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Nigeria's Lower Niger dredging campaigns, 1909–2014: the politics of a Lugardian inland water transport project versus the global playbook

Edmund Chilaka[1]

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Abstract
The paper examines the policy of Sir Frederick Lugard to dredge the Lower Niger for all-year-round navigability in the early 1900s. As well as its politics, dredging history and a comparison with the Pearl River and the Mississippi, the River Niger study focused on "Lugard's colonial imperatives" about the river in contrast to the challenges of its peculiar characteristics vis-à-vis the dynamics of Nigeria's inland water transport (IWT) market in the post-independence era and the corrupt procurement processes for the dredging campaigns which, concertedly, affected its real and perceived utility. Archival, primary and secondary data sources were used, with qualitative analytical methodology. The findings include the lack of off-take cargoes and commercial voyages even after the latest dredging campaigns, zero opportunity cost of the river system, environmental and host community challenges, and the effects of the so-called "downward march of the Sahara Desert" on the river's future, as well as 'nearly-impossible' milestones in the capital and maintenance dredging objectives. The conclusion compares the operational and commercial problems, the budget constraints and the transparency issues against alternative global models and argues that the episodic dredging campaigns ought to be scrapped and Nigeria's IWT policy reviewed to avoid further unjustifiable dredging spends in favour of better models of river systems management.

Keywords Lower Niger dredging · Inland water transport · River training · Colonial railways · Northern Nigeria · Niger Delta

Introduction

The politics of the first dredging campaign on the Lower River Niger in the first decade of the 1900s was rooted in the zeal of Sir Frederick Lugard, the first High Commissioner of Northern Nigeria, to improve the chances of the landlocked Northern Protectorate to access

✉ Edmund Chilaka
edmundchilaka7@gmail.com

[1] Department of Geography, Centre for Multimodal Transport Studies, University of Lagos, Lagos, Nigeria

the sea (Lugard 1964; HC Deb 22 August 1907 vol 181, cc 1176; Dike 1959). Hence, the "Lugardian project" encapsulated this policy, painstakingly promoted as an overarching transport master plan with its ambitious river dredging scheme well-orchestrated until it assumed a life of its own subsequently. As the architect of the controversial amalgamation of the Northern and Southern Protectorates in 1914, Lugard, according to several sources, deeply favoured the supremacy of the Northern Protectorate and went to great lengths to accommodate the wishes of her leaders, including a separate existence from the Southern Protectorate, until the mid-1920s (Akinwumi 2002; Flint 1969, pp. 252–252; 1960, p. 34; HC Deb 21 February 1912 vol. 34). The amalgamation itself was opaquely designed as a silver bullet to solve the Northern Protectorate's administrative financial woes. New information reveal that the pace was hastened to aid British preparations for the First World War, which began later in the same year, and for which the imperial power had factored that "Nigeria would be used as a base of operations against the German colony of Cameroon in 1914/15" (Nigeria Colony; Nigeria Handbook 1924; Crowder 1986). Thus, far from any altruistic considerations, the Lugardian dredging plan for the Lower Niger was one of those die-hard imperial policies in Nigeria with parochial long-term objectives but widely off the mark of the global playbook for conventional inland water transport (IWT) markets or commercial river system management.

In *A Tropical Dependency*, Lugard (1964) showed that Northern Nigeria was pre-eminent in the British Government's assumptions that "the trade of the northern territories was regarded from the beginning as likely to prove beyond all comparison more value than that of the lower river…" and, therefore, the necessity of "a railway [to be laid] from a navigable port on the Niger to Zungeru…" (Lugard 1964, pp. 357, 368, 499). However, the characteristics of the river became a restraining factor on the water transport applications to which it was subjected. At base, therefore, although dredging the Lower Niger was designed to aid colonial transportation logistics and keep the reluctant Northern Protectorate happy, the study is premised on the insight it provides to problematize the typical roiling and socio-political ferment in former British dependencies which unravelled after decolonization, such as India, Pakistan, Palestine and Sri Lanka (Milner 1995, pp. 226–256; White 2000). It also interrogates the hypothesis that an exorbitant dredging project of colonial provenance, sustained for decades through opaque policy manoeuvres despite increasingly diminished IWT fundamentals, ought to give way to more cost-effective alternatives that reflect the realities on the ground. As a contribution to knowledge, the study objectivized the problem of the Lower Niger's river bed characteristics at the Baro–Lokoja segment which, when proven, seals the limitation of the river system to support the touted year-round commercial navigation policy, irrespective of dredging engineering.

In global cosmology, rivers usually play highly significant roles in the lives of peoples, communities and individuals. The early civilizations of Egypt, Mesopotamia, the Indus Valley, China and Peru from around 3500 BC grew out of the rivers in their locales. The dynamics of their riverine economies provided drinking water, fishing and hunting grounds, irrigated land and channels for water transportation (Junta de Andalucia: Early River Civilizations; Berking 2018). Scholars have long discussed the so-called 'hydraulic empires' to emphasize how early river-based societies [including the Ajuran Empire in East Africa (Somalia) which flourished on the banks of the Jubba and Shebelle river systems], relied on tight control by ruling dynasties or autocrats over access to the water, irrigation and flood remediation (Wittfogel 1957). The Niger at the Inland Delta in Niger Republic also featured similar rulership over the centuries, where the Maitre des Eaux (Master of the Waters) supervised fishing, other activities and "what was to be done on the river, and where and how it was to be done, according to the flood level, especially

during flood recession" (Andersen et al. 2005, p. 8). Generally, however, the stress is on water management, understood to comprise themes as varied as water availability, water technology, social governance of domestic drinking and potable water, irrigation and animal husbandry, fishing, navigation, cult practices, energy, status, hygiene, entertainment, protection, cooling and recreation. Some of these themes, for their relevance, can be found high up the list of the current UN Sustainable Development Goals (SDGs) 2030 milestone (Berking 2018, p. 9; Sürmelihindi 2018).

The Niger, similarly, accounted for much of the lifeblood of the communities living on its banks for fishing, drinking, irrigation and sociocultural activities. It provided the nexus for the initial contact between West Africans and European explorers probing the African interior soon after the slave trade era for markets, gold, commodities and evangelism. The *Global Water Partnership* estimates that 100 million people from nine countries (Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Guinea, Mali, Niger, Nigeria, and Chad) inhabit the 1.5 million km^2 Niger River Basin, of which 80% live in Nigeria (Global Water Partnership, n.d.). The Niger Basin Authority was established in 1980 and 'The Water Charter of the Niger Basin' was signed in 2012, ostensibly to mediate intra-basin questions such as the uses of the river, the construction of hydroelectric dams and promotion of 'integrated development' (Water Charter 2012).

In sum, although the Lower Niger was a critical transportation resource for Nigeria during the colonial exploitation of commodities and minerals, the post-independence usage tapered off with the expansion of the road, rail, and aviation modes, leaving the river often on the wrong side of media attention, such as intermittent flooding and passenger boating accidents (Shehu et al. 2015). The 2012 flooding incident, for example, claimed 363 lives, washed away farms, displaced 2.1 million people and obstructed the Abuja–Lokoja Highway for one week (Reuters Staff 2012). Moreover, the lack of commercial shipping voyages, even after the dredging campaigns and, instead, frequent incidents of capsized passenger boats with scores of fatalities, indicate the problematic development of the IWT industry despite huge budgetary spending (Hassan-Wuyo and Na Annabi 2022). Hence, the present study is also situated in its significance to provide a policy review covering the colonial multimodal transport objectives and decolonization outcome of domination politics, on the one hand, and the need for critical fiscal and environmental postmortem of the IWT procurement processes for such huge dredging spends in a struggling Third World economy. The paper is divided into five thematic sections and the conclusion, namely: (a) hydrology and regional significance, (b) hinterland communication and the politics of the colonial dredging project, (c) the Lower Niger dredging history and IWT in Nigeria, (d) comparison with other river systems: the Mississippi, the Tennessee Valley Authority (TVA) and the Pearl River, (e) the environmental and community relations issues in the Lower Niger system, and the conclusion.

Hydrology and regional significance

Rising in the Guinea Highlands, the Niger flows 4180 km northeast in a crescent through Mali, Niger and Nigeria, boosted by other rivers, including the Kaduna and Benue, to form a delta at the Nigerian southeastern seaboard with the Atlantic Ocean. Following climatic variations, however, the river's hydrology is problematic, with flooding and ebbing which begin at different times of the year: in June, between July and October, and by May or June, in the Upper, Middle and Lower Niger segments respectively; up to 10m differences

