



Conservation Vs “Development”? The Political Ecology of the Stiegler’s Gorge Dam and the Selous Game Reserve

By Boyce Sarokin



Wildlife tourism is one of Tanzania’s main foreign exchange earners and an important source of formal employment, but the sector’s survival is threatened by poaching, mineral exploration, and pressure from farmers and cattle-keepers to access farmland, fuel, pasture and [protein](#) in protected areas. For the Selous Game Reserve (SGR), the decision to build Africa’s largest dam across the Rufiji River adds a new and potentially devastating dimension to these existing threats.

Between a quarter and thirty per cent of Tanzania consists of national parks, conservation areas, game reserves, and controlled and [protected areas](#). Until last year, the Selous was the world’s largest game reserve, covering an area of 50,000 sq. kms (larger than Denmark). In 1896, the area was designated a protected area by the Governor of Tanganyika [Hermann von Wissmann](#), and it was made a hunting reserve in 1905. Last year’s gazetting of the 31,000 sq. kms [Nyerere National Park](#) reduced the SGR by sixty per cent, to about 20,000 sq. kms. President Magufuli justified this radical move as a means of reducing hunting tourism. “Tourists come here and kill our lions, but we don’t benefit a lot from these wildlife hunting activities”, [Magufuli said](#). Slicing up the SGR will also complicate future negotiations over its status as a World Heritage Site, discussed below.

Exploration and mining concessions to Western and Russian oil, gas and uranium [companies](#) covering an estimated six per cent of Selous constitute a further challenge to the reserve's integrity, and have been widely criticised by environmentalists. By 2017 there were said to be 48 prospective oil, gas and uranium concessions in the SGR (See Map 1), but for the moment, the government has put their [development](#) on hold. If and when the price of uranium reaches a certain threshold, we may expect mining to take off, with the attendant negative environmental [consequences](#).

From the Selous' killing fields...

The Selous once boasted Africa's largest concentration of elephants and other megafauna. Waves of sustained ivory [poaching](#) reduced the elephant population from about 100,000 to only 13,000 in 2013. In 1982, SGR was declared a UNESCO World Heritage Site for protective purposes, and in 2014, it was added to UNESCO's List of World Heritage Sites in Danger, by which time poaching, driven by the Asian ivory trade, was threatening to wipe out Tanzania's entire elephant population, leading UNESCO's World Heritage Centre (WHC) and the International Union for the Conservation of Nature (IUCN) to declare that: "there appears to be no coherent governmental response which could halt or even reverse the documented poaching trends". Successive Tanzanian governments, politicians and officials, were widely considered complicit at best or, at worst, actively involved [in facilitating the trade](#).

... to the Stiegler's Gorge Dam...

In 2016, Stiegler's Gorge Dam (SGD) was included in the Tanzania [Power System Master Plan](#), and the project was finally underway. In the same year, the WHC expressed its "utmost concern about the ongoing project despite a high likelihood of serious and irreversible damage to the [Outstanding Universal Value](#) (OUV) of the property", that is, the Selous. In 2017, UNESCO stated bluntly: "The foreseeable impact of Stiegler's Gorge Hydropower project is irreversibly damaging to the Outstanding Universal Value of the property and clearly not in line with the Committee's position on the incompatibility of dams with large reservoirs inside a World Heritage property". UNESCO consequently recommended that the Tanzanian government should "permanently abandon" the project.

... enraging the conservationists...

In addition to UNESCO and other UN agencies, conservationists and the wildlife tourism industry were dismayed by the proposed dam, as were bilateral agencies and NGOs supporting Tanzania's conservation efforts. They complained that no robust social or economic impact analysis, environmental assessment or public consultations informed the decision to proceed with the dam. The brief Environmental Impact Assessment ([EIA](#)) produced by the University of Dar es Salaam's Consultancy Bureau in 2018 contained "hardly any quantitative predictions of positive or negative impacts" of the proposed dam. Conservationists further argue that, by disturbing annual water flow patterns, the dam will have a potentially devastating impact on farmers and fishers downstream from the dam, and on the vast mangrove forest in the Rufiji Mafia-Kilwa Marine [Ramsar Site](#), another internationally protected area. The dam would trap sediment and organic matter normally transported to the coast and enriching downstream agriculture, fisheries and hatcheries. Interrupted water flows would lead to increased [salination](#) upstream from the delta.

