1984.

project incorporates elements of flood control and water supply.[719] This multi-faceted approach also provides an opportunity to supply water to Dar es Salaam's growing population and support the city's ambitious economic and social development goals. Interestingly, this aspect was part of the FAO plan back in 1961, demonstrating foresight in addressing the future challenges of urbanisation. According to Muller Mahn et al, people tend to perceive megaprojects as if they were already completed, overlooking crucial factors such as complexity, local conditions, hidden risks and underlying agendas. This perception has significant implications for both the physical environment and societal dynamics.[720] The case examined here illustrates how expectations regarding infrastructure development, particularly land valuation and resource utilisation, became the foundation for communal land subdivision and commodification. This transformation also aligns with the popular narrative of people abandoning rural areas and leaping towards modernity. However, the aspirations associated with these megaprojects as systems for circulating goods, knowledge, meaning, and power were reduced to mere hopes. It is worth noting that while anticipating all potential challenges might seem prudent, doing so could potentially hinder progress. Thus, if all potential challenges were anticipated, nothing would ever get off the ground.

The failure of early post-colonial planners to heed the criticisms of the FAO report probably prolonged project implementation. While grand, unrealistic visions can mobilise action, they also offer opportunities for inclusive participation and for addressing the structural injustices inherent in many projects. Despite challenges and setbacks, these development ideals continue to influence modern economic, social and political discourse. Large-scale projects and ambitious promises remain powerful justifications for significant external borrowing, despite growing concerns about escalating international debt burdens.

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719 University Consultancy Bureau, "Environmental Impact Assessment for the Stiegler's Gorge Hydropower Project, Tanzania." Dar es Salaam, Tanzania: Tanzania Electricity Supply Company, 2018.

720 Müller-Mahn, et al., "Megaprojects—Mega failures?" 1069–1090.

6.4 Reviving the Delayed Future Project

Unlike the agricultural development in the Rufiji Basin, an important factor in the equation of the Rufiji basin was the proposal to construct a hydropower plant at Stigler's Gorge.[721] The plans to build a dam at Stiegler's Gorge stayed dormant until 2015 when the newly elected President John Magufuli shifted the country's development priorities from agriculture to industry. This fundamental strategic realignment created a favourable environment for a renewed effort to advance the mega-dam project.[722] John Magufuli, who saw himself as a successor to Julius Nyerere, decided to revive the dam project to address the country's energy crisis and redirect national development towards enhanced industrialisation. In an attempt to rebrand the project, the dam was officially renamed the Julius Nyerere Hydropower Project (JNHPP) in honour of Julius Nyerere in October 2019.[723] According to Hoag, from the 1960s to the 1980s, planners also referred to the proposed project at Stiegler's Gorge by several names, including "Stiegler's Gorge Hydropower Project", "Stiegler's Gorge Multipurpose Project", Stiegler's Gorge Hydropower Utilisation Project" and Stiegler's Gorge Power and Flood Control Project."[724] The renaming of the project to Nyerere carried significant symbolic meaning, replacing the name of Franz Stiegler, a German colonial officer, with that of Julius Nyerere, Tanzania's legendary independence hero. This change served as more than just a name alteration; it represented a shift in identity and purpose. Importantly, this transformation contributes a historical dimension to the concept of travelling ideas. The original idea of constructing a dam at Stiegler's Gorge persisted across decades, regimes, and ideological shifts, prompting the question: what happens when ideas travel not just across space, but through time? This case suggests that travelling can be temporal as well as spatial, highlighting how infrastructure visions are reinterpreted, reappropriated, and revived in new political and historical contexts.

721 FAO, "Rufiji Basing Tanganyika.":44-45.
722 Havnevik, "The Stiegler's Gorge Project in Tanzania": 105-116.
723 Godius Kahyarara, "Tanzania's Investment in Infrastructure: Gateway to Economic Hub," in Maliyamkono, T.L & Mason, H.L. (eds). *The Game Changer: President Magufuli's First Term in Office* (Tema and Siyaya, 2020):180.
724 Hoag, "Designing the Delta":173.

Similarly, President Magufuli repeatedly framed the dam as the cornerstone of his vision for modern Tanzania. The project transcended its status as mere infrastructure, embodying a broader symbolic significance that went beyond its physical form.[725] This situation is evident when Magufuli said:

> *"This is the first day in the economic liberation of Tanzania, it's a unique and historic day. Our envisaged industrial economy needs adequate, cheap and reliable power supply through hydrogeneration. This project has stalled for many years, we will build it with our own money."*[726]