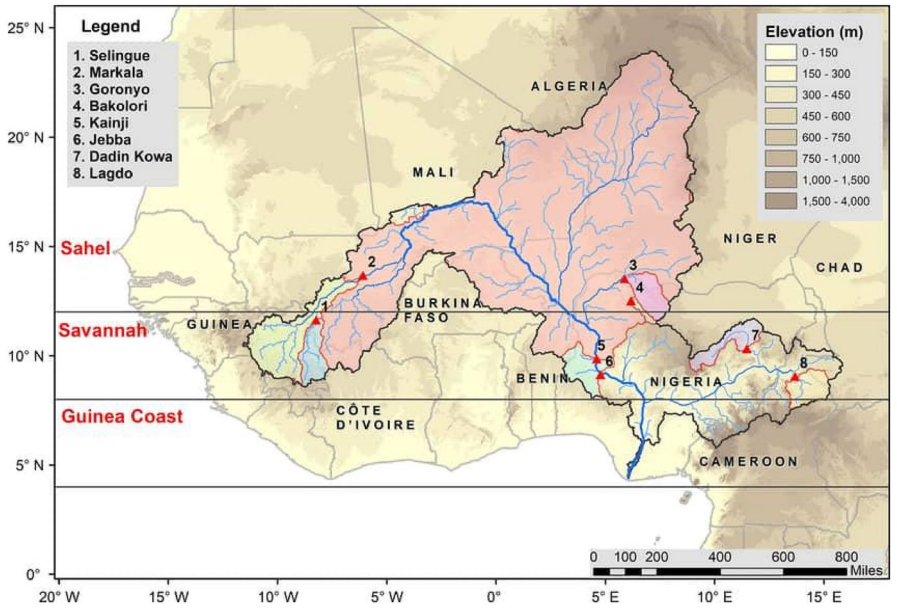

Fig. 1 Reservoir dams built on the Niger–Benue System. The Niger River Basin and locations of major reservoir dams in the basin. (1) Selingue, (2) Markala, (3) Goronyo, (4) Bakolori, (5) Kainji, (6) Jebba, (7) Dadin Kowa, and (8) Lagdo. *Source* Yue et al. (2022)

have been recorded between high and low water, making navigation planning somewhat challenging (Mabogunje 2019). Hence, the river's hydrology exhibits notable character differences along the six hydrologic reaches it traverses from the Guinea Highlands to the terminal Delta in Nigeria. At the source in the Upper Basin, it flows under abundant tropical rainfall until it reaches the northeast Inland Delta where it loses flow volume and velocity while passing near the Sahara Desert. However, its tributaries bough up the flow in the southeast course after the Niger Bend, with the River Benue contributing by far the most buoyant current which enlarges its footprint the rest of the way to the final delta.

Overall, Nigeria has spent more to develop dams for electricity generation, hydrology studies, dredging and river training projects along the River Niger and Benue system than other West and Central African countries since the early 1900s when Lugard made the basin the hinge of British colonial policy on inland transportation. Even so, she has so little to show for it: a mere 2062 megawatts of total installed hydroelectric power (Energypedia 2021). Of the major reservoir and hydroelectric dams constructed so far in the basin (some are shown in Fig. 1), Nigeria with Goronyo, Bakolori, Kainji, Jebba, Shiroro, Zungeru, and Dadin Kowa Dams far outranks Mali's Selingue and Markala Dams and Cameroon's Lagdo, by some reckoning (Yue et al. 2022). Yet, the single Cameroonian candidate is responsible for several large-scale flooding incidents which caused deaths and destruction of property in several Nigerian communities due to the failure to complete the Dasin Hausa Dam in Fufore Adamawa State (Nigeria), as agreed, to contain the Lagdo's projected overflow. Thus, the lapses of the Niger Basin Authority countries to implement pledges of complementary basin development projects is underscored by negative aftermaths such as the flooding and lack of policy traction observable in the persistent dredging of the Lower

Niger despite lack of off-take cargo and vibrant commercial use of her inland waterways, the subject of the present research (Igidi 2014).

The poor governance of Nigeria's overall water transport management architecture is widely traced to the erstwhile British imperial era which, at decolonization, foisted a mediocre hegemony in the polity fraught with nepotism, ethnicity, the Big-man syndrome and bureaucratic influence-peddling (Houeland and Jacobs 2016). The problem is also mirrored by the challenges faced by the Nigerian Hydrological Technical Committee, for example, which, although charged with advising on hydrological and water resources research and planning as well as liaison with foreign counterparts, contends with red-tape and bureaucracy to streamline policy-making with sister agencies such as the Federal Ministry of Water Resources and the National River Basin Development Coordinating Committee, all of which conjointly regulate the sector (Ayoade and Oyebande 1978, pp. 53–55). The fact that inland water transportation falls under another agency besides, the National Inland Waterway Authority (NIWA), further conflates the bureaucracy instead of facilitating ramifying countrywide IWT service delivery. Hence, the controversy around the procurement processes of the 2009 dredging campaigns is highlighted by the persistent failure of the river to attract commercial traffic even after the completion of the project and its subsequent bashing by the media as a drainpipe for corrupt politicians (Esiedesa 2021).

Hinterland communication and the politics of the colonial dredging project

The politics of the Lower Niger dredging are inherent in the foundation of the Nigerian state whose colonial antecedents manifested in disharmony and disjointed policy-making even with projects of a supposedly national scope as the dredging of the Lower River Niger. Many factors accounted for this state of affairs. One, Nigeria was cobbled together to form a nation-state out of over 400 ethnic groups in West Africa by Great Britain after the 1884 Berlin Conference of the great powers. The three largest ethnic groups inhabit the north (Hausa–Fulani), the southwest (Yoruba) and the southeast (Igbos), with the jostle for dominance a perennial issue (see Fig. 2). Historically, Britain relied on the treaties earlier signed between the indigenous potentates and sundry diplomats to secure the Northern and Southern Nigerian territories under the British sphere of influence at the Berlin Conference (Flint 1960). Some of these diplomats, including Frederick Lugard, were employees of the Royal Niger Company (RNC) which ruled the Niger provinces under Royal Charter before the onset of full-blown colonial government. Lugard and his officers therefore proceeded from these quarrelsome antecedents to their first assignment: the colonial administration of Northern Nigeria from 1900. Hence, the special preference for Northern Nigeria had its roots in Lugard's preceding career as a RNC commercial officer which intensified when he assumed the High Commissionership of Northern Nigeria (Flint 1969; Longmore 2020; Babb 1989; Russell 1997b, a). There are evidences of quarrels over boundary matters with the Governors of the other two British territories, the Niger Coast Protectorate and the Colony and Protectorate of Lagos which portrayed Lugard's parochial policy-making and, in hindsight, hardly fit his latter-day statesmanship accolades (Crowder 1986). One of these policies, the Northern Railway line, became the origin for the elusive Lower Niger dredging campaigns which, till date, remains inconclusive and is the major subject of this paper (Fig. 3).

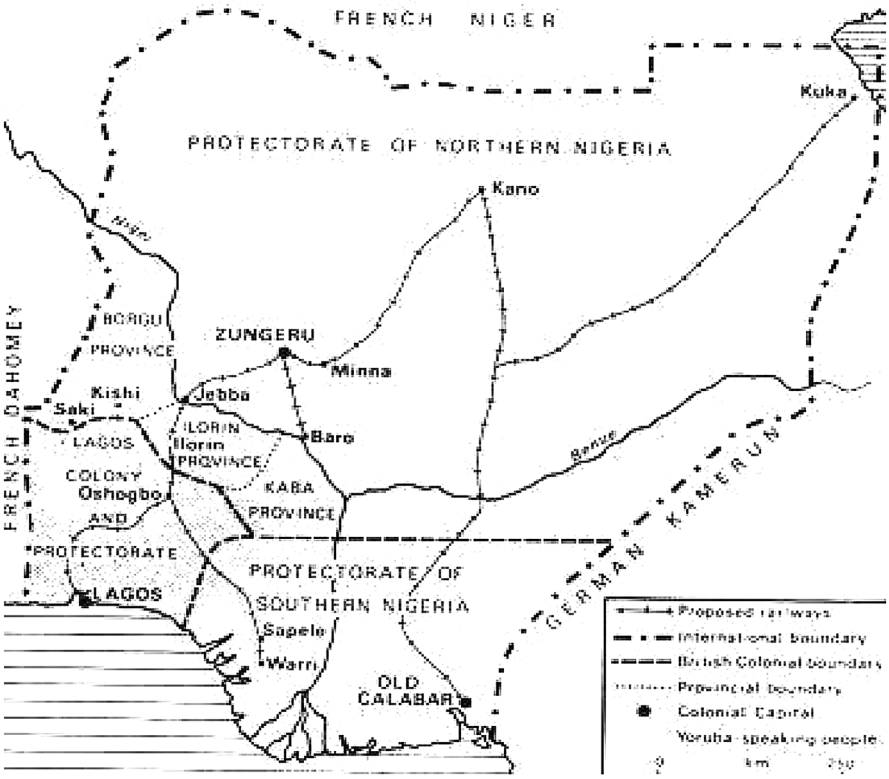

Fig. 2 Nigeria before 1914 amalgamation. *Source* Akinjide (2000)

Fig. 3 River Niger at the Confluence town Lokoja. *Source* The Guardian, https://guardian.ng/news/niwa-steps-up-maintenance-dredging-of-nigerriver/, Accessed 8 November 2020

Another factor of disharmony happened in 1902 when Lugard jostled with the Lagos Governor, MacGregor, over the Yoruba-speaking towns of Kishi and Saki which he wanted to be ceded to his governorate, on the ground that he signed the treaties with their kings on behalf of Britain during his stint at RNC (Crowder 1986). The towns geographically fell to the Colony and Protectorate of Lagos (see Fig. 2), and the inhabitants, being Yoruba by ethnicity, loathed Lugard's plan to join them to the Northern Protectorate with which they had few cultural affinities. The treaties in question (396 in total), had been valued at £865,000 by the Exchequer and payment was made to the RNC, making Lugard's quest somewhat mischievous (HC Deb 3 July 1899 vol 73, cc 1289–331). On the eastern border, he pushed for similar accessions from the Niger Coast Protectorate. However, Ralph Moor, the Governor, countered him until they "…agreed joint patrols along their undefined borders…. But the divisions between them were too deep" (Crowder 1986). In fact, Lugard was so enamored to pro-North policies that although the three colonial territories entered into a customs union in 1899, he later repudiated it, according to Crowder (1986), and arbitrarily imposed tolls on goods entering the Northern Protectorate by road and marked all Lagos-based African traders wishing to trade in the North as 'aliens', to restrict them. All these caused adverse effects later when he made the proposal for the dredging of the Lower Niger and disagreements arose, which continued to dog the project's overall perception ever since.