In addition, critics argue, the dam's reservoir will take years to fill and will be subject to increasing rates of evaporation as temperatures rise under global warming. Up-stream irrigated rice cultivation on the Kilombero River and sugar on the Great Ruaha have reduced the volume of water flowing into the Rufiji, and future unpredictable weather patterns could lead to crippling [drought](#). Effectively, only the waters of the Rufiji will be filling the dam's vast reservoir. A more optimistic scenario could

see an increase in precipitation from the unpredictable effects of climate change on micro-climates.

New roads and power transmission lines and the arrival of contractors and workers on the dam site and attendant commercial activities will have a massive and uncontrolled impact on the local environment and encourage further poaching, say the project's critics. The millions of tons of cement required to build the dam will stimulate the local cement industry, but at the cost of a massive [carbon footprint](#) (cement accounts for about eight per cent of global greenhouse gas emissions). Loggers have already cleared the dam site of vegetation, and the site of the projected [1,200 sq. kms.](#) reservoir, containing nearly three million trees, awaits the same fate, with unknown effects on wildlife habitats and biodiversity. When the loggers entered the park in late 2018, one [luxury lodge](#) announced its imminent closure.

... and leading economists to wave a red flag

Not only conservationists have found fault with President Magufuli's mega-project. Though the necessary data for a robust analysis are lacking, economists argue that the dam makes neither financial nor economic sense and that there are cheaper, smaller, less risky and more practical alternatives for increasing [access to electricity](#). Joerg Hartmann, an independent consultant who undertook an [economic feasibility assessment](#) of the project, argues that: "Stiegler's Gorge has become unnecessary, and would be a significant economic burden for Tanzania". The dam is likely to cost a multiple of the present contract price, and take much longer to build than currently proposed. One recent estimate puts the total cost of the dam at nearly \$10 billion, while the Brazilian conglomerate Odebrecht estimated that it would take 9-10 years to complete, and not the three years claimed. At over 11 US cents per unit (kWh), SGD power would cost almost twice the current tariff, and a multiple of the cost of power from [gas](#).

Currently, Tanzania has surplus power generation capacity of 280MW, and it is most unlikely that so much additional power would find a [market](#). The project's supporters claim that surplus power from the SGD will be exported. A 2018 [World Bank](#) technical appraisal for a power interconnectivity project between Tanzania and Zambia argued that internal demand for electricity was inadequate to justify the SGD, so that it could *only be justified* if exports were built into the project.

A final risk facing the planned dam is the apparent inexperience of the Egyptian contractors. According to [Barnaby Dye](#), Arab Contractors, a state-owned company, worked on the giant Russian-built Aswan Dam in the 1960s, but only as one of many sub-contractors, while the second company, El Sweeny, builds transmission lines, not complex electro-mechanical systems.

President Magufuli defends his project

Defending the dam that he claims will power his ambitious industrialisation programme, President Magufuli claims that it will affect "[just three percent](#)" of the SGR, and will help combat deforestation across the country by providing citizens with a cheap alternative to charcoal and wood fuel. Ironic, therefore, that over 90,000 ha of *miombo* woodlands and forest risk losing an estimated 2.6m trees in the dam's reservoir. For the moment, only the dam site has been cleared. President Magufuli says more power will be required for industrial growth, rural electrification and to run the Standard Gauge Railway, justifying one mega-white-elephant project in terms of the needs of another. Arguably, diesel power would be more economical than electricity given the probable low traffic density on the new railway, though this needs to be examined empirically.

Critics argue that the notion that rural Tanzanians will soon enjoy cheap hydropower via the national grid thanks to the SGD is highly unrealistic. The huge investments in transmission and distribution infrastructure required to make this work have not been costed, and the limited demand for electric

power would make the required investment to reach Tanzania's vast rural hinterland hugely expensive. Solar mini-grids have become widely popular and can be supplied at little cost to the state by commercial and social investors. Gas, not electricity, is the best (or least bad) alternative to unsustainable charcoal use for cooking in [Dar es Salaam](#) and other urban centres.