The renaming and framing, from Stiegler's Gorge to JNHPP had several symbolic implications: first, historical reconciliation; by replacing Stiegler's name with Nyerere's, the project distanced itself from colonial associations and aligned itself with Tanzania's struggle for independence. Second, national identity; by using Nyerere's name, the project was directly linked to Tanzania's national identity and its founding ideals. Third, the development vision; by presenting the dam as the centrepiece of modernisation efforts, it was positioned as a symbol of progress and development for the nation. Fourth, the leadership narrative, as Magufuli's repeated emphasis on the dam as his vision for modern Tanzania reinforced his leadership narrative and development agenda. According to Dye, the dam project reveals another underlying motivation - to serve as a tool to re-establish a strong centralised state capable of driving the national agenda.[727] The rationale is in keeping with the legacy of Julius Nyerere, marking a renewed shift towards nationalism and an approach aimed at promoting state-led economic growth and modernisation.[728] This raises the question of whether Magufuli was the game-changer Tanzania was waiting for, given that his tenure brought about tremendous development in the electricity sector on an unprecedented scale in Tanzania's history. However, the Magufuli administration faced numerous challenges in implementing the project, which had previously thwarted earlier

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725 Tanzanian President Inaugurates Construction of Mega Hydropower Project, *Xinhua News*, 27.07.2019; Nyerere Hydropower Project, Honouring Mwalimu's Legacy, *The Citizen*, October 15, 2019 — updated on November 02, 2020.

726 Nyerere Hydropower Project, Honoring Mwalimu's Legacy, *The Citizen*, Tuesday, October 15, 2019.

727 Dye "Dam Building by the Illiberal Modernisers":231-249.

728 Coulson, "*Tanzania*": 144-145.

attempts to advance the initiative. The following figure shows the opening ceremonies in Tanzania in 2019 (The Citizen newspaper, 2019).

Figure 29: Photo taken during the Inauguration of the Construction of Mega Hydropower Project in Rufiji

Historically, earlier attempts were confronted with other development options and financial challenges and the whole idea for the dam had to wait for another four decades until the 1960s when it came up again.[729] Late in the 1960s, the postcolonial government of Tanzania requested UNDP to conduct a feasibility study on the possibility of developing an 'ambitious' power plant in the basin.[730] The UNDP approved the project, but it did not take off as quickly as anticipated. From the outset, the idea of a large dam was contested because of the ecological, social, cultural and general environmental impact that stopping the water at this dam would have.[731] Partly, environmental and financial constraints were among the issues considered in the politics that ended up not realising the project in the 1970s and 1980s.[732] It took six decades until when the construction was given new rigour in 2018.

729 Uhuru, 26th Agosti 1976.
730 The Standard, 26th November 1969.
731 Mwalyosi, "Environmental Impacts of the Proposed Stiegler's ":250-254.
732 Uhuru, 22nd October 1976.

The return of project plans to tangible infrastructure can be linked to the structure of the ruling regime or state capacity, which plays a significant role in how projects are implemented and how the state interacts with both dam-affected communities and anti-dam activists. The state capacity is multi-dimensional. The first capacity is administrative capacity, where the government designs its policies and then implements them. The second capacity is coercive capacity, where the government maintains order and sometimes uses military force to implement state-led projects. Finally, extractive capacity refers to how the state mobilises resources to finance its activities.[733] These three dimensions are closely interrelated and are pivotal in terms of implementing state developments. As far as Stiegler's Gorge dam is concerned, the renewed push to advance it became feasible due to an unprecedented decision to allocate TZS 6.55 trillion from the national budget for its construction.[734] This move was in line with the state's capacity and enabled the government to accelerate construction despite opposition. In 2017, international tenders were issued by TANESCO, the state-owned electricity company.[735] An Egyptian joint venture, comprising Arab Contractors and Elsewedy Electric with backing from President Abdel Fattah El-Sisi, emerged as a key contender for the prestigious Tanzania dam project. Ultimately, the Egyptian consortium secured the contract to build the Julius Nyerere Hydropower Dam in December 2018, partnering with Chinese company Sino-Hydro as a subcontractor. Elsewedy Sigh for Construction shows the new project name as the Julius Nyerere Hydropower Project, replacing the colonial officer Stiegler.

733 Jonathan K. Hanson & Rachel Sigman. Leviathan's Latent Dimensions: Measuring State Capacity for Comparative Political Research. Manuscript Presented at the World Bank Political Economy Brown Bag Lunch Series, March 21, 2013.

734 Tito Mwinuka, Johary Kachwamba & Pastory Mwijage, "Development in Electricity Subsector in Tanzania under the Fifth Phase Government and its Impacts," in Maliamkono T.L and Mason H.L. *The Game Changer: President Magufuli's first Term in Office* (Tema and Siyaya, 2020): 373.

735 No Backing Down On Stiegler's, Govt Vows, *The Citizen*, 27th January 2019; NORAD, Oxford Analytica, Controversy may Mire Tanzania's Stiegler's Gorge Dam, 2018.