Nevertheless, Lugard's strongest preparation for personal preponderance over the affairs of Nigeria came through his appointment in 1897 to organize the West African Frontier Force (WAFF), the 3000-strong colonial army of mainly Hausa troops officered by English troops (Lugard 1964, pp. 361–364). He later deployed this Force to the conquest of the Sokoto Caliphate and the 'pacifying' of other ethnic groups. More significantly, the 60-year British colonial enterprise relied on this force to levy taxes, for law and order and to enforce civil administration after which it became the foundation for Nigeria's emergent police and armed forces after independence. Hence, the powerful position Lugard established, first, over the Northern Protectorate administration and, latterly, over the entire country, gave his views and policies superior authority and resonated in the psyche of successive colonial officials, citizens and leaders of the country. However, it also engendered suspicion, favoritism and cantankerous politics among the major stakeholders in the colonized territory, namely, the British colonial officialdom, Northern Nigeria (dominated by the insular Hausa–Fulanis), and Southern Nigerians (who were more egalitarian and cosmopolitan).

Although the three colonial territories (later merged to two) were administered separately from 1900 and Lugard finished his first tour of duty in the Northern Protectorate around 1907 and departed Nigeria, he was recalled 6 years later by the Colonial Office expressly to manage the 1914 amalgamation (Flint 1978). Some schools of thought trace the acrimonious pattern of the 1914 amalgamation to Lugard's unilateral imposition of the laws and administrative procedures which he had fashioned primarily for Northern Nigeria upon Southern Nigeria, and how he made the latter subservient to the former, despite the South's greater financial buoyancy (Crowder 1986; Flint 1978). In fact, Southern Nigeria paid annual grants to support Northern Nigerian administration in lieu of accruable customs duty from the ports in the south: £34,000 from 1901 to 1903 and £50,000–£70,000 from 1904 to 1912 (Flint 1969, p. 254; Crowder 1986; Udochu 1987, p. 91). Some of the payments were later disputed and formed further grounds for inter-ethnic suspicion and distrust of Lugard's overall designs in the Lower Niger dredging project.

Furthermore, the development of infrastructures became controversial and lacked homogeneity and convergence, to the extent that the two contiguous British territories, despite

affectations of an imminent amalgamation, operated like two separate countries: they pursued two distinct railway projects, with different gauges (see Fig. 2). Whereas the Southern railway line heading northwards, Lagos to Jebba, was 3′ 6″ gauge, the Northern line planned by Lugard was 2′ 6″, proposed to set off from Kano southwards through Zungeru, the capital, to meet the Lower Niger at Baro, for an onward course to the Niger Delta ports (HC Deb 27 May 1909 vol 5, cc 1369-9; Crowder 1986; Chilaka 2022). This route was designed to ensure limited contact with Southern Nigeria since the River Niger was made a free international waterway by the Berlin Act of 1884. It was this railway project which gave birth to the first dredging of the Baro–Lokoja segment of the Lower Niger in order to deepen it and achieve all year-round navigation to circumvent the Lagos maritime gateway.

Recall that the railway infrastructure was contained in the original articles for the appointment of Lugard to the High Commissionership of Northern Nigeria (Lugard 1964, pp. 368, 499). Eventually, the path to the harmonization of the two railway lines involved a coterie of factors, including the mediation of the Colonial Office, the problems posed by the hydrological difficulties of the river such as the existence of innumerable rock outcrops, and the lack of sufficient water depths during the dry season. Regardless, Lugard's reputation in London remained intact as evinced by Sir Gilbert Parker's comments during the House of Commons debate on a Public Loans Bill for the railway and Baro Port projects. He said that the Under Secretary for the Colonies "… wished to pay the highest tribute to the splendid work which Sir Frederick Lugard and his confrères had done. Personally, he doubted whether this railway would ever have been established for strategical purposes alone" (HC Deb 22 August 1907 vol 181, cc 1176). Such expressions bolstered Lugard's tendency for unilateralism and disregard for Southern Nigeria.

Eventually, the Northern railway gauge was subsequently ordered to be harmonized to the Southern railway, but Lugard's dredging plans survived, even if without a clear assent from all stakeholders. In fact, Walter Egerton, the Southern Nigeria Governor, probably motivated by southern sentiments, opposed the demand for money from the Southern colony to be applied to the project because, as he argued, "dredging the Niger north of Onitsha does not greatly interest the south…" (Flint 1969; Ali 2012). At best, he offered to pay half of the cost for dredging parts of the river south of Onitsha. Again, the face-off was mediated by the Colonial Office, which prevailed on him to support it. Some scholars trace the origins of the prebendal, oligarchic, and skewed politics of Nigeria to these early disagreements and compromises (Joseph 1991, pp. 49–59). Despite the manoeuvers, however, even the project's feasibility turned out to have been exaggerated as it was formally discontinued in 1913. In the next section, we shall analyse how the discontinued project survived through the Lugardian politics of federal power, institutionalism and bureaucracy rather than economic rationality and viability, and the case for its permanent scrapping from the scheme of things.

Colonial dredging agenda and oligarchic power politics: a convergence

Historically, routine dredging of the waterways and the work of "snaggers" who cleared verdant obstructions on river courses were basic functions of the Marine Department during colonial rule (Dennis 1983; Arrowsmith 1991). This was chiefly because transportation of goods and the movement of colonial officials depended largely on the navigable rivers. The problem of communication with parts of the country outside the compass of the Lower Niger became mitigated by the railway constructions linking Lagos and Port Harcourt to the northern regions from 1896 onwards. Nevertheless, the particular dredging

of the Lower Niger from Baro to Lokoja and on to the sea relied on high-wire political maneuvers, first by the colonial rulers and subsequently by northern political leaders. Although scant attention was paid to it after the 1913 suspension, events during the sunset years of the colonial era brought it back to limelight. In the interwar years, around 1925, the Lower Niger was not prioritized for dredging activities as other major inland rivers such as the Sombriero, Ossiomo, Nun, Ethiope, Otamini, Orashi, Calabar, Kwa Ibo, Kaduna, Gongola, and New Bussa also enjoyed government's attention as well, and were cleared of snags. Some were dredged for depth, including various segments of the Niger and Benue, although government's funds devoted to dredging activities and river engineering had begun to dry off in favour of roads and the railways (Ekundare 1973, pp. 128–130). Hence, many inland rivers were maintained simultaneously as they conjointly accounted for the entirety of the colonial inland transportation network which in 1908 carried 13,587 passengers and 20,889 tons of cargo and supported barge and launch services between Lagos–Porto Novo, Lagos–Siluko–Sapele, Lagos–Ejinrin–Epe, Forcados–Warri–Sapele and several upstream destinations at Onitsha, Makurdi, Lokoja, Numan, Baro, Garua, Idah, Ibi and Yola (Ekundare 1973, p. 131). However, the decline in government revenues following global economic downturn affected the budget for the Marines Department in the 1930s. Subsequently, the lack of funds deteriorated and, in several places, including at New Bussa on the Niger between 1928 and 1931, dredging and river clearing works stalled due to poor funding (Ekundare 1973, pp. 128–130).

However, after the Second World War and the onset of agitation for independence, the covert British decolonization agenda to install northern successors in power had begun to fructify and talk of a revived large-scale agenda for the Lower Niger dredging and transformation began to be sounded with vigour. For example, the *Foreign Commerce Weekly* reported the widely orchestrated visit of Alhaji Tafawa Balewa, the Federal Transport Minister, to the facilities of the Mississippi River system at Pittsburg, St. Louis, Vicksburg and New Orleans in 1955.[1] Apparently, the northern leaders seemed undeterred by the hydrological or geomorphological difficulties blamed for the failure of the 1913 dredging campaigns. During a subsequent state visit in 1961, this time as Nigeria's Prime Minister, Balewa toured Chicago and Knoxville and thereafter said that the Tennessee Valley was comparable to the River Niger. In a national broadcast on 2 August 1961, he said that

> The Tennessee Valley, which we later visited was an economically weak region in 1933…. Its rivers were underdeveloped; its forests were suffering from overcutting; its soils were eroded and drained of plant food; its people were on a low subsistence level and were also faced with problems of malaria incidence, flooding and with navigational difficulties. As you know we have similar problems with the River Niger and its tributaries; and you will understand why we went to Tennessee to see what lessons we can derive from the great experiment in this region… (Robtakes 2019).

This was the first time a Nigerian cabinet official made the comparison between the Niger and the Tennessee and Mississippi as river systems which could be improved by dredging and river engineering, a comparison that has persisted despite the clear hydrological and operational differences on the ground (NEDECO Report, Vol. 1, 1959). Earlier, at a Franco-Nigerian Technical Conference in 1957, Balewa had also pushed for further studies and an environmental impact assessment (EIA) of the Niger waterway. He argued that,

[1] *Foreign Commerce Weekly* (54) 1955: 29.