The President's claim that "just three percent" of the SGR will be affected by the dam is also challenged by environmentalists, pointing to the downstream impacts and the likely negative effects of the dam's construction on the Selous discussed above.

Past plans to dam the Rufiji came to nothing

Both colonial and post-independence governments explored the viability of damming the Rufiji River at Stiegler's Gorge to produce power and develop [irrigation agriculture](#). In the 1970s, Swedish aid financed dams at Kidatu and Mtera on the Ruaha River, a tributary of the Rufiji, upstream from Stiegler's Gorge. At different times, detailed technical studies and construction designs by Japanese, American and Norwegian aid agencies and consultants led nowhere, while the World Bank concluded that, on the basis of demand projections and environmental concerns, a large dam was not feasible. Donors subsequently funded two more small- to medium-size dams, at [Kidatu and Pangani](#).

Increasing power shortages and rationing under Presidents Mkapa (1995-2005) and Kikwete (2005-15) led the government to seek private investors through power purchasing agreements. South African, Canadian and Chinese companies came forward with hydropower proposals, but the main interest came from Brazil's giant [Odebrecht](#) corporation, which in 2012 signed an MOU with the Rufiji Basin Development Authority ([RUBADA](#)). The MOU specified a seven-year timeline to finish the first phase and a further three years to complete the project. But the project preliminaries had not been finalised before the corruption scandal known as [Operation Carwash](#)" made Odebrecht a household name for serial bribery in Brazil and internationally, and led to the imprisonment of three former Brazilian presidents. President Magufuli disbanded RUBADA in 2017 and the SGD's client is now Tanzania's power utility TANESCO under the supervision of the Ministry of Energy.

Not even [China](#), Africa's premier source of concessional finance for big infrastructure projects, including dams, has shown any interest in financing this one. As of 2015, Chinese contractors were involved in dam building projects in over twenty African countries, from [Angola to Zimbabwe](#). Though estimates vary, Deborah Brautigam and her team identified [Chinese-financed](#) dam projects in 17 African countries in 2013, financed by concessional loans from China's Exim Bank worth nearly US\$7 billion.

Finally, no private investors could be found to finance a dam on a Public-Private Partnership (PPP) basis. Globally, private developers are increasingly reluctant to invest in large dams for power production or irrigation. Human rights activists condemn forced population displacements while the economics of large dams are increasingly questionable. No forced population movements are involved in the SGD project, however.

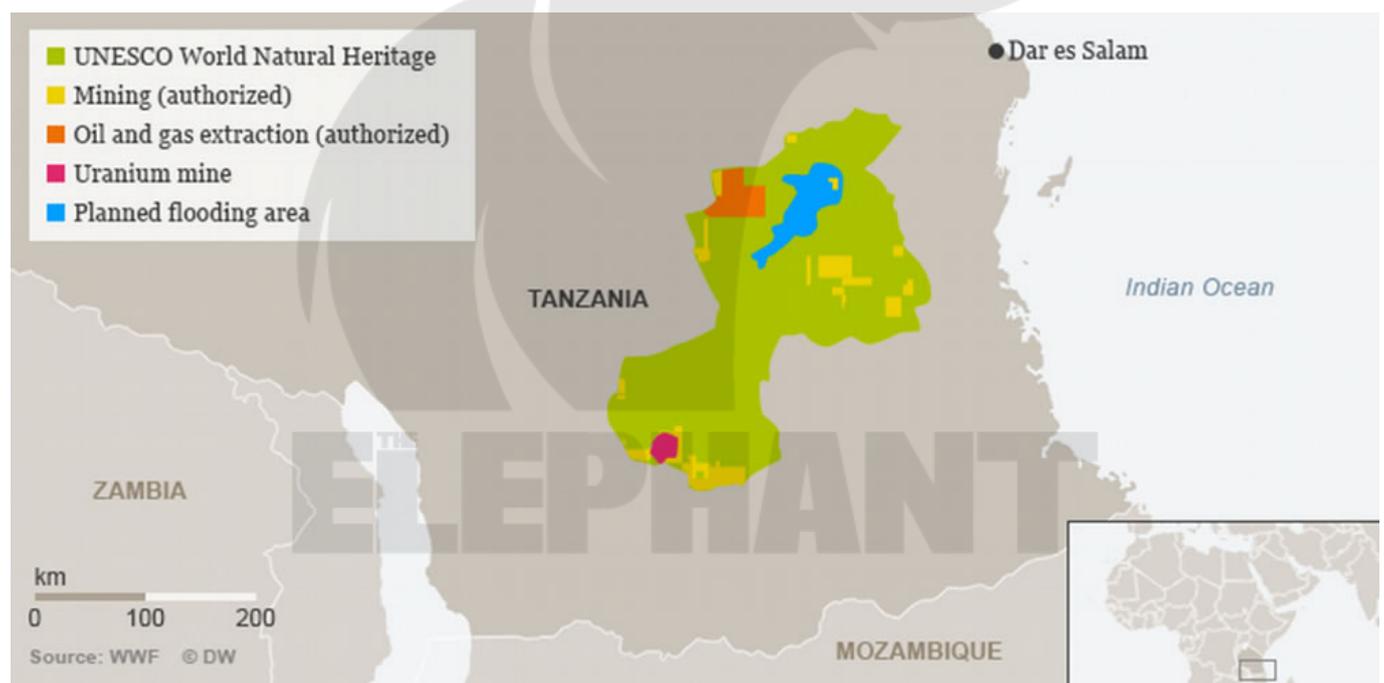
What has changed to make this project viable?