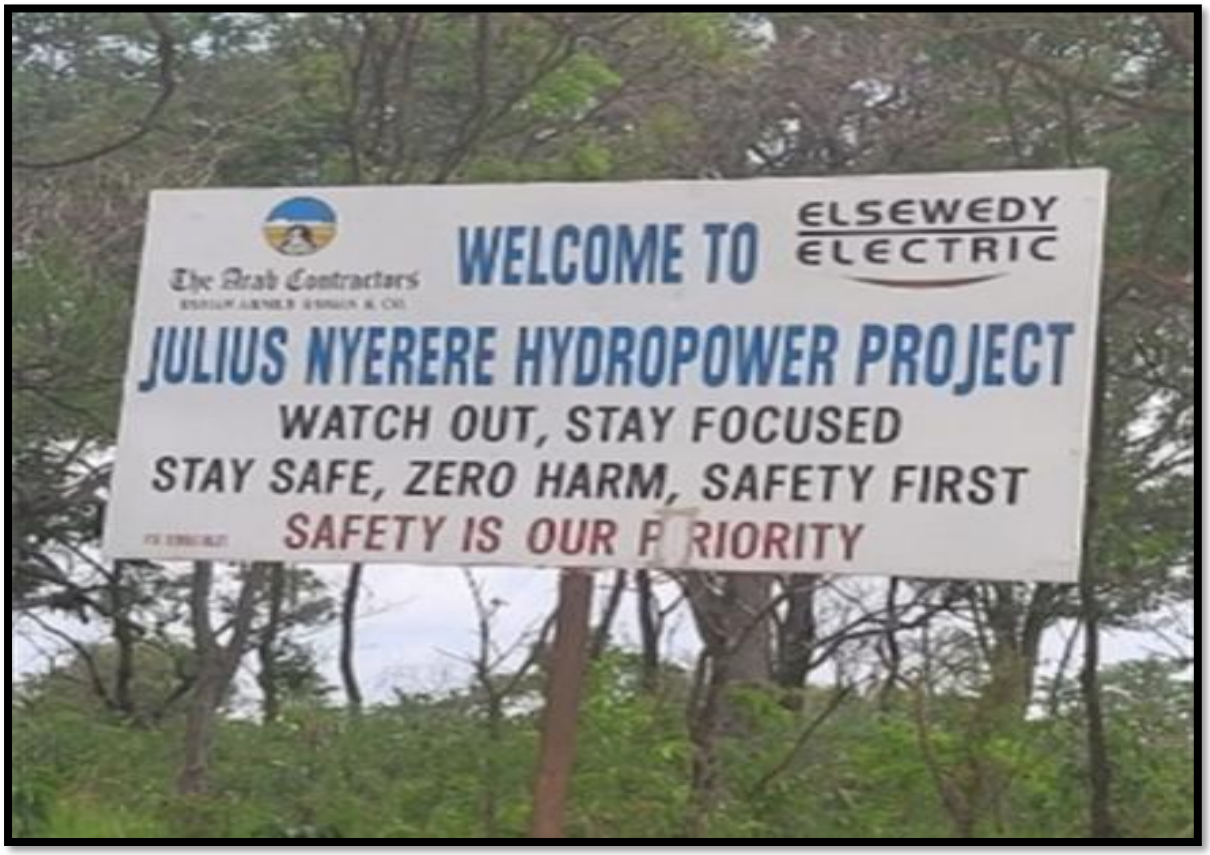

Figure 30: Elsewedy Contractor's Signs in Kisaki village, Morogoro

Source: Photo taken by the author

Notably, the Tanzanian President, Magufuli (see Figure 38) negotiated the contract directly with Egyptian President El-Sisi. Originally scheduled for completion within four years, construction encountered unforeseen obstacles due to the COVID-19 pandemic and severe flooding in 2020, necessitating successive deadline extensions. Despite these challenges, the project demonstrated remarkable resilience and progress.[736] Construction began in 2020, and it was expected to be commissioned in 2022. However, the COVID-19 pandemic occasioned further delays, and the first dam filling commenced in November 2022. Turbine installation was completed during this period.[737] The project's ability to stay on track despite numerous hurdles probably stems from consistent support from both Egyptian and Tanzanian Presidents, even

736 JNHPP Well on Course: Samia, El-Sisi Thumbs up Project Pace, *Daily News*, 10th November 2022.

737 Construction of Dam at Julius Nyerere Hydropower Station Begins, *CCE News*, Saturday,21 Nov 2020.

following Magufuli's passing in 2021. This top-level support was instrumental in overcoming challenges and sustaining momentum throughout the development process.

Figure 31: President Samia Suluhu* (left) *with her counterpart El-Sisi shortly before the two leaders held talks

Source: Photo / Statehouse- The citizen 10 November 2022.