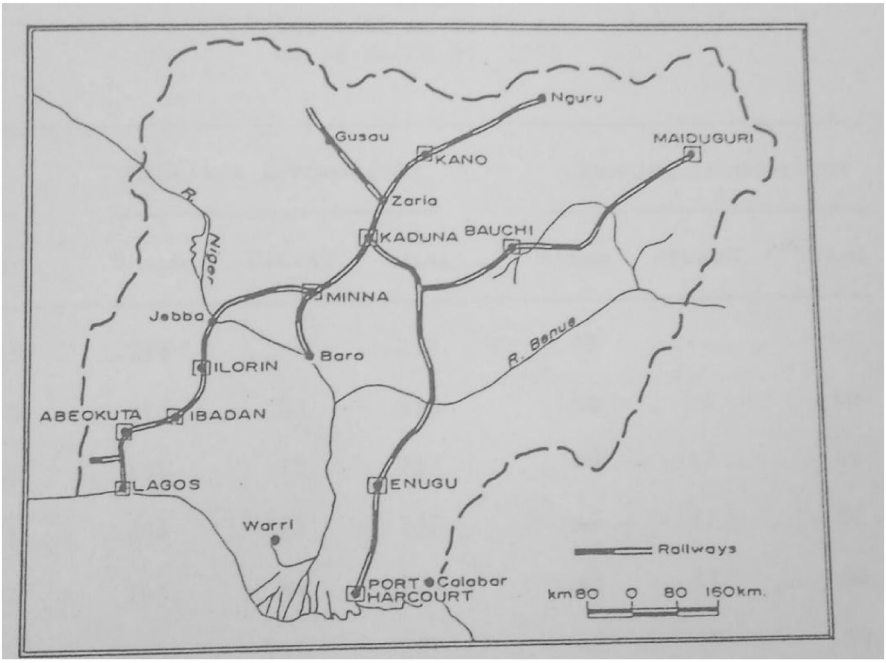

Fig. 4 Nigerian Railway system 1986. *Source* Olanrewaju (1986, p. 35)

> In the Niger and Benue, we have two of the great rivers of the world. Rivers and creeks and deltas are temperamental things, as willful as living creatures, and their habits and vagaries must be carefully studied before we subject them to engineering controls (Nyityo 2015).

In fact, the Federal Government awarded a contract to the Netherlands Development Company (NEDECO) in 1953 to survey the engineering controls and possibilities of the Lower Niger (NEDECO Report, Vol. 1, 1959). The studies and drawings became the basis for the series of post-independence dredging campaigns. NEDECO has since transformed to Royal Haskoning DHV but continued to feature as consultants in the subsequent dredging projects. Thus, the cooled embers of the pre-independence dredging campaigns became revived despite the past failed attempts and huge dissimilarities between the Lower Niger, the Mississippi and the Tennessee rivers, as we shall see below. Various socio-political and economic factors explain this outcome. First, the Northern Region is landlocked, although with a vast arable landmass and abundant exports of the time: groundnuts, sesame seeds, ivory, gum Arabic, hides and skin, tin and, latterly, cotton. With the advent of British colonialism and the linkage of the Nigerian economy to the world market, access to the sea for exports and imports was critical to its existence. Attempts made to secure trusted channels to the ocean included the plan to avoid the Lagos Port in favour of Forcados port, the design of a separate railway network with a sea head at Baro, and the critical Baro–Lokoja dredging plan (see Fig. 4).

However, despite the Colonial Office directives, operational disputes persisted until the amalgamation in 1914 between managers of the northern and Lagos rail networks over issues of differential cargo pricing. Hence, despite the delays caused by shallow draft

downstream, groundnut and other cargoes continued to be sent through the Baro Port. In one of the British parliamentary arguments,

> Lord Rennell rose to call attention to the accumulating stocks of ground-nuts in Nigeria… My Lords, my Motion deals with what I am afraid can be regarded administratively only as a very sad mess in Nigeria…The figures he then gave (I am quoting from column 1258 of Hansard, April 13) were that at that time the failure of transport in Nigeria had led to an accumulation of over 300,000 tons of ground-nuts at Kano. The actual figures were that there were unmoved 44,000 tons of the previous crop and 276,000 tons of the current crop, making a total of 320,000 tons. The noble Earl went on to say that he was aware that between August, 1948, and January, 1949, the railings—that is to say, the amount of ground-nuts moved monthly—had been very bad, but that he hoped by June of this year the monthly railings would have gone up to some 30,000 tons a month; and he hoped that they would reach some 36,000 tons a month later on this year (HL Deb 13 July 1949 vol. 163, cc 1271).

Hence, Northern political leaders keenly sought alternative maritime gateways as a fall-back for the region's international trade in the emerging political order—an independent Nigeria riven with ethno-religious and cultural diversity and competition. In this quest, they were encouraged by the steady British financial and political support since the early 1900s, as noted by the Financial Secretary to the Treasury, Mr. Runciman, during a Parliamentary debate. He argued that,

> …Northern Nigeria, in which the proposed railway was to be constructed, had been a source, not of profit, but of great expense to the United Kingdom [including]…. Grants-in-aid of varied amounts up to £350,000 per annum…. If the Home Government wished to reduce that amount they would have to enter upon such schemes as would reduce the cost of the administration and the cost of the West African Frontier Force…. [U]nless the means of communication in that Colony were improved none of those things could be attained.…Therefore, it was felt absolutely necessary that as soon as possible a railway should be constructed along the main lines of communication….from Baro on the Niger to Zungeru, about 100 miles, and ultimately to Kano (HC Deb 27 August 1907, vol. 181 cc 1169).

Another option explored to protect the Northern region's future international trade was the possible re-establishment of connections with a North African maritime gateway, Tripoli. Historically, their trading relationships with North Africa were only displaced by the Atlantic Ocean-based commerce in the 1800s. Previously, Northern Nigeria partook in the erstwhile Trans-Saharan trade in slaves, gold, hides and skins, gum Arabic, salt and spices, from 700 AD to the 1600s (Johnson 1976). From the early 1830s, however, international trade in "legitimate goods" began to be conducted more through the Lagos Port, the Forcados River and the Oil Rivers (Lloyd 1974). From 1857, McGregor Laird's expeditions succeeded in establishing hinterland trading posts at Aboh, Onitsha, Lokoja and, by 1878, in 25 other major towns up to 600 miles in the northern territory, with the value of produce collected reaching £300,000 per annum (Dike 1956, pp. 22–23). Hence, British imperialism became *fait accompli* and, for its preservation against rival French designs, resulted in colonialism and the Nigerian political system. The problem of the country's exports and imports passing through the Lagos port and arguments over the neutrality of the Lagos port have been examined above and need not

detain us here. However, they formed part of the broader northern discontent over the 'hasty' demand for independence by Southern Nigeria.

For the discrete survey of the Port of Tripoli, although the manoeuvres of the northern leaders were top-secret, aspects of the plot were captured in the political satire, *Just Before Dawn*:

> [T]he Sarduana has already discussed and received the confirmed cooperation of the government of Niger. The idea is that if the North breaks away from Nigeria, we have access to the sea by way of a road from Sokoto through Niger and Libya to the Mediterranean Sea. The ambassador watched the man trace the proposed road through Sokoto to somewhere between Tripoli and Cyrenica (Omotoso 1988, p. 222).

The idea of a Mediterranean gateway was not far-fetched as the formerly busy caravan routes of the Trans-Saharan Trade which linked Northern Nigeria to the markets of North Africa still functioned for selected commodities well into the twentieth century (Johnson 1976). In sum, even if Tripoli might have been a longer haul, the low-hanging fruit was the Kano–Baro–Forcados link, hence the motivation for the orchestrated Niger dredging campaigns.

The third factor for the survival of the moribund dredging project was the inept and oligarchic civil service cadre which served during Nigeria's long era of military rule, whose order was that "[i]n the process of our rapid economic development, popular and unpopular policies will have to be implemented", according to General Obasanjo (Oyediran 1988). This was an era exemplified by the imperious 'Super Perm Secs' (short for super permanent secretaries), whose bureaucracy saw projects such as the Lower Niger dredging as unquestionable and inevitable, probably following its pro-North and Lugardian origins. After all, similar recrudescences were blamed for the infamous "cement armada" scandal of 1975 where Nigeria lost about $1b to an avoidable importation fiasco which led to the worst port congestion in the country (Cranfield 2007). For the Lower Niger dredging project, for example, papers and presentations in public seminars and conferences by top civil servants and even the National Development Plans of the 1970s lightly justified the river dredging project without juxtaposition to the facts on the ground vis-a-vis diminishing traffic spurred by the changing export trade patterns (Anyaoku 1990; Oyediran 1981, pp. 238–239) (Table 1).

In one of such papers delivered in 1986 in Kano at a national seminar on evolving comprehensive national transport policy, the author averred that

> It is urgent that a clear decision be taken now by Government to embark on improvements to be carried out on the waterways…. Immediate improvement in the navigability of the Rivers Niger, Nun and Forcados can be achieved by a programme of annual dredging and improved aids to navigation, together with capital dredging to widen and straighten some identified narrow and tortuous sections (Anyaoku 1990, p. 302).

Thus, we can see the source of the language of the request for proposals (RFPs) issued to international dredging contractors for the 2009 capital and maintenance dredging campaigns. In fact, one key person informant for this study, a former top employee of NIWA who supervised aspects of the 2009 campaign, revealed that even when his department raised memos critical of the project for the lack of off-take cargo and other problems, his superiors waved them aside because the policy decision had already been made to execute

Table 1 Tariffs of Niger River Transport and Nigerian Railway Corporation 1967–1968

	Route	Distance (km)	Rate (pence/ton km)
(a) River transport commodity			
Groundnuts	Baro–Burutu	634	0.58
Groundnuts	Yola–Burutu	1365	0.68
Groundnuts	Makurdi–Burutu	776	0.48
Cotton seed	Garoua–Burutu	1588	0.60
Cotton seed	Numan–Burutu	1297	0.50
Cotton seed	Lokoja–Burutu	518	0.48
Benniseed	Ibi–Burutu	924	0.53
Palm kernels	Idah–Burutu	416	0.70
(a) Rail transport commodity			
Groundnuts	Maiduguri–Lagos	1785	0.61
Groundnuts	Kano–Pt. Harcourt	1139	0.97
Groundnuts	Makurdi–Pt. Harcourt	463	0.98
Cotton lint	Maiduguri–Pt. Harcourt	1441	0.90
Cotton lint	Bukuru–Lagos	1117	0.93
Cotton lint	Oshogbo–Lagos	293	1.48
Cassiterite	Jos–Lagos	1118	1.25

Turton (1974, p. 329)

the project nevertheless (interview with Engr. Michael Dike).[2] Accordingly, the eyes of most stakeholders in the Nigerian dredging community were fixed on spending the huge budget approved for the project and not on the achievement of any commercial viability goals.

