Large dams: harmony or acrimony with environmental resource management paradigms in Zimbabwe and Lesotho

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Abstract
Grandiose dam construction in Africa has a long history, but the 1970s marked the beginning of the environmental decade distinguishable by the birth of ecological concern among scholars and environmentalists based on the impact of such engineering technology. Prior to the 1970s the always assumed positive contribution of dams and damming to human life seems to have been over-emphasised to the detriment of attendant environmental consequences and costs. Several scholars have generated insurmountable interdisciplinary works on the efficacy of gigantic dam schemes worldwide and their apparent harmony with nature. However, the literature available is thin on alternative and sustainable strategies to balance the benefits with the evils or risks of dams on the environment as propounded by exponents of sustainable natural habitats. Recent decades have witnessed a striking increase in the mobilisation of environmental awareness around the Kariba Dam in Zimbabwe and the Katse as well as the Mohale dams in Lesotho, largely driven by internal developments and external dynamics. The choice of these water bodies is based on their size and unique environmental impacts which can be studied from a comparative perspective on the basis of new and emerging literature on ecological disasters associated with human action in creating these large water bodies. It is also based on the fact that although the three are distinct technological impoundments, the environmental consequences they engender are not mutually exclusive as end results of processes initiated to support economic and industrial development. The interplay between hydro-politics, humanity and the environment cannot be denied. In spite of attracting far less commentary, the construction of huge man-made lakes in Africa has resulted in ecological disturbances that have also produced formidable sociological and medical problems warranting attention. One of the chief arguments of this article is that the benefits and the colossal investment (by southern African standards) injected into Kariba by the Federal government and into the Lesotho Highlands Water Project (LHWP) by Lesotho, South Africa and the World Bank are dwarfed by the socio-economic and environmental consequences and controversies wrought by these projects. It seeks to explore whether large dams represent harmony or acrimony with environmental resource management paradigms in Zimbabwe and Lesotho.

Written from a holistic multidisciplinary perspective on social and environmental effects of large water projects, the article follows three interrelated lines of inquiry focusing firstly on the rationale and legacies of large dams (this includes revisiting the large dam controversy); secondly, dams' interaction with humans; and thirdly, their contemporary impacts on valley and highland communities.

Keywords: Water, dams, environment, ecosystem, ecology, hydro electricity, management, conservation, multidisciplinary.

"Those who cannot remember the past are condemned to repeat it". George Santayana in *The Life of Reason or the Phases of Human Progress* (1906) cited in Balon, "Kariba: The Dubious Benefits of Large Dams", 1978, p. 40.

INTRODUCTION

The main focus of this article is grandiose dams. Clearly, large dams in Africa have a long history dating back to the establishment of the Gezira,[1] Aswan[2] and the Volta schemes.[3] The article argues that the positive contribution of dams and damming to human life seems to have been over-emphasised to the detriment of attendant social costs and environmental consequences.[4] Its main supposition is that developers of massive dam projects such as Kariba in Zimbabwe and the Lesotho Highlands Water Project (LHWP) in Lesotho whilst they wanted the dams to be beneficial to society, in many respects, unleash a host of problems that impede socio-economic and environmental sustainability. The commissioning of these installations has ostensibly failed to fully take into account pertinent concerns related to people's value systems, ethics, economic development, water-use efficiency, management of shared water resources, environmental sustainability and social justice or equity issues which are steeped in economic, cultural and political history. The tenuous or fragile relationship between policy discourse and the practical impacts of large dam projects on the environment are clear. The bi-lateral agreement between South Africa and Lesotho culminating in the creation of the LHWP had the effect of obviously benefiting the two countries and their citizenry disproportionately as the benefits from dams were not equitably distributed among the poor and rich categories of people.[5] This is one of the controversies, but certainly not the only one, around big water reservoirs which this paper explores, hence, adding to the opposition to large dam projects the World Commission on Dams (WCD)[6] has been trying to address since its inception in 1998 as

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[1] T. Barnett, "The Gezira Scheme: Production of Cotton and the Reproduction of Underdevelopment" in I. Oxaal, T. Barnett and D. Booth (eds), *Beyond the Sociology of Development: Economy and Society in Latin America and Africa*, London: Routledge and Kegan Paul Ltd., 1975 and J. F. Munro, *Africa and the International Economy 1800–1960: An Introduction to the Modern Economic History of Africa South of the Sahara*, London: J. M. Dent and Sons Ltd., 1976, p. 128.