The project boasts an impressive capacity of 2115 megawatts, surpassing notable hydroelectric dams in Africa such as Egypt's Aswan High Dam (2100 MW), Mozambique's Cabora Bassa Dam (2075 MW), and Angola's Lauca Dam (2069 MW). With the completion of construction works, the previously delayed future has been revitalised. This development demonstrates that the project was not abandoned but merely in a state of dormancy. Significantly, the completion of the dam marks a milestone in the comprehensive development strategy that FAO launched in 1961. However, this achievement is likely to introduce new challenges regarding water usage

in the basin, similar to those encountered in upstream developments such as the Mtera and Kidatu hydropower dams. Human activities downstream may need to be adjusted to ensure the smooth operation of the dam. Upstream rice cultivation in the Usangu plains, Mbarali and Kilombero, established based on FAO recommendations, remains dependent on annual reliable rainfall and unrestricted water flow into the newly constructed national project.[738] While dams are often seen as symbols of modernity and drivers of liberal economic development, they are also contested infrastructures.[739] These structures can face sustainability issues due to the complexity of managing interconnected components. The Rufiji basin presents a longstanding challenge in reconciling the diverse interests of various stakeholder groups without compromising any aspect of the project. This delicate balancing act has remained at the forefront of attention for more than six decades after independence, consistently drawing scrutiny to the basin.

Taking the past-future perspective, the construction of the JNHPP reveals larger parallels and legacies of the high modernity development discourse in dam building, particularly the construction of the Kidatu and Mtera dams in the 1970s and 1980s. As with earlier hydropower dams in post-independence Tanzania and sub-Saharan Africa, serious ecological and technical problems were overlooked by dam constructors. As the report by Tanzania's Controller and Auditor General (CAG) revealed in 2021, TANESCO failed to check the economic and technical feasibility of the project and built the dam based on feasibility studies carried out by Norwegian consulting companies in the 1970s and 1980s. Construction began without sufficient up-to-date technical, economic and ecological data.[740] Although the Ministry of Energy and Minerals stated in the tender invitation that the tender would be conducted through international competitive bidding by the Public Procurement (Amendment) Act 2016 and the Public

738 NAN, NORAD, box 91, 431-TAN 012.5: 'Overall Assessment of the Stiegler's Gorge Project' in Lower Rufiji Valley Integration Study, Oslo, 5 December 1983; NAN, 95 UD 37 4/149, Volume 25: Draft Agreement on Hydropower Potential in the Rufiji River Basin, 20 October 1982.

739 Rutgerd Boelens, Esha Shah, and Bert Bruins, "Contested Knowledge: Large Dams and Mega-Hydraulic Development," *Water* 11, no. 3(2019): 416; Attia, Benjamin, "Too Big to Succeed? Africa's Clean Energy Mega-Projects," *Energy For Growth* (2020); Dye, "Dam Building by the Illiberal Modernisers: 231-249; Müller-Mahn, Mkutu, and Kioko, "Megaprojects—Mega Failures?": 1069-1090.

740 Julius Nyerere Hydroelectric Power Project Using 1970s Feasibility Study, *The Citizen*, 8 April 2021.

Procurement (Goods, Works, Non-Consultancy Services and Disposal of Public Assets by Tender) Regulations of 2013[741], critics of the dam noted that the bidding and tendering process involving Egyptian companies Elsewedy Electric Co. (consultant) and Arab Contractors (contractor) lacked international standards and appeared politically motivated, with decisions being made in haste.[742] Both the Egyptian consultant and the Arab contractor were deemed incompetent for large-scale hydropower dam projects, yet they were selected under an ambitious state initiative that suppressed dissenting opinions.[743]

As previously indicated, the dam was originally scheduled for completion in 2022. However, the project timeline exceeded the initial four years making the total cost escalate significantly, reaching over USD 10 billion compared to the initial projection of USD 3.6 billion established at the project's inception.[744] The parallels between past and present are striking. From the 1960s to the 1980s, local and international experts who opposed hydropower projects were systematically dismissed. This pattern continues unabated. Within and beyond Tanzania's borders, opposing voices on mega-hydropower projects continue to be largely ignored. In the case of the Stiegler's Gorge project, this trend culminated in parliament in 2018, where a federal minister explicitly warned that "anyone against Stiegler's Gorge will be jailed,"[745] for the interest of the state. The delayed future project was brought to life for the interest of the state. The question of whether the dam will be fully realised, and whether it will serve the intended purposes depends on whether decision-makers and planners learn from history in terms of successes and failures. Tanzania has a diverse range of energy resources, including abundant and cost-effective renewable options such as solar and wind power, substantial domestic gas reserves, coal and potential geothermal energy,

741 Tanzania Opens Bidding for Rufiji Hydropower Project, *The Citizen*, 10th September 2017.

742 Barnaby Joseph Dye, "Unpacking Authoritarian Governance in Electricity Policy: Understanding Progress, Inconsistency and Stagnation in Tanzania," *Energy Research & Social Science* 80 (2021): 9.

743 Dye, Unpacking Authoritarian," 98-10.

744 Tanzania Stiegler's Gorge Dam to Cost More than Double the Original Estimates, Report, *Global Construction Review*, 15th February 2019.(https://www.globalconstructionreview.com/tanzanias-steiglers-gorge-dam-cost-more-double-ori/) Accessed on 04.02.2025.