IWT history of the Lower Niger and Benue

At this juncture, a survey of the IWT history of the Lower Niger system becomes instructive. The IWT industry covers all water transport activities from the coast and land borders inwards and around the country, on rivers and lakes, separate from coastal and deep-ocean shipping operations. During the colonial era, such passenger and vehicle ferry services relied on crossing stations operated in 27 major towns along the Lower Niger and the River Benue (see Fig. 5). Aside from the ferry services run by the Marine Department as stated earlier, private ferry operators also provided services. The prominent companies were the Niger River Transport Company Ltd. (with headquarters at Burutu) established by the United African Company Ltd. (UAC) in 1929, Holts Transport, Niger–Benue Transport Companies, Niger Delta Shipping Agency, and Niger Cargo Transport Company (Report of Committee of Experts 1987, p. 71). Beginning from the early 1900s, these firms accounted for much of the haulage of exports through the waterways to Warri, Port Harcourt, Lagos, Calabar, Onitsha, Idah, Lokoja,

[2] Engr Dike was the former Director of Engineering Services at NIWA during the 2009–2012 capital dredging campaigns, now retired.

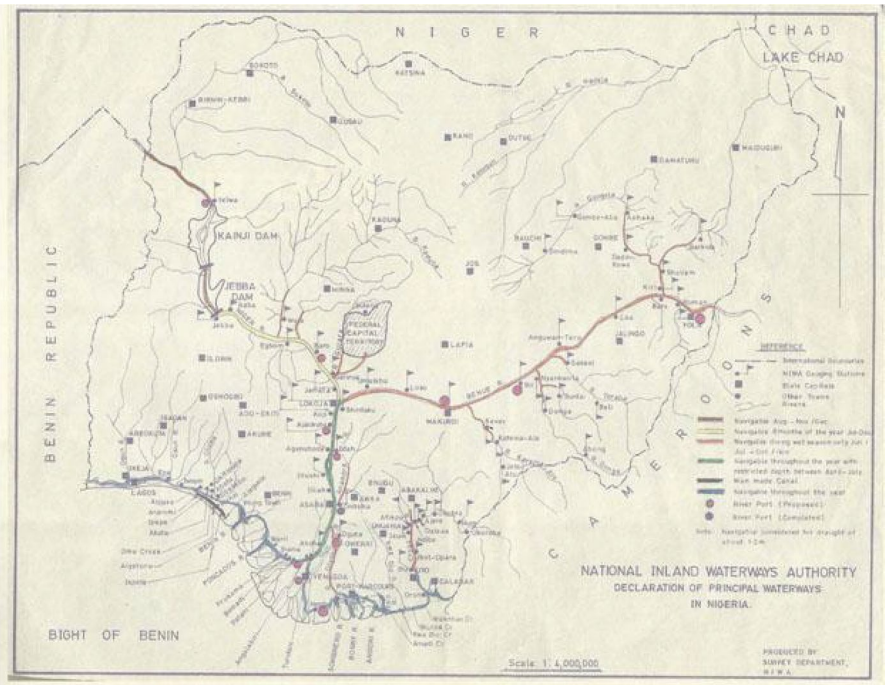

Fig. 5 Nigeria major rivers and waterways. *Source* NIWA Diary (1999)

Baro, Jebba and along the Benue, Makurdi, Ibi, Lau, Yola and Garoua, in Cameroun (see Fig. 5). The RNC developed the ferry services at the Niger Delta and far upstream after forcefully displacing the local mariners from 1887 onwards (HC Deb 17 December 1888, vol. 332, cc 563–564). Babb (1989) who travelled from Kaduna to Yola in 1929 on the Makurdi–Yola steamer observed that '[t]hese boats [RNC steamers] were stern-wheelers, their main function being the transport of stores and trade goods to trading stations on the upper reaches of the Benue River, returning with the annual groundnut crop, loaded into barges and lashed alongside." Nevertheless, he, like Geary (2013) also reported the problem of "sandbanks and too shallow water", for which "[s]ome days later we arrived at Lau, to be greeted with the news that the boat would not be going on to Yola since the river was too low and would not be navigable again until the next shipping season" (Babb 1989) (Fig. 6).

Colonial data showed a largely humble profile at the initial stages. At the Onitsha–Asaba traffic crossing point, for example, 81,101 passengers and 1212 vehicles were ferried, with accruing revenue of £2102 in 1937 up from a previous record of £1924 when 978 passengers and no vehicle were ferried (Ali 2012, p. 153). Of course, there were no tarred roads or railways in the early 1900s, the dominant mass transit mode being water-based. The government provided fleets of launches, especially for administrative and law enforcement workers, while private companies operated steamers for public transportation. A popular ferry route in the Niger division up to 1930 was Burutu–Forcados–Young Town where the activities of foreign palm produce buyers created much bustle with the indigenous people. Irregular mail services also ran between

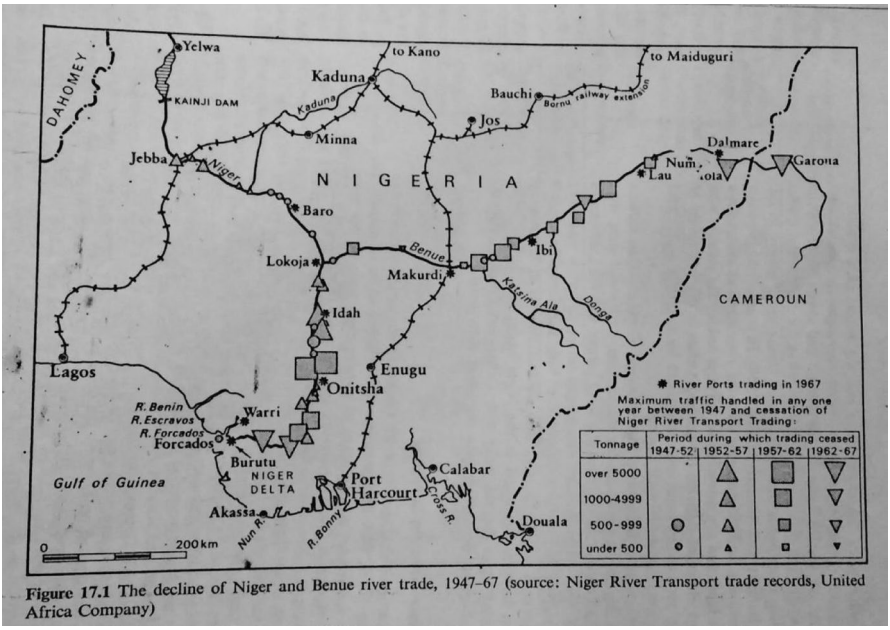

Figure 17.1 The decline of Niger and Benue river trade, 1947–67 (source: Niger River Transport trade records, United Africa Company)

Fig. 6 River ports trading in 1967. *Source* Turton (1974, pp. 323–341)

Table 2 Passenger traffic on the Lower Niger River 1943–1953

S/no	Year	No. of passengers
1	1943–1944	53,000
2	1944–1945	29,000
3	1945–1946	23,000
4	1946–1947	7000
5	1947–1948	9000
6	1948–1949	8000
7	1949–1950	5000
8	1950–1951	4000
9	1951–1952	6000
10	1952–1953	5000
Total		149,000

Source: B. O. Anyaoku (2001:5)

Forcados, Warri, Koko and Sapele while steam boats, pontoons and piers dotted the banks of the river and its tributaries up to the upper reaches of the rivers such as Baro, Wukari, Idah, Ibi, Makurdi, and Garua in Cameroon (Ochefu 2002, p. 485; Benatari 2000). Water crafts such as launches and steam ferry boats were constructed by the Public Works Department in the government dockyards (Dennis 1983). The ferry schedules were fairly regular. For example, Onitsha–Asaba ferry left Onitsha at 8:00 a.m., arrived Asaba at 10:00 a.m. and returned to Onitsha for a repeat of the frequency, daily, from Monday to Saturday, except Sunday and public holidays. The prominence of the

Table 3 Successful bidders and details of lots for the Lower Niger Dredging Project 2009

Lot	Location	Distance (km)	Cost (N)	Contractor	Consultant
1	Warri-Bifurcation Forcados–Nun Rivers	154	N4,836,943,125	Fung Tai	Royal Haskoning
2	Bifurcation to Onitsha	116	N3,889,174,896	Dredging International	Jayuda International
3	Onitsha to Idah	118	N9,869,504,700	Van Oord	Dredging and Marine Consult
4	Idah–Jamata	108	N12,545,469,55	Van Oord	Enplan Group
5	Jamata to Baro	76	N3,665,261,250	William Lloyds Tech	Aims Consultants Ltd

Ezigbo (2008)

Onitsha crossing was attested by Robert Longmore, a colonial assistant district officer in Northern Nigeria when he remarked that, "I started a letter home on 7th January 1952 "Waiting for the Ferry at Onitsha" …When we got on the ferry I recorded: "Now on the ferry! Five cars, one lorry and the chinks full of Africans, compressed!" (Longmore nd) (Table 2).