[2] After eleven years of construction, the Aswan High Dam across the Nile River in Egypt was completed on 21 July, 1970.

[3] W. E. I. Andah, N. van de Giesen and C. A. Biney, "Water, Climate, Food, and Environment in the Volta Basin", Contribution to the project ADAPT, Adaptation strategies to changing environments at http://www.weap21.org/downloads/ADAPTVolta.pdf, accessed on 11 December 2014, p. 3.

[4] Dams and large water reservoirs have the potential to alter natural ecosystems.

[5] For detail on how the LHWP benefitted South Africa more than Lesotho see M. Ginster, C. Gouws, C. M. Gouws, H. Maki, R. Mathipa, S. Motloung, M. Nyandoro and J. W. N. Tempelhoff, "Views on unlawful water abstractions along the Liebenbergsvlei River, South Africa", *TD: The Journal for Transdisciplinary Research in Southern Africa*., Vol. 6, No. 1, July 2010, pp. 1-24.

[6] The World Commission on Dams (WCD) was a global multi-stakeholder body of civic society, scholars, private enterprise, professional associations and the government initiated in April 1997 (and firmly established in May 1998) by the World Bank and the World Conservation Union (IUCN) as a global forum for research and reporting about the environmental, social and economic impacts of the development of large dams. It established the most comprehensive guidelines for dam building. The WCD was established in response to the escalating local and international controversies over large dams and was mandated to review the development effectiveness of large dams and assess alternatives

an independent,[7] international and multi-stakeholder process. The WCD focused on addressing the controversial issues associated with large dams.

Before the establishment of large dams, it was assumed people lived in harmony with their environment. Such conjectures failed to take cognisance of the many taboos that existed about environmental use. The harmony that was assumed also ignored that there were floods, droughts and other afflictions even prior to the construction of these big water reservoirs. Allen and Barbara Isaacman's study on Cahora Bassa, for instance, includes a very insightful chapter on how people interacted with nature before the dam and why the harmonious relationship cannot be over-emphasised.[8] Nevertheless, the presumed harmony with environmental resource management paradigms in Zimbabwe and Lesotho that was believed to exist in the past was turned into an acrimonious affair with the resort to damming. Kariba dam was built in the Federal period for hydro-power generation, and the bulk of the power was for mining and industrial purposes. Its construction also created great potential for a large inland fishery.[9] In both the colonial and post-colonial periods, the building of dams using some salient design features was the only practical and realistic solution for increasing the energy security of countries based on the ideas and experiences of hydrologists, geologists, planners, engineers and people in many other fields.

In general, the need for a dam can be established by a predicted demand for water by urban, industrial, mining or agricultural development.[10] Dams are designed mainly to meet the needs and wants of the beneficiaries. Hence, the decision to build a dam is arrived at as an optimal engineering solution to satisfy a societal need. In particular, geophysical factors influence the location (site) of a dam project and the amount of water that any catchment can supply is dependent on its size, its rainfall, and its topographical features. Ecosystems should not be disturbed as this would tamper with environmental systems. Nevertheless, in some cases ecosystems were disturbed by imported engineering technology mainly from Europe. According to Water Rodney, Africans' conceptual and experiential linkages to their localities and regions were either ignored or discounted as projects and policies were conceived.[11]

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for water resources and energy development, and to develop internationally acceptable criteria, guidelines and standards for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams. See United Nations Environment Programme (UNEP) Dams and Development Project (DDP), "The World Commission on Dams" at http://www.unep.org/dams/WCD/, accessed on 12 December 2014; N. K. Dubash, M. Dupar, S. Kothari and T. Lissu, "A Watershed in Global Governance? An Independent Assessment of the World Commission on Dams (Executive Summary)", *Politics and the Life Sciences*, Vol. 21, No. 1, March 2002, pp. 42-62; WCD, *The Report of the World Commission on Dams: Executive Summary*, American University International Law Review, Vol. 16, No. 6, 2001, pp. 1435-1452 and *WCD Final Report* which comprised an innovative framework for planning water and energy projects intended to protect dam-affected people and the environment in order to ensure that the benefits from dams were more equitably distributed.

[7] The independence of the WCD has been debated in published literature and in the SADC Region.