745 Anyone Against Stiegler's Gorge Project will be Jailed, says minister. In: *The Citizen*, 22nd May 2018. https://www.thecitizen.co.tz/tanzania/news/national/anyone-against-stiegler-s-gorge-project-will-be-jailed-says-minister-2637536 Accessed on 04.04.2025

as well as several hydropower dams. Former President Magufuli's prioritisation of Stiegler's Gorge hydropower project over more affordable and expedient alternatives, despite its high cost and expected eight-year construction period, has contributed to delays in electricity availability. Consequently, the decision to pursue the dam, rather than its incomplete status, is largely responsible for the electricity shortages experienced since 2017. Notably, Magufuli also chose to decommission operating fossil fuel power plants, reducing Tanzania's overall capacity, while failing to allocate funds to previously prioritised gas projects, such as Kenyerezi IV, which could have met Tanzania's 2009 energy demand projections. These projections were more realistic than the Ministry of Energy's overly optimistic estimates in 2016.

Experience of the Stiegler's Gorge project shows that technological limitations and the failure to consider environmental and social factors in the planning and construction of dam infrastructure are among the causes of failure. In the 1960s to 1980s, post-independence governments in Africa struggled to build large hydropower dams as symbols of what modern countries should look like, which in turn became the source of social problems due to an over-reliance on Western technology, finance and expertise that ignored the social aspect of such infrastructure. This is an important lesson from the past for Tanzanian decision-makers, who can learn that the full materiality of infrastructure depends not only on its productive capacity but also on the consideration of the social aspects on which the infrastructure operates. This understanding is particularly important now, as large dams are being built again in countries of the Global South to expand power generation technologies. They can learn that they must first address the previous constraints to full technology transfer, including social factors. Thus, this study is not only about the accounts of past historical events that have shaped the current hydropower infrastructure, but it is also useful for future hydropower technology and use in Tanzania.

6.5 Conclusion

This chapter has examined the politics of delay and revival in large-scale infrastructure projects, using Stiegler's Gorge Dam as a case study. It argues that prolonged dormancy should not be mistaken for failure or abandonment. Instead, delay emerged as a formative condition, sustaining the dam's presence in national and local imaginaries

despite its physical absence. The historical record reveals that the project's stagnation was driven not only by funding shortages and environmental concerns but also by deeper tensions between conflicting development paradigms: state-led industrial modernity versus participatory sustainability, and foreign expertise versus local knowledge. These contradictions rendered the project politically and technically irresolvable for decades.

Yet, this dormancy was not a void. The chapter demonstrates how latent infrastructures can be reanimated through shifts in regimes, ideologies, and political agendas. The recent revival of the project was not a mere continuation of past plans, but a rearticulation of its purpose, infused with new narratives of national pride, energy sovereignty, and economic ambition. The project illustrates the temporal complexity of infrastructural politics in postcolonial contexts, where dormant schemes linger as spectral futures, only to be revived during moments of political transformation. Understanding these cycles of deferral and return offers insight into how futures are not simply planned but also postponed, contested, and reimagined.

The case of Stiegler's Gorge contributes to critical infrastructure studies by illustrating that even unbuilt projects can shape regions and communities. Long-awaited and frequently revised, the project's lifecycle, spanning from the colonial period to its recent realisation, underscores how infrastructure can remain influential long before materialisation. The archival records and oral testimonies presented here highlight that delays were not incidental; they were shaped by shifting political priorities, global power dynamics, environmental debates, and internal contestations. The dam remained a powerful symbol of national modernisation, and its enduring presence in public discourse helped sustain its relevance across generations. What characterises it as a "delayed future" is not just the passage of time but the continued resonance of its vision. The eventual construction of the JNHPP revitalised this long-standing ambition, linking it to broader development goals.

Several factors contributed to the delays: competing national and international interests, environmental concerns regarding the Selous Game Reserve, socio-political struggles over resource allocation, and the financial challenge of balancing industrial ambitions with conservation. These elements made the project a site of ambiguity and

negotiation, rather than linear progress. Importantly, delayed infrastructure projects such as Stiegler's Gorge can have deep social and emotional repercussions. They represent not only unbuilt futures but also deferred hopes, frustrations, and contested aspirations. The eventual realisation of such projects, even after decades, highlights the complexities of development. It shows that infrastructure is as much about time, politics, and imagination as it is about concrete and steel.

Stiegler's Gorge exemplifies both a ghost of unrealised potential and a dream finally fulfilled. Its long history reflects Tanzania's evolving political landscape, the role of African agency in shaping development decisions, and the power of historical narratives to shape infrastructural futures. Had the dam been built earlier, Tanzania might have joined the wave of postcolonial mega-dam projects in the 1960s, following the example of Egypt and Ghana. Instead, its delayed realisation invites a more critical reflection on past models of development and their enduring influence. With the construction of the JNHPP, Tanzania re-engages with a developmental path once seen as aspirational and now more cautiously assessed, signifying the complex, cyclical nature of infrastructural modernity in Africa.