Further to the north of the river, other diaries by Russell (1997b, a), Anderson (2017) and Bird (2009) reported on journeys contemporaneously made on the ferry services of the Niger River system at Bida, Koton Karfe and Bussa, respectively. They noted the centrality of the Onitsha crossing. Thus, the busier years of IWT on the Niger coincided with the frenzy of the colonial administration, which employed "400 white men in the Northern Nigeria service" alone; a period when Divisional Officers (DOs), Assistant Divisional Officers (ADOs), Residents, Governors and sundry officials, missionaries, and soldiers connected Nigeria's northern hinterlands using the Niger and Benue Rivers, and, combined with a similar number in the southern territories, catalysed a considerable industry, especially as the service expanded in the inter-war years (Lugard 1964, p. 481). It was not unusual for a single arriving or departing officer to have 18 chest boxes of various sizes to move to or from their bush or urban locations through the waterways and the railways bound for Lagos and the sea or for the bush (Longmore n.d.).

Consequently, inland waterway haulage created ancillary industries such as canoe and boat builders, paddlers, canoe leasing, among others. The Marine Department was set up in 1901 and charged with the administration of rates, erection of crossing points, wharves, piers, landings and dockyards and their maintenance (Dennis 1983). It had divisional offices at Apapa, Forcados, Burutu, Lokoja, Port Harcourt and Calabar, representing the major riverine hubs in the country where crossings and embarkations were established. In 1954, the Marine Department gave way to the Inland Waterway Department (IWD) as administrative structures were being reorganized to prepare for Nigeria's 1960 independence. The IWD was later reorganized as the National Inland Waterway Authority (NIWA), the agency presently responsible for the dredging activities on the Lower Niger. The Central Water Transportation Company was set up in 1971 by six states, namely, North-Eastern, North-Western, Benue/Plateau, East-Central, Mid-West and Kwara, when the foreign ferry companies folded up after the civil war. Eventually, after independence, the transport of export commodities from the northern parts of the country to the coast increasingly relied on the railways. For example, in 1955/1956, 85% of exports and 68% of imports,

which passed through Lagos and Port Harcourt ports were moved by rail whereas by 1977, 89% of exports and 95% of imports were moved by road, the lure of speedier vehicles having snatched the bulk of the traffic (Olanrewaju 1986, pp. 38–39).

Nevertheless, the study by Turton (1974) showed that while it lasted, the Niger and Benue Rivers provided vibrant trading maritime centres deep in the interior and extending to foreign hinterlands in Cameroun, Tchad, Niger and Mali. Table 3 shows huge tonnage of export products which justified even the scant Lugardian dredging plans of the era but whose atrophy incipiently as well justifies a concomitant policy review. Turton found that

> Between 1947 and 1960, the total annual traffic carried by N.R.T. on the Niger-Benue and other waterways often exceeded 180,000 tons but after 1960 a steady contraction of trade began and by 1970 the total had fallen to an estimated 46,000 tons, of which less than 20,000 was carried on the Niger-Benue system. The other shippers experienced similar reductions and the total amount of long-distance commercial traffic on the Niger-Benue in 1970 did not exceed 40,000 tons (Turton 1974, p. 329).

Hence, many up-river stations were progressively closed by the N.R.T. which almost exclusively operated all the up-river and some delta ports. At this point in 1970 when the commodity cargo stream tanked and IWT operators withdrew would have been the obvious capstone to end the expensive dredging of the river, altruistically. Even in 1955 when Balewa visited the Mississippi River system with the stated aim to copy its engineering format for the Lower Niger, the latter had been in obvious irreversible decline for many years. By 1951, for example, only Jebba, of the Niger ports above Lokoja, was handling more than 1000 tons annually whereas the rest had closed, and Baro was kept operating by groundnut throughput from the rail line (Turton 1974, p. 330). Hence, the Balewa Government's designs in striving to widen and deepen the river channel despite the diminishing commercial cargo streams was seriously questionable, and indicative of ulterior, arcane or oligarchic objectives far distant from any demonstrable national benefits.

Lower Niger dredging history and studies

It is clear from the foregoing that the initial primary motive for the Lower Niger dredging campaigns was the export master plan of the Northern colonial governors and strategic troop movements in-country (HC Deb 10 March 1899 vol. 68, cc 474–476). The contract to 'improve' the river from Baro to Lokoja commenced in 1907, according to Geary (1927). The full account of the actual removal of spoil, sand or river training procedures have not been found but the project plan went as follows:

> "Baro was selected as the river terminus because, as it was said, it was at a point above Lokoja sufficiently accessible to navigation, and the engineering difficulties were less than at any other point between Baro and the mouth of the Kaduna…. The construction of the Baro line was based on the assumption of the navigability of the Niger to Baro, which was not justified by facts. During two months in the autumn on the high Niger, steamers drawing 12 feet can come up to Baro; though there is always the risk that owing to a sudden fall of the river the steamer may become bar-bound till the rise of the Niger in the ensuing year. But outside these two months the navigability of the Niger cannot be depended upon, though below Lokoja and the confluence of the Niger and Benue there is more water than above the confluence. The truth is that the bed of the Niger, made by the autumn flood,

> is too large for the water at other times and consequently bars and shallows are formed with only 2 feet of water on them (Geary 1927, p. 172).

The actual mobilization to site happened during the administration of Sir. P. Girouard, with a despatch of 30 May 1907 which declared that

> "the Baro-Kano railway was sanctioned and a steamer dredger at the cost of £25,000 sent out to improve the Niger… Experience proved that the result of the dredging was more or less a failure. In 1911 the lowest depth at Lokoja was 3 feet, and in 1912 3 feet 6 inches. On the Lokoja-Baro section the lowest depth in 1912 was only 2 inches, and in 1913 the official report frankly states that 'For the fourth year in succession dredging operations have been systematically carried out in the Lokoja-Baro section of the River Niger…but it has now been demonstrated that this is quite impossible when the Niger is unusually low and the experiment will not be continued' (Geary 1927, p. 173)

As already noted above, the failure to achieve an appropriate depth for dry-season navigation by stern wheelers caused the project to be discontinued in 1913. Other minor campaigns for desilting the waterway took place in the interregnum. For example, Alli (2012) noted that £771.6s was spent during the "low water season of 1928 and 1929", presumably, to dredge the same Baro–Lokoja section of the river. In the 1930s and 1940s, as stated earlier, the revenue available to government for river improvement and maintenance was paltry due to the drop in export earnings. The next major events happened two decades later in 1953, when the Federal Government engaged the NEDECO to study the river system and advice on "the possibility of improving the shipping conditions of the Rivers Niger and Benue" (Ali 2012, pp. 266–267). The NEDECO Report which was released in 1959 advised on the broad hydrological data of the river system, its navigational prospects and improvement possibilities. Our present study did not see any evident removal of spoil, river training exercises or civil constructions during the NEDECO investigations.

The next phases of the dredging project took place after independence, although much planning, bureaucracy and seeming hesitation affected it as the railways and inland waterway transportation were overtaken by the road transport and aviation modes. Nevertheless, the perpetuation of the project, despite inauspicious reports, was facilitated by the contrived rulership structure in the post-colonial era which favoured political dominance by Northern civilian and military rulers (Lynn 1997; Achebe 2012, pp. 40–52). Thus, a dredging contract was executed by "…a consortium of LCHF[3] and Westminster Dredging Company in 1978 from Baro through Lokoja to Onitsha, Onya to Warri/Port Harcourt", according to Wolf et al. (IAIA-Nigeria). Another reference to two dredging contracts which were awarded to "a Dutch Consortium" and "a German group" "for improving the navigability of the Niger-Benue river systems" was made by the Commissioner for Transport in 1977, Colonel Mohammed Magoro, during the opening of the newly-constructed Tin Can Island Port (Oyediran 1980). We did not find corroborating evidence of these activities nor their achievements in the course of our study. However, in 1998, the Petroleum Trust Fund (PTF), a special intervention agency established by the military government of General Sani Abacha and headed by a sole administrator, General Muhammadu Buhari, took up the project again. It proposed a dredging campaign of the Lower Niger River from Baro to Warri and Port Harcourt ports at a cost of N8.3b (US$96.5 million) (Nwosu 1999; IRIN 2000). The objectives included capital and maintenance dredging of the navigation channel

[3] LCHF (Laboratories Central d'Hydraulique de France).

spanning 573 km and 100 m wide. With a minimum average depth of 2.5 m, the projected total quantity of spoil to be removed was 16 million m^3. In addition, inland river ports were to be developed at Idah, Lokoja, Baro and Onitsha with river training works planned for the segment between Jamata, around Lokoja, and the Onitsha Bridge (Wolf et al. 2019; Burg 2010, pp. 27–30). However, the project did not proceed past the payment of mobilization fees as the contractors did not even mobilize to site, for unstated reasons. Subsequently, the successful bidders, namely, West Minister Dredging and Marine Limited, Nigerian Dredging and Marine Limited, Ham Dredging Nigeria Limited, Julius Berger Nigeria Limited, Tayasa Dredging and Construction Limited and Giorgio Dredging Nigeria Limited, were sued to court by the Economic and Financial Crimes Commission (EFCC) and, in 2005, refunded N660m (about US$3.5 million) out of the initial mobilization payment of N2.034 billion (Ugwoke 2005).

The next episode of the dredging project took place in 2009 when President Umaru Yar'adua commissioned what was hyped in the press as the largest capital and maintenance dredging campaign ever done on the river (Ezigbo 2008). Again, 573 km of the river from Baro to Warri was projected for deepening, with river training works from Jamata to Lokoja to artificially encourage the river to flood the main channel especially during the dry season—a practical repeat of the scope of work used during the 1998 contract awards. The Jamata to Lokoja segment belongs to the critical Baro–Lokoja course of the river which had historically been targeted for improvement since the days of Frederick Lugard. Then, unlike now, the river even had the semblance of a thriving IWT industry freighting commodities for export. Now, however, no commercial voyages use the waterway, except passenger canoe rides by the riparian communities. Nevertheless, the contractor was tasked to erect dykes, groynes, dams and blast rock outcrops which hindered the effective pooling of water floods in the main channel (Burg 2010). In addition, the scope of work included the construction of inland ports at Baro, Idah and Lokoja; completion and rehabilitation of Onitsha Port; maintenance dredging for three years and the construction of Gulu–Baro Road (20 km) to provide access to Abuja (see Table 3 for the contract award details). Needless to say, very much of this work scope went undone eventually; none of the requisitioned port developments fructified to the point of operation till date.