[8] A. F. Isaacman and B. S. Isaacman, *Dams, Displacement, and the Delusion of Development: Cahora Bassa and Its Legacies in Mozambique, 1965-2007*, Athens: Ohio University Press, 2013, pp. 1-324.

[9] M. Kalumbu, "The Development of the Kapenta Fishing Industry in Kariba, 1967-2000", BA Honours dissertation, 2005, p. 1.

[10] NAZ, GEN-P/ELL, Eng. K. D. Elliott, *An Outline of the Design of Dams*, Paper presented to the 3rd Rhodesian Science Congress, 2-7 September 1974, Salisbury: Ministry of Water Development, 1974.

[11] W. Rodney, *How Europe Underdeveloped Africa*, London: Bogle-L'OuverturePublications, 1972, p. 316.

Often, the placement of these economic development projects disregarded social and environmental concerns. In many instances, indigenous knowledge and culture were ignored or even destroyed.[12] For Attwell although dams were initiated as useful innovations to promote development,[13] they can only be seen as important strategies that reduce risks and vulnerability for some, and increase insecurity for others. It should be acknowledged that dams have negative and positive impacts. Nevertheless, due to the negative environmental effects of these structures what were perceived as interventions (or means) to mitigate poverty for some nonetheless increased poverty among others (differential impact of dams) which is an important gap in policy which needs to be addressed.

Prior to the 1970s there were insufficient interdisciplinary studies on damming and the environment exploring many forms of complex geological, commercial/economic, economic historical, engineering and cultural issues associated with water (a vital and life-giving resource for all). This study, in part, attempts to help produce a body of literature on water and large dams which is not limited, but which pays attention to the combined natural and unnatural activities on the African continent's river systems. As illustrated by the excerpt at the beginning of this article, those who cannot remember the importance of the environment in examining the topic on damming are bound to repeat experiments that lead to its destruction and unsustainability. The complexity of the topic is underscored by the controversies that have emerged around large dams as these engineering marvels of the world create both possibilities and limitations for Zimbabwe, Lesotho and other countries.

Revisiting the "large dam controversy": Rationale and the legacies of large dams

Worldwide, over 45 000 large dams have been built, and nearly half the world's rivers are obstructed by a large dam.[14] The belief that large dams, by increasing irrigation and hydro electricity production, can cause development and reduce poverty has led developing countries (the Global South) and international agencies such as the World Bank to undertake major investments in dam construction. By 2000, dams generated 19% of the world's electricity supply and watered over 30% of the 271 million hectares of irrigated land worldwide. However, these dams were also responsible for displacing over 40 million people and altering the cropping patterns of most arable lands.[15] The distribution of the costs and benefits of large dams across population groups, and, in particular, the extent to which the rural poor have benefited, are issues that remain widely debated among the proponents and detractors of these ventures as differential social and environmental costs can be discerned.

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[12] P. W. Porter, "Wholes and Fragments: Reflections on the Economy of Affection, Capitalism and the Human Cost of Development", *Geografiska Annaler B:69*, 1987, pp. 1-14.

[13] R. I. G. Attwell, "Some Effects of Lake Kariba on the Ecology of a Flood Plain of the Mid-Zambezi Valley of Rhodesia" Extract from *Biological Conservation*, Vol. 2, 1970, pp. 189-196.

[14] E. Duflo and R. Pande, "Dams", *The Quarterly Journal of Economics*, Vol. 122, No. 2, May, 2007, pp. 601-646.

[15] World Commission on Dams, *Dams and Development: A New Framework for Decision-Making*, London: Earth Scan Publications, 2000.

According to Van Vuuren, for more than 3 000 years societies have diverted and dammed up rivers to meet their increasing water needs, but the subsequent high level of river regulation has come at a price for many countries' aquatic ecosystems. While large dams bring a myriad of benefits, from water supply to flood control, these man-made reservoirs have adverse effects on rivers and the flora and fauna which are dependent on them.[16] This view was reiterated by Ronnie Kasrils, the South African Minister of Water Affairs and Forestry (DWAF), in his 2000 keynote address to *The Southern African Hearings for Communities Affected by Large Dams* in Cape Town when he stated:

> Dams have resulted in loss of land, forests and resources. Fresh water fish have become endangered species, and extinct. The impact downstream has been devastating, and it has been estimated that [40 million or more] people world-wide have been flooded off their lands and out of their homes [displaced] by the construction of dams … The development is needed and we need it to conquer poverty, we need it to improve people's lives, but it needs to be properly thought through. [For a] development that has not considered the full consequences … [that] are often extremely far-reaching … we [often] find irreversible [devastating] situations.[17]