CHAPTER VII

SUMMARY AND CONCLUSION

This study examined the complex, prolonged trajectory of Stiegler's Gorge Dam project to illuminate the broader implications of delayed large-scale infrastructure development in post-independence Tanzania. Drawing on historical analysis, political economy/ecology, socio-technical imaginaries, and travelling ideas, the study positioned the dam not merely as a technical project but as a deeply symbolic and political artefact that evolved over time. Central to the analysis are the concepts of the delayed future and ghosting , which challenge the assumption that delay is a neutral or technical condition. Instead, the study argues that delay is productive: politically, socially, and symbolically. It shapes state discourse, informs institutional behaviour, and conditions local livelihoods. As previous scholarship has shown, futures are not abstract destinations, but socially embedded, materially mediated, and importantly, historically constructed.[746] The case of Stiegler's Gorge demonstrates how unrealised infrastructure can have real and enduring effects, generating expectations, shaping policy agendas, and sustaining collective imaginaries.[747]

Infrastructure is often viewed as a forward-looking endeavour, shaping the future through the physical organisation of space, nature and society. However, as illustrated by Stiegler's Gorge Dam, infrastructure is never detached from its past. It is deeply rooted in historical legacies, institutional memory and layers of political aspiration and abandonment. Understanding its future, therefore, requires engaging with its history, not as a distant backdrop, but as an active force shaping what is imagined, proposed and ultimately built. This study achieved its objectives by tracing the historical development of hydropower planning in Tanzania, analysing the

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746 Appadurai, "The Future as Cultural Fact." Insights on the concept of 'the capacity to aspire' as a culturally informed and unequally distributed phenomenon (pp. 179–180); discussions on how aspirations influence planning and future-making, particularly in developmental contexts (pp. 182–185); and the relevance of this concept for understanding the symbolic and political life of stalled or deferred projects (pp. 225–230).; Beckert, "Imagined Futures." See especially Chapter 3, "Fictional Expectations. 45–68.

747 Carse & Kneas, "Unbuilt and Unfinished." Key discussions on latent infrastructures are on pp. 12–15; Harvey & Knox, "The Enchantments of Infrastructure Mobilities" See pp. 528–531 for insights into infrastructural enchantment.

involvement of national and transnational stakeholders in the evolution of the dam project, and examining the local experiences of anticipation, uncertainty, and adaptation. The findings contribute to broader debates in political economy, socio-technical imaginaries, the travelling of ideas and infrastructure studies by foregrounding the interplay between infrastructure, temporality and power.

Hydropower planning in post-independence Tanzania

The first objective traced the evolution of hydropower planning in Tanzania since independence. The findings revealed that the post-independence state, inspired by socialist ideals and a desire for self-reliance, embraced infrastructure, particularly dams, as emblems of national modernity and industrial progress.[748] Stiegler's Gorge was repeatedly integrated into national development plans, including the Arusha Declaration and successive Five-Year Plans, even in the absence of financial or technical feasibility. These ambitions mirrored global postwar narratives in which large dams became icons of modernisation.[749] However, these top-down visions frequently overlooked ecological complexities and local contexts, as cautioned by Scott, leading to repeated delays and mounting contestations.[750] Despite being technically desirable, the dam project repeatedly stumbled upon these issues, ranging from environmental concerns within the Selous Game Reserve to economic volatility and shifting donor priorities.[751]

Transnational and local stakeholders

The second objective focused on the role of transnational and local actors in shaping the dam's fate. The analysis showed that the project evolved not solely through domestic planning but through continuous interactions with foreign governments,

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748 Coulson, "Tanzania". Refer to Chapter 5, "The Arusha Declaration and its Legacy," pp. 120–145; URT, *The Second Five-Year Development Plan 1969–1974*. See pp. 45–50 for plans related to hydropower development.

749 Kaika, "Dams as Symbols of Modernisation." Discussions on the symbolism of dams are on pp. 280–285; Swyngedouw, "Liquid Power: Contested Hydro-Modernities" Discussions on hydro-modernities are found in Chapter 2, pp. 60–85.

750 Scott, "Seeing Like a State". Refer to Chapter 1, "Nature and Space," pp. 11–52, for critiques of high-modernist planning.