From available historical evidences, the transparency of the bidding process was affected by the usual opaque procurement patterns of a historically-corrupt bureaucracy as the contractors were said to have parted with huge sums to 'buy' their awards from original awardees, ruling party chieftains and henchmen favoured by the government (Olawoyin 2017; Labaran 2022). One contractor was said to have chased a serving Minister who was allocated one of the slots to his village on a weekend to seal the deal and transfer the contract to his company. Overall, the project proceeded as scheduled and as the Van Oord project manager, Burg (2010), noted, most preparations for mobilization by the contractors were made offsite and dredging spreads moved in convoy on the river, for security reasons. The security teams remained embedded with the contractors throughout the operations. In Lots 3 and 4, a total of 300 buoys were laid, according to Van Oord, with 18 cross dams and 14 groynes constructed to cut off tributaries and aid flooding in the navigation channel during the dry season. In fact, Burg (2010) admitted that in places it was difficult to achieve the targeted 2.5 m depth despite the civil engineering works. This corroborates the eyewitness account of Geary (2013) about the perennial problem. According to him,

> In the spring of 1913, I went to Kano in Northern Nigeria as counsel for a European firm whom the Government sought to eject from their factory in Kano City which they held under rent from the Emir and a payment to the Government…. I had gone

Fig. 7 A container barge transits under River Niger Bridge at Onitsha. *Source* NIWA Public Relations Department (2021)

> up from Lagos by railway to Zungeru and thence to Kano, but I returned from Baro by steamer down the Niger because I had to investigate an embezzlement case at one of the Niger Company's riverside factories. The river was low and the steamer was time after time aground on sand-banks for many hours, which proved to me the Niger was not really navigable for commercial purposes, any more than the Loire. There is not enough water to fill the Niger's broad shallow bed except during three summer months of flood - August, September and October (Geary 2013, p. 12).

The Chief Operating Officer of another contractor which executed Lot 1 (Warri-Bifurcation Forcados–Nun Rivers), Sir Isaac Chuks, also revealed that sometimes sticking to the 2.5 m depth benchmark "amounted to making big holes in the channel" as the river did not possess sufficient flood quantum to fill the length and width of the river bed except during the rainy season[4] (see Fig. 7). Thus, the dredging exercises continually proved to be needless but exorbitant expenditure of resources due to wrong policy frameworks and misplacement of priorities. The problem of policy harmonization or rationalization tended to be hampered due to the frequent changes of the top executive management of the responsible agency, NIWA. None of the appointed CEOs settled down long enough to take a longer or holistic look at the project's overarching objectives and targets vis-a-vis IWT service delivery (Interview with Dr. Gidado Idris).[5]

[4] Interview with Sir Isaac Chuks, Abuja, November 2012.

[5] Dr. Idris was the Special Assistant to three chief executive officers of NIWA during the period from 2011 to 2014, when the capital dredging campaign was in full swing, on secondment from Nigerian Institute of Transport Technology, Zaria.

The Lower Niger compared with the Pearl and Mississippi Rivers

Undoubtedly, IWT on the Niger formed the backbone of European penetration of the West African hinterland following the confirmation of the source and flow of the river by the Lander Brothers in the 1830s (Davies 1973, pp. 36–37; Dike 1959). However, in the intervening years, improved road and air transportation diminished its use—a trend that mirrored the global decline in IWT *vis-à-vis* other transport modes in places such as Poland, Romania, the United Kingdom, Germany, France, the United States of America, and China, between 1970 and 2005 (Wang and Li 2012/2013). Nevertheless, a comparison of the Lower Niger with other river systems is instructive to further interrogate Balewa's attribution of similarities with the Mississippi and to assess the former's peculiar handicaps. Of the 4180 km of the River Niger, the Lower Niger under focus is 573 km (Akana and Adeigbe 2019). On the other hand, the Mississippi, 3730 km-long, is navigable for about 870 miles from Minneapolis–St. Paul to Ohio River, according to the Upper Mississippi River Basin Association, and the 14,000-km Pearl River system in China has a navigable length of 2214 km (Mississippi River Commission 2019; Wang and Li 2012/2013). However, comparing the three river systems' different management and funding regimes largely explains the viability of the two versus the apparent decline of the Lower Niger.

The NIWA, which managed the Lower Niger system was funded entirely under the Federal Ministry of Transportation, having been originally established by the colonial government in the 1950s to improve navigation and regulate transportation on rivers, lakes, lagoons and inter-coastal waterways in Nigeria. Conversely, the Mississippi was managed by the Mississippi River Commission, established in 1879 to maintain navigability on the river at an average depth of 2.7–3.7 m with the support of the US Army Corps of Engineers. It charged about $3.99 per ton as commercial barge rate for the use of the river (USACE Navigation 2019; Kennedy 2014). In contradistinction, the Pearl River system was also managed autonomously, with commercial and profit orientation.

> Of the entire river, 5000 kilometres links inwards to the Southwest through barges, leading outwards to the South China Sea and all over the world through eight portals, which formulate one of the most important coastal port systems in the world, consisting of Hong Kong, Guangzhou and Shenzhen (Wang and Li 2012/2013).

The management of the river ports on the vast Pearl River delta falls mostly to the riparian communities, such as the city authorities. Thus, whereas the Lower Niger system was managed as one of over seventy sizeable rivers in Nigeria (List of Tributaries), the Mississippi and Pearl Rivers had dedicated commercial management authorities which focused on their single existence and viable business procedures as going concerns separate from governmental interference and control.

Also, the funding patterns for dredging activities on the Mississippi and the Pearl Rivers were similarly commercial and devoid of bureaucracy, unlike the Lower Niger which was funded solely by the federal government. For the Mississippi and the Pearl Rivers, the riparian cities and states shared the dredging budget with independent federal or central government agencies. For the Mississippi, river management costs were shared between states', federal and municipal agencies in the ratio of 25%:75% respectively (with about 15–20% borne by the city) while 80% of the Pearl River's operating costs were borne by Ministry of Transport (United Soybean Board 2019; Wang and Li 2012/2013). The dredging expenses were purely market-based transactions outside the purview of the civil service. The viability of the two river systems was hinged on the volume of traffic as the Mississippi recorded annual average

throughput of 669 million tons of cargo, composed of 60% of grains, 22% of oil and gas products and 20% of coal (Budde and Nicely 2016; USACE Navigation 2019; Kennedy 2014). Also, unlike Nigeria, Griffiths (2020) found that only few of the 400 active ports in China were coastal, the rest were inland ports handling mainly containers, and "among the inward transshipment of Hong Kong port from Mainland China in 2011, 73% came from the Pearl River Basin" (Wang and Li 2012/2013). Comparatively, no record of commercial container traffic has ever been recorded as throughput on the Lower Niger.

Thus, compared to its counterparts, the Lower Niger, during the study period, was in a perennial struggle with elementary handicaps such as navigational depth and lack of off-take cargo. In postmortem, none of the stated objectives of the 2009 dredging campaign was achieved. This included year-round navigability, attraction of commercial traffic volumes, opening of river ports at Idah, Baro, Lokoja, irrigation possibilities, flooding control. Even the post-capital phase of maintenance dredging for 2 years was abandoned due to lack of funds—a strong indication of unmitigated project failure. Many factors explain this quandary. One, the commodities such as palm produce, timber, cotton, groundnut and European manufactures, ferried on the Lower Niger during the colonial era, were displaced by other export goods while other transport modes became preferred (Report of Committee of Experts 1987, p. 71; Ali 2012, pp. 243–244). Two, river-borne traffic volumes also cratered as ferry services dried up with the development of rail and road transport services and the lack of vibrant industries along or proximate to the waterways. Also, the disruptions suffered by IWT during the Nigerian civil war were not redeemed as the operators closed shop *sine die*. Three, whereas the core management of the Lower Niger system was bureaucratic, public-sector driven and wholly financed by the state, the Mississippi river system and the TVA being quoted as models were profit-seeking public corporations run on liberal free market ideals on the basis of providing competitive commercial services to consumers. The TVA, for example, had a net worth of $1.4b in 2019 while the Mississippi's dredging, locks and irrigation engineering works were funded by the federal government, 31 states and 2 Canadian provinces, which it traversed, with $15.9 billion capital injection since 1928 and damages prevented calculated at $1.75 trillion as at 2018 (Sonnichsen 2019; Mississippi River Commission 2019). This is a far cry from NIWA's beggarly financial status.

Four, a contrast of the opportunity cost of the Lower Niger and the Mississippi is also revealing. A new study funded by 10 states of the Mid-America Freight Coalition suggested that "the failure of any one of 25 aging locks on the Upper Mississippi River could result in nearly a half-million truckloads of freight on highways between the Twin Cities and St. Louis" (Hubbuch 2018). In comparison, the volume of freight movement on the Lower Niger during the 1950s was around 600,000 metric tonnes per annum, fell to around 80,000 in the 1970s, and presently has zero industrial throughput record, even after the latest dredging campaign, all blamed on decline in commodity exports and the so-called oil curse (Report of Committee of Experts 1987). Hence, there is zero opportunity cost with regards to the IWT value of the Lower Niger. Thus, faced with obvious budgetary difficulties, the huge dredging spend on the Lower Niger is questionable, unsustainable, corruption-prone and ill-advised.