The observation by Kasrils, cited in Stott, Sack and Greeff, that freshwater fish were endangered species can be disputed as far as the Kariba Dam is concerned. It can be refuted on the grounds that there is evidence to the contrary especially considering the fact that the dam has witnessed the introduction of Kapenta in 1967, the Kariba Bream (Tilapia) and the Tiger fish which currently act as the basis for the fish-tourism industry. For Kalumbu, the move to turn fishing into a commercial activity transformed the nature of development in Kariba from a mere tourism-driven economy to one that would also be commercial Kapenta fishing driven.[18] It is, therefore, difficult to agree with the remaining section of the statement by the former South African minister because in Kariba, Kapenta, the Kariba Bream and Tiger fish have become major sources of livelihoods. Indeed, part of the minister's assertion shows that he was not right.

However, to a large measure, these sentiments by minister Kasrils attest to the fact that the "big dam" controversy which has been dormant for a while has once again become active pitting the opponents and supporters of grandiose dam projects. From the outset, it is necessary to grapple with the "interference with nature" argument. The school that advances this argument posits that the course of a river represents a natural regime; that the river and its environment including human habitations, settlements, forests, and the entire flora and fauna of the area form a natural ecological system; and that any interference with this is fraught with danger and must

[16] L. Van Vuuren, *In the footsteps of giants - Exploring the history of South Africa's large dams*, Water Research Commission: Pretoria, 2012, pp. 1-334.
[17] N. Stott, K. Sack and L. Greeff, *Once there was a Community: Southern African Hearings for Communities Affected by Large Dams, Final Report*, Wynberg: Environmental Monitoring Group (EMG), 2000 cited in M. B.Matli, "The Social Impact of a Large Development Project: Lesotho Highlands Water Project", MSc dissertation, Department of Geography, University of the Free State, December 2005, p. 3.
[18] Kalumbu, "The Development of the Kapenta Fishing Industry in Kariba, 1967-2000", p. 1.

be avoided.[19] What is generally not understood by non-dam engineering professionals, though, is that the size of a dam is generally dependent on the hydrology and topography of the site and each dam design optimises the prevailing topography and hydrology. If this results in a "big dam", then that will be the optimal solution. It should be noted that if one builds a small dam in a large catchment area in Zimbabwe, worse still in Lesotho, for instance, it will silt up in less than 20 years. In engineering terms, a dam site is optimised if the storage ratio of the resultant dam is at least 30%. The major proponents of the non-interference theory (school) include Ehrlich and Ehrlich who, in their work titled: *The Population Explosion*, especially the chapter on "The Big Dam", have argued against big dams because they were responsible for causing bilharzia and other water-borne diseases.[20] In summary, for Iyer, supported to a certain extent by Baijal and Singh, it is the distinguishing characteristic of humankind to modify the environment. He argues that the discovery and use of fire, the establishment of human settlements on the banks of rivers, the practice of agriculture: all constitute "interferences" with nature; hence, the avoidance of interference with nature is an impossibility.[21]

Environmentalist opposition to large dams is couched in the proposition that we do not really need dams. The statement that we can do without large projects, however, implies that we can manage with a combination of other measures such as local water conservation *in situ*, water harvesting, the use of groundwater, greater emphasis on rain fed agriculture, economic use of water and better water management among other measures. Iyer says, while all these things need to be done, it does not follow that they will be adequate for meeting the projected future demand for water.[22] It has always been an accepted proposition, for instance, that the vulnerable dependence of Indian agriculture on the vagaries of the monsoons must be reduced through the storage of water for irrigation.[23] With reference to irrigation schemes in the same country, Saleth tries to explain what she perceives to be a polar shift in India's valuation of large irrigation schemes when she argues that "Gigantic dams, once considered the temples of modern India, are viewed today as symbols of controversy".[24] Big dams often cause controversy due to the widespread impact on local communities, flood areas, changes in river ecosystems, geologic hazards, and regional water disputes. In spite of these effects, Iyer however argues that big or small

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[19] R. R. Iyer, "Large Dams: The Right Perspective", *Economic and Political Weekly*, Vol. 24, No. 39, September 30, 1989, pp. A107-A116.