751 Dye & Hartmann, "The Changing Role of Foreign Aid ". Discussions on donor influence are on pp. 345–350; Hoag & Öhman, "Turning Water into Power." Key historical context is provided on pp. 630–635.

donor agencies, and consulting firms. FAO, USAID, Japan, Norway, Brazil and, more recently, Egypt and China have all at different points played significant roles in either promoting or halting the project, depending on prevailing development ideologies and geopolitical interests and thus, the dam became a node in a broader web of global interests and ideological shifts.[752] These interactions reflect the dam's role as a socio-technical imaginary—embodying shared visions of development, security, and sovereignty.[753] Over time, its purpose shifted: from flood control and irrigated led agriculture to industrial electrification, and later to national prestige and geopolitical strategy.[754]

Local perceptions and the experience of delay

The third objective focused on how local communities living near and further downstream of the proposed dam site perceived and navigated the prolonged delay. Oral histories revealed that the dam became a spectral infrastructure, a ghostly presence that generated hope and anxiety, constantly evoked yet never materialised for a long time.[755] In villages such as Kisaki and across the Rufiji Basin, residents interpreted the project through rumours, partial information, and vague political promises. Despite limited engagement in formal planning processes, these communities adapted to the dam's looming presence, strategically negotiating its imagined benefits, while managing its uncertain consequences. To the local communities, waiting was not an option. As Beckert notes, imagined futures can deeply influence current decisions and behaviours, even in the absence of physical realisation.[756]

The following conclusions emerged based on the analysis presented in this thesis:

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752 Öhman, "Taming Exotic Beauties." Chapter 4 provides detailed case studies, pp. 95–120; Movik & Allouche, "The Travelling of Ideas." See pp. 124–126 for analysis of the movement of development ideas.

753 Jasanoff & Kim, "Sociotechnical Imaginaries." The concept of sociotechnical imaginaries is elaborated on pp. 190–192.

754 Dye, "The Politics of Renewable Energy in Africa." Relevant analysis on Tanzania's hydropower politics is found on pp. 3–5.

755 Harvey & Knox, "The Enchantments of Infrastructure." See pp. 528–531 for insights into infrastructural enchantment.

756 Beckert, "Imagined Futures". See especially Chapter 3, "Fictional Expectations," pp. 45–68.

The political economy framework reveals that Stiegler's Gorge Dam was a contested terrain where local, national, and international actors competed for influence and resources. The dam's history underscores how development was often driven by state-centric and donor-driven priorities, frequently excluding local concerns. As Havnevik argues, Tanzania's post-independence development was characterised by a top-down approach that failed to incorporate democratic participation, thereby contributing to the eventual failure of many large infrastructure projects.[757]

Donor involvement was shaped by economic self-interest. Norway, for instance, benefited through consulting contracts and technology exports, while Tanzania bore the financial risk.[758] This dynamic reflects the asymmetrical nature of donor-recipient relationships and the extent to which foreign aid can be compromised by economic and geopolitical motives. The project overemphasised electricity output (megawatts) at the expense of broader socio-economic goals such as flood control, irrigation, and equitable resource distribution. While foreign donors saw energy generation as a measurable return on investment, the Tanzanian government invested symbolic and political capital into the dam as a national aspiration, not simply a technical utility.

Tanzania's socialist aspirations clashed with donor priorities. While the state focused on rural development and self-reliance, international partners prioritised return on investment.[759] The project's dormancy should not be seen solely as a technical or planning failure. Rather, it reflects a broader crisis in Tanzania's socialist development model, which failed to generate sufficient industrial demand for electricity and lacked the fiscal means to implement large-scale infrastructure without foreign aid. The mismatch between development ideology and market realities contributed to the project's suspension.[760]

The dam's revival as the JNHPP illustrates the enduring appeal of infrastructure as a symbol of national progress, even if materially unrealised.[761] Despite its delayed

757 Havnevik, "Tanzania," :25–27.
758 Havnevik, "Tanzania, ":28–30.
759 Moyo, S, & Paris Y. 2005. Reclaiming the Land: The Resurgence of Rural Movements in Africa, Asia and Latin America. London: Zed Books: 172: Havnevik, Tanzzania:31.
760 Coulson, "Tanzania, " 176–178.
761 Harvey & Knox: 524; Appadurai: 67–70.

materialisation, the dam remained central to Tanzanian development discourse, functioning as a site of deferred aspiration, hope, and contestation. The project, though dormant, had a spectral presence in local and national imaginaries

Finally, unbuilt infrastructure can still exert influence. Concepts like socio-technical imaginaries and latent infrastructure explain how such projects persist in public consciousness and institutional agendas.[762] The study shows how visions of the future embedded in infrastructure projects shape political action, social expectations, and institutional decisions. In this sense, delays are not just temporal setbacks but productive political and symbolic moments. As Appadurai reminds us, the capacity to aspire is a cultural and political faculty that allows societies to navigate uncertain futures, even when aspirations are unmet or indefinitely postponed.[763]

This study thus contributes to the growing scholarship on infrastructure, temporality, and development in Africa. It calls for a more nuanced reading of delays, not as signs of failure, but as sites of political negotiation, historical sedimentation, and aspirational endurance.

Delayed futures as an analytical framework

The Stiegler's Gorge project epitomises the characteristics of delayed infrastructure, periods of prolonged stasis punctuated by brief surges of political interest. These periods of delay are not idle; they are moments of ideological reconfiguration and strategic recalibration. The dam's revival in the 2010s reflected a shift toward nationalist, top-down developmentalism, but it did not erase the project's historical entanglements or unresolved tensions.[764] Rather, the past remained present, informing contestations over ecological impacts, land rights, and governance.