After so many years of aborted plans to build a dam, what has changed to make Stiegler's a viable project? The answer is: nothing. If anything, the project is even less viable now than it was a decade ago, before Tanzania's huge gas deposits off its southern coast began to be exploited. The risks attached to continued upstream-irrigated agriculture and siltation increase with time, bringing the additional risk that the dam's reservoir could fail to provide the volume of water required to run the facility at a capacity level that would justify the huge [investment](#) involved.

For sixty years, no bilateral development agency nor the World Bank has been willing to finance a dam at Stiegler’s Gorge, though these agencies have funded numerous medium-size dams over the years on tributaries of the Rufiji River, which regularly dry up during the dry season and are increasingly vulnerable to unpredictable rains. A study titled *Structural adjustment and sustainable development in Tanzania reported that* siltation was a common feature of small dams in Arusha, Kilimanjaro, Dodoma, Tanga and Rukwa regions. Falling water levels due to the degradation of water catchment areas rendered the potential of hydropower “doubtful”.

Beware of the mega-dam syndrome

If completed, the 700m long by 130m high SGD would be one of Africa’s largest dams by [installed capacity](#), equal to Egypt’s Aswan High Dam (2,100MW) and Mozambique’s Cahora Bassa (2,075MW). A rapid review suggests that SGD will generate few of the benefits but suffer most of the costs normally associated with large dams. A study titled [Megaprojects and risk: An anatomy of ambition](#) lists four typical flaws of mega-projects, including dams: “underestimated costs, overestimated revenues, undervalued environmental impacts and overvalued economic development effects”. All four appear to apply in the case of the SGD. The study argues that: “Megaprojects are systematically subject to “survival of the unfittest”, the worst projects get built instead of the best”. Big dams are inherently high-risk. In a 2014 study, [researchers](#) from Oxford University concluded that: “In the vast majority of cases . . . megadams are not economically viable”.



Map 1: Selous Game Reserve. Source [DW](#)

Note: The map shows the SGR before the creation of the Nyerere National Park in 2019.

Dams *per se* are not the issue, but mega-dams. Though it is by no means true that dams are carbon-neutral, hydro is still by far the most common source of renewable power worldwide, accounting for around 90 per cent of renewable [energy generation](#). The main problems with mega-hydro highlighted in the literature are population displacement, often accompanied by inadequate compensation, and the up- and down-stream impacts on local eco-systems discussed in this report. Despite mega-dams’ bad reputation, a number of countries are investing heavily in [mega-hydro](#), including Ethiopia, Brazil, Pakistan and China. The SGD does not involve population displacements.