Environmental and host community issues

In addition, the flurry of Lower Niger dredging activities were not totally harmless to the environment. Environmentalist groups such as Environmental Rights Action (with affiliation to Friends of the Earth), the Urhobo Historical Society, United Ijaw Movement and

sundry denizens of the Niger Delta have articulated problems of the dredging project such as shoddy EIA and community impact assessment (CIA), poor compensation package by the dredging managers (NIWA), and ecosystem issues (Wolf et al. 2019; IRIN 2001; Benatari 2000). Independent environmental studies of the impact of dredging activities in the Niger Delta are replete with warnings of their deleterious effects. According to Okonkwo et al. (2015), dredging activities in the Niger Delta region caused "physico-chemical changes in the water of the delta, particularly pH, total dissolved and suspended solids (TDS and TSS), conductivity, turbidity, sulphate, dissolved oxygen and oxygen demand. The process of dredging causes water degradation as well as harmful effects on fishes." Ohimain et al. (2004, 2005) found that the multivariate anthropogenic consequences of dredging activities on the ecosystem caused destabilizing impact. In one of their studies, Ohimain et al. (2017) also found that dredge spoil abandoned along river banks of the Niger Delta caused "…altered topography and hydrology, acidification and water contamination, which has resulted in vegetation damage and fish kills [and] …could result in a considerable change in the duration of inundation, thereby causing plant mortality and fauna impact." Other studies by Nwilo and Badejo (2005) and Abam and Okogbue (1993) traced the effects of industrialisation from the exploitation of hydrocarbon resources, including environmental degradation through oil spills, "pollution of water supply" and "loss of biodiversity."

Moreover, the basic occupations of the riparian communities being fishing, the locale for the heaviest fishing industries was the Niger Delta Basin where Nze et al. (2018) implicated dredging operations in the dislocation of traditional fishing activities because "… fish species in the un-dredged locations were found to be generally in a better condition than those in the dredged locations." Fishermen in the upper courses of the river also reported sparse fish population in dredged segments. With a population of 272,000 "artisanal marine fishermen" in 1997, Nigeria had the highest occupational density in the semi-skilled industry and stood likely to be most impacted by the adverse conditions triggered by river dredging activities, according to Akegbejo-Samsons (2007). Furthermore, Abam and Oba (2018) utilised three case studies to show that harmful changes in "…sediment transport capacity and turbidity, shifts in saline and freshwater interfaces, changes in river morphology and disappearance of fish nursery and spawning grounds are the other less frequently reported effects." With the proven failure of the IWT aims of the entire dredging project, it bespeaks double jeopardy for Nigerians to suffer the effects of collateral environmental damages as well.

It is therefore instructive to examine a few other issues such as the environmental impact situation per capita and the host-community responses vis-a-vis the differential impact patterns across the river system's deltaic footprint and other riparian communities, and even the ageing of the river system. For example, whereas there was the problem of low depth in the upper segments of the Niger and Benue rivers, this was not the case closer to the delta, where the river was perennially in flood and hosted more and assorted dredging activities. This disparity was likely heightened by the construction of dams at the upper levels of the Niger. Hence, according to Nwosu (1999), the Benue's stronger current "… at 3.4 knots suggests that much of the water flowing south from the confluence comes from the Benue rather than from the Upper Niger." Ekeh (2001) also raised the issue of "desiccation of the rivers, lakes, and streams in the Niger Delta [which] … occurred after the building of the giant Kainji Dam and other numerous dams on the Niger and Benue and their tributaries. The ongoing drying up of the Niger and Benue have also followed the building of these dams." In sum, this school of thought argued that the frequent siltation and drying up of the Niger were seen as part of the so-called "downward march of the Sahara Desert which

began thousands of years ago" with the drying of many rivers and lakes that used to flow there (Ekeh 2001). The construction of electric power dams at Kainji, Jebba and Shiroro took place in 1968, 1985, and 1990, respectively. Their overall contributions to the country's energy solutions and their aggregate environmental impact belong to broader studies, although the lack of electric power to millions of Nigeria suggests crappy utilization of the dams.

However, the community impact of the dredging projects include insecurity on the waterways. Whereas notorious pirate attacks presently continue in the Niger Delta waterways, such occurrences at the upper segments of the river were sparse since the end of the notorious 1870s middlemen wars involving the RNC (Chilaka 2014; Flint 1960). The probability is also high that the lack of commercial voyages could explain the lower record of pirate attacks. Overall, however, no fewer than 510 communities in Niger, Kogi, Anambra, Imo, Rivers, Edo, Delta and Bayelsa States were projected to have been impacted by the 2009 project. The Ijaw riverine communities of the delta ranked high among opponents of the dredging campaigns, citing its doubtful objectives. The extent these concerns spurred the spate of pirate attacks against the dredging spreads or kidnapping for ransom and general restiveness amongst youths in the communities has been expressed by other commentators (Benatari 2000). However, criticisms of the poor EIA study, conducted post hoc, seemed justified by instances when the Government had to rely on EU and US diplomatic intervention to gain the release of foreign nationals taken hostage at Warri due to aggravated environmental grievances (Wolf et al. 2016).

Consequently, with regard to the hydrology, environmental and host-community issues, certain critical issues are germane to the study. One, the NEDECO late-colonial studies needs further interrogation to ascertain its present utilitarian value. Obviously, the poor environmental sensitivity of the campaigns was underscored by the fact that despite many years of gestation, the post-independence dredging contracts were still awarded in advance of EIA reports. Burg (2010) also noted that the 2009 contract awards were based on 2006 data which left the contractors no option but to re-confirm them at own cost. Notably, although the NEDECO Report recommended series of weirs, canalization, and locks construction to improve the navigable depth and large dams at the upper reaches of the river, as reservoirs to raise the water level, especially above Jebba, there was a wide disconnect between this scope of work and the milestones set for the 2009 campaigns (NEDECO Report, Vol. 1, 1959, p. 75). Equally shelved were the Report's recommendations of further studies to ascertain the river's hydrological cycle of rainfall, run-off and evaporation, morphological investigation of variation in slope of the water surface, the sediment sizes, channel roughness and the behaviour of crossings or the actual behaviour of the river-bed, its formation and deformation, and analysis of the causes and consequences (NEDECO Report, Vol. 1, 1959, p. 78). These omissions could not have helped the project to achieve its set milestones.

Conclusion

The Lower Niger's value for colonial and postcolonial transportation logistics was obvious, as presented historically and statistically in the text. This gave rise to the attempts in the early 1900s to dredge its waterways to achieve all-year navigability. However, subsequent socio-political and economic developments drastically affected the fortunes of the river system since the late 1960s. As a dredging and river engineering project, the emergent

question over the years was whether the Lugardian project had outlived its usefulness and become a drainpipe by corrupt politicians and bureaucrats? From the evidences presented in the text about its procurement processes, the answer is in the affirmative since a huge sum of N32 billion was spent in the 2009 campaign and the stated objectives were not achieved, and no outcome of the project continues to be tracked by NIWA till date due to lack of funds, hence the popular clamour against the project's continuance in disregard to the global playbook for viable IWT industry. Despite the dredging campaigns, the perennial problems of the river system persisted in geomorphological difficulties and rock outcrops, poor navigational depth at the upper levels, environmental and host-community issues, and the bureaucratic nature of its management and operations.

The major challenges to the commercial viability of the Lower Niger system include the absence of water-borne cargo streams which weakened its potential utility in the present multimodal transport network of the country. Furthermore, the decline in cargo stream meant the lack of IWT demand by end-users located along the river banks or within its proximity to generate off-take cargo, and poor passenger ferry services. Moreover, whereas irrigation and electricity generation were touted as benefits for the dredging campaigns, the low access to electric power supply in Nigeria, 55.4% of the population (World Bank 2020 cited in *Trading Economics*), on the one hand, and the intermittent flooding incidents, on the other, indicate the absence or failure of any articulate river engineering control systems and overarching policy (Nnodim 2016). Also, the river's lacklustre shipping outlook, despite the 2009 dredging spend of N32b (US$84 million) contrasted sharply against the successes of the Mississippi, the TVA and the Pearl River systems as going concerns, with the logical conclusion that the Nigerian dredging campaigns ought to be permanently discontinued as irredeemable project failures going by the global playbook for the market. It is an open secret that the projects were opaque, surrounded by corrupt procurement processes and bribes, which were used to 're-buy' the contracts from ruling party chieftains. These did not escape bashing, as media reports regularly lampooned the waste of scarce resources in a badly-managed oil-rich country which the World Poverty Clock classified as the world capital of poverty since 2018 (Oshewolo 2010).

Lastly, one of the present study's contributions to knowledge is the confirmation of the finding that the Lower Niger's river bed characteristics at the Baro–Lokoja segment seals the limitation of the river system to support year-round commercial navigation policy upstream, irrespective of applied dredging solutions. Stemming from its colonial provenance in the 1913 Report noted above, there is no gainsaying the fact that, going forward, contemporary policy-making for future management of the Lower Niger waterway by federal and state ministries, departments and agencies (MDAs) have the latest information from the 2009 campaigns as a nexus to correct past mistakes and put the river system in a better administrative framework.

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Edmund Chilaka is an Adjunct Lecturer of Maritime Transport and Logistics at The University of Lagos Centre for Multimodal Transport Studies. His Ph.D. research completed in 2015 led to the publication of The Rise, Fall and Liquidation of Africa's Pioneer Carriers: Nigerian National Shipping Line and Black Star Line. Dr. Chilaka is the Editor-in-Chief of Dredge Drill and Haul magazine (www.ddhmag.com) and the National Coordinator of the Nigerian Dredging Summit and Exhibition since 2007. In 2018, he worked as Secretary of the Local Organising Committee of the University of Lagos International Conference on Land and Development in Lagos; the papers were published as a book in 2020.