The concept of delayed futures, proposed by this study, offers three key contributions:

- Analytically, it moves beyond binary classifications of infrastructure as successful or failed. Instead, it frames projects like Stiegler's Gorge as processual

762 Jasanoff & Kim: 190–193; Carse & Kneas : 35.
763 Appadurai: 67–69.
764 Dye & Hartmann: 341–362; Müller-Mahn et al: 134–154.

and contingent, constantly evolving in meaning, value, and consequence.[765] It also demonstrates how ideas can evolve over time.

- Theoretically, it situates temporality at the heart of infrastructure politics. Delays are not technical failures but outcomes of political struggle, environmental complexity, and geopolitical manoeuvring.[766]
- Methodologically, it demonstrates the value of combining archival research, oral histories, and ethnographic observation to understand how infrastructural imaginaries are sustained over time and across scales. Moreover, local responses offer a valuable contribution to historical literature, particularly in areas where such perspectives have been underrepresented or absent.

The discussion demonstrates that Stiegler's Gorge project was cancelled multiple times before resurfacing in the 2010s. Its suspension can be understood within the broader context of shifting global development ideologies, national economic constraints, and mounting environmental concerns. In the 1980s, the rise of neoliberalism and structural adjustment programmes deprioritised large, state-led infrastructure in favour of small-scale, market-oriented development. Tanzania's economic crisis further limited donor support, while concerns about feasibility and ecological risks deepened uncertainty. These factors collectively stalled the project for decades. Its eventual revival as the JNHPP reflected a renewed nationalist discourse centred on energy sovereignty and state-driven progress. Framed as the fulfilment of Nyerere's vision, it became a symbol of political resolve and national pride.

Stiegler's Gorge thus exemplifies a long-dormant infrastructure initiative dramatically reactivated after years of neglect. Its significance lies not only in its strategic potential but also in its transformation from an imagined future to physical reality. This study illustrates that infrastructure is not merely about building material structures, but also about crafting national futures—futures shaped by cycles of ambition, delay, negotiation, and revival. It argues that delayed infrastructure projects are not passive

765 Carse & Kneas:905–924; Rieber, A., Aalders, T., and Munene, K. 2025. Displaced futures or futures in displacement? Anticipations around the proposed High Grand Falls Dam in Kenya. *Futures*, 166,2025 103530; Hänsch, Valerie. On patience: Perseverance and imposed waiting during Dam-induced displacement in Northern Sudan", *Critical African Studies* 12:1,2019:1–14

766 Swyngedouw, "Liquid Power"

or failed; rather, they are dynamic, politically charged, and historically contingent. Recognising this complexity enables a more nuanced and contextually informed approach to development in Tanzania and across the Global South.

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No.	Type of Interview	Place	No. of Interviewees	Occupation	Date
1	Expert Interview	Dar es Salaam	1	Ecologist	8th April 2024
2	Expert Interview	Dar es Salaam	1	Former TANESCO Engineer	23rd December 2023
3	Expert Interview	Morogoro	1	MP	29th December 2023
4	Expert Interview	Dar es Salaam (Energy Congress)	2	Engineer (TANESCO & Commissioner for Energy's Office's officer)	21st September 2023
5	Expert Interview	Dar es Salaam	1	TANESCO Engineer	21st April 2024
6	Expert Interview	Dar es Salaam (Energy Congress)	1	TANESCO Engineer	20th September 2023
7	Expert Interview	Morogoro	2	Engineers	5th January 2024
8	Focus Group Discussion	Kisaki, Morogoro	8	Villagers	8th April 2024
9	Focus Group Discussion	Kisaki Village	5	Villagers	10th April 2024
10	Focus Group Discussion	Kisaki Village	8	Villagers	8th April 2024
11	Focus Group Discussion	Kisaki, Morogoro Rural	7	Villagers	8th April 2024
12	Interview	Kisaki Village	1	Villager	8th April 2024
13	Interview	Kisaki Village	2	Villagers	9th April 2024
14	Interview	Kisaki Village	1	Former Hafslund/Norplan Worker	8th April 2024
15	Interview	Kisaki Village	4	Residents of Rufiji	11th April 2024
16	Interview	Kisaki Village	3	Residents of Rufiji	29th April 2024
17	Interview	Kisaki Village	1	Villager	19th April 2024

18	Interview	Kisaki Village	1	Villager	20th April 2024
19	Interview	Kisaki Village	1	Villager	8th April 2024
20	Interview	Dar es Salaam	1	Ecologist	20th April 2024
21	Interview	Kisaki Village	3	Residents of Rufiji	8th April 2024
22	Interview	Kisaki Village, Morogoro Rural	1	Villager	10th April 2024
23	Interviews	Signali Village, Kilombero	3	Former Ujamaa truck drivers	20th September 2019

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