Megaprojects are systematically subject to “survival of the unfittest”, the worst projects get built instead of the best

But the dam’s power generation capacity is also questionable. The figure of peak generation capacity of 2,100MW was based on a 25-year old feasibility study, since when the [Rufiji](#) River’s average volume is said to have fallen by as much as a quarter. Upstream agriculture and (possibly) climate change are responsible. Experts see the effects of climate change (more droughts, storms, floods) as a threat to the viability of hydropower globally. According to Clemente Prieto of the Spanish Committee on Large Dams: “Climate change is having a remarkable impact on hydropower generation and it increases the challenge of managing hydro plants”. Though the effects of climate change are difficult to predict, the increasing intensity of extreme and [unusual climatic events](#) is well documented.

A dysfunctional aid relationship

UNESCO’s World Heritage Centre, prominent wildlife and nature conservation bodies, including the World Wide Fund for Nature (WWF) and the International Union for Conservation of Nature (IUCN), numerous donors and a substantial number of private philanthropies dealing with specific animals and issues (hunting, poaching, wildlife trafficking, forestry, water), have commented negatively on the SGD initiative, so far to no avail. Germany, one of the most vocal critics of the project, has been at the forefront of wildlife conservation efforts in Tanzania since colonial times. Over many years, Germany has financed the Tanzanian government, technical experts, the Frankfurt Zoological Society (FZS) and others to promote conservation efforts in the Selous. After a heated debate in the German Bundestag in early 2019, a proposal that future [Germany aid](#) should be made conditional on Tanzania abandoning the dam was rejected, while it was agreed that Germany should assist Tanzania in finding an alternative source of power. This offer was not pursued.

Climate change is having a remarkable impact on hydropower generation and it increases the challenge of managing hydro plants

Critics wonder why, given the Tanzanian government’s refusal to enter into a substantive dialogue with its main long-term advisor/financier on conservation issues, while constantly ignoring its own international conservation commitments and policies, Germany continues to fund conservation efforts in Tanzania. In late 2018, a group of German experts was refused permission to enter the Selous to check on progress in anti-poaching. A German source commented: “International nature conservation organizations are increasingly wondering about the German policy of ‘paying and keeping their mouth shut’”. An expert from KfW (Germany’s state development bank) resigned after two years, during which the GOT restricted his visits to Selous (his work site). Underlying the protracted stand-off is the widespread belief that the rapid decimation of Tanzania’s elephant population—a two-thirds decline from about 109,000 in 2009 to about 43,000 in [2014](#)—was facilitated by the active participation of elements within the [Tanzanian state](#). The slow release of a 2018 aerial survey of wildlife in the Selous fuels suspicions that poaching is still an issue. It took two years to release the report, which the German government had financed. According to [Henry Mwangonde](#), the number of elephants had stabilised at just over 15,000, more or less the number counted in 2014, suggesting little or no recovery.

Comment is free ... and punishable

Once the government launches a major project, its implementation is declared “inevitable” and

beyond discussion, and any internal criticism is deemed “unpatriotic” and “treasonable”, while development prospects. [Magufuli](#) accused “some” **CSOs** and **NGOs** “of being used by ‘foreigners’” to push the latter’s agenda. In May 2018, both ruling party and opposition MPs challenged the decision to proceed with the SGD project in advance of an Environmental Impact Assessment (EIA), and the premature issuing of licences to [clear-fell](#) the site of the dam’s future reservoir.

International nature conservation organizations are increasingly wondering about the German policy of ‘paying and keeping their mouth shut’

These mild criticisms were met with an impassioned threat from environment minister [Kangi Lugola](#), who told parliament: “. . . the government will go ahead with implementation of the project whether you like it or not. Those who are resisting the project will be jailed”. Since then, apart from praise-singing, local commentary has been muted, while external critics have focused more on the conservation aspects of the project than on its economic and financial implications, though the two are [related](#). No academic economist, Think Tank or newspaper editorialist has commented negatively on the project, while social media sources have featured both critical and pro-Magufuli commentary, albeit with little insight into the underlying issues. It is striking that no advocacy group or alliance in or outside Tanzania has challenged the SGD through public interest litigation, as happened in the case of the proposed [road](#) across the Serengeti.

Conservation versus “development”: a zero-sum game?