[20] P. R. Ehrlich and A. H. Ehrlich, *The Population Explosion*, New York: Simon & Schuster, c1990, pp. 1-320. See also P. R. Ehrlich, *The Population Bomb*, Revised Edition, New York: Ballantine Books, c1978, pp. 1-226.

[21] Iyer, "Large Dams", pp. A107-A116 and P. Baijal and P. K. Singh, "Large Dams: Can We Do without Them?" *Economic and Political Weekly*, Vol. 35, No. 19, May 6-12, 2000, pp. 1659-1666.

[22] Iyer, "Large Dams".

[23] *Ibid*. See also S. Singh, *Taming the Waters: The Political Economy of Large Dams in India*, Delhi: Oxford University Press, 1997.

[24] R. M. Saleth, Review of B. D. Dhawan, "Big Dams Controversy: Economics, Ecology, and Equity, The Big Dams: Claims and Counter Claims", *Economic and Political Weekly*, Vol. 27, No. 30, July 25, 1992, pp. 1607-1609. N.B. Sometimes the world's most controversial hydropower dam projects are seen as dangerous waters. See Anon, "Dangerous waters - the world's most controversial hydropower dam projects", 12 June 2014 at http://www.power-technology.com/features/featuredangerous-waters---the-worlds-most-controversial-hydropower-dam-projects-4290847/, accessed on 12 December 2014.

dams are still necessary. This is so because dams serve multiple purposes as they are used for power generation, irrigation water, fisheries and flood control as in the Tennessee Valley in the United States of America (USA). Thus, he says large or minor reservoirs are necessary not only for India, but also for other nations in a similar predicament. In this regard, he has attempted a possible answer to the controversy by arguing:

> We cannot, on environmental grounds, say 'No' to large dams and reservoirs; nor can we, having regard to projections of demand and availability, accept the view that there is no need for such projects. We should certainly accord priority to the utilisation of the potential already created, the reclamation of the potential which has been lost through misuse, and a vast improvement in water management (including both economy in use and recycling).[25]

Nevertheless, given the wide ranging socio-economic and environmental impacts of large dams, still a variant to Iyer's suggestion can be sought from scholars such as Isaacman and Isaacman and Van Vuuren instead of sticking to his "right perspective".[26] It has its own merits which, however, should not negate the ecological perspective. On the whole, it is difficult to arrive at complete concurrence with Iyer's viewpoint.[27] Dams and particularly large dams are required to meet the increasing demand for water, food grains, flood control, supply of power and supply of carbon-free energy. However, there are apprehensions about the effects of hydro projects, especially large dams, on ecology and society and displacement of people.[28] It is important to balance current needs with long-term sustainable development as suggested by the World Commission on Dams (WCD), which addresses the controversial issues associated with large water installations.

The story of dams can be understood in terms of the modifications and adaptations to changing waterscapes on the one hand and in terms of human constructions and alterations of the hydrological[29] world on the other. Utilisation of the Zambezi and the Senqu (Orange) Rivers was intrinsically linked to power generation, food and other national security concerns by Zimbabwe and Lesotho respectively. However, very little heed was paid to the unintended but baleful or malevolent environmental consequences, social consequences and issues of environmental security wrought by these dam projects which led to loss of land, hunting grounds and some indigenous plant and animal foods due to flooding. Dams can harm the environment and people.[30] In Zimbabwe the affected communities have

[25] Iyer, "Large Dams".
[26] See Iyer, "Large Dams"; Isaacman and Isaacman, *Dams, Displacement, and the Delusion of Development* and Van Vuuren, *In the footsteps of giants*.
[27] J. Jairath, "Large Dams and Development: A Response to a Response", *Economic and Political Weekly*, Vol. 25, No. 45, November 10, 1990, pp. 2510-2512.
[28] P. Baijal and P. K. Singh, "Large Dams: Can We Do without Them?" *Economic and Political Weekly*, Vol. 35, No. 19, May 6-12, 2000, pp. 1659-1666.
[29] D. M. Rosenberg, P. Mccully and C. M. Pringle, "Global-Scale Environmental Effects of Hydrological Alterations: Introduction", *BioScience*, Vol. 50, No. 9, September 2000, pp. 746-751.
[30] The Tokwe-Mukosi flood disaster in early 2014 is a case in point.

complained against environmental pollution,[31] societal dislocation and unrealised benefits from the Kariba project. Similarly, in Lesotho the unfulfilled promises of development in the affected highland