Rapid population growth is fueling increasing conflicts between farmers and cattle-herders over land. Both groups face off against conservationists, big-game hunters and the *safari* tourism industry in what is increasingly becoming a zero-sum game. Attempts for more than two decades to “empower” villagers to [protect](#) rather than harvest wildlife and [forest reserves](#) have largely failed. Last year, President Magufuli ordered [the deregistration](#) of a number of “idle” forest and game reserves totaling over 700,000ha for “redistribution to *wananchi* for residential and farming uses”. Subsequently, the government announced the creation of three new national parks, including one near President Magufuli’s home district of Biharamulu. In addition, the government has recently legalised the hunting and sale of [game meat](#), a move that conservationists see as opening the door to the widespread slaughter of wildlife. The wildlife survey mentioned above reported a 72 per cent decline in the number of wildebeest in the Selous between 2013 and 2018. According to Mwangonde, the numbers for buffalo and antelope have not been released, but there are thought to have been significant decreases. Lastly, though the President justified the creation of Nyerere National Park in terms of stopping hunting tourism, the ban on commercial hunting that was imposed in 2015 has been [partially lifted](#).

For your information, the government will go ahead with implementation of the project. .
. Those who are resisting the project will be jailed

With or without a functioning dam, the SGR has taken an additional hit. While ivory poaching may have been curbed for the moment, and uranium mining and oil and gas exploration are on hold, the disruptions caused by the SGD contractors and the impending clear-felling of the dam’s imagined reservoir only add to these and other threats to the (now much smaller) SGR’s long-term survival. A gloomy but realistic prognosis is that further population growth and the impact of climate change will eventually put an end to conservation and wildlife tourism in the Selous and throughout the continent. According to Kenyan conservationist Richard [Leakey](#), as a result of climate change: “. . .

the problems we all face now are far beyond the power of individual conservationists to cope with”.

Although many conservationists would challenge this view, it is difficult to see how fences and armed wardens can ward off climate change even if they can prevent “trespassing”, illegal hunting and grazing, or how farmers and pastoralists can be “empowered” to conserve rather than degrade forests and grasslands in the absence of an effective state that can legislate, coordinate and regulate the management of natural resources effectively and efficiently in the public interest. Even without the gathering storm clouds of climate change, and the obscenities of ivory poaching and wildlife trafficking, population growth and competition over finite resources are likely to lead us inexorably towards a comprehensive [tragedy of the commons](#).

Resource misallocation and delays

Beyond conservation issues, however, is the question of resource misallocation, which [economists](#) now treat as a major explanation of why some economies and firms perform better than others. Though universal, the issue of systemic resource misallocation is particularly devastating in poor countries, where investible savings are by definition limited, and where prestige projects, white elephants and poor policy analysis and implementation commit huge amounts of capital to non-performing ventures, at enormous opportunity costs. Africa is littered with examples of leaders’ [vainglory](#), [extravagance](#) and [incompetence](#).

President Magufuli is pinning his legacy on what he terms “[strategic](#)” infrastructure projects, perhaps reflecting, in [Flyvbjerg’s](#) words, “The rapture politicians get from building monuments to themselves and their causes, and from the visibility this generates with the public and media”. But the success of the strategy depends on the success of the projects. If they succeed, the leader’s legacy is assured. If they fail, so does the legacy.

Wildlife trafficking, population growth and competition over resources are likely to lead us inexorably towards a comprehensive tragedy of the commons

President Magufuli’s penchant for multi-billion-dollar infrastructure projects is stretching Tanzania’s finances to the limit, consuming an ever-larger part of the national budget and growing the national debt. Since coming to power in 2015, he has: initiated a 2,500km, \$14.2 billion standard gauge railway ([SGR](#)) to replace the narrow gauge line and extend it to neighbouring countries; revived the country’s airline Air Tanzania Company Ltd (ATC) with new [aircraft](#), including four Airbus A220-300s and two Boeing 787-8 Dreamliners; signed off on a three-kilometre, \$260m bridge across the [Mwanza Gulf](#) on Lake Victoria, and launched a number of other costly projects.

It is most unlikely that the SGD will be commissioned before the end of President Magufuli’s second term in 2025, given the typical delays and cost overruns in mega-dam construction, leaving the unfinished project as a potentially costly embarrassment for the next government to deal with. Hopefully, ongoing investments in gas-fueled power plants, bottled gas for urban consumers and off-grid solar for rural areas will assure adequate power and help control deforestation in the likely event of an aborted Stiegler’s Gorge Dam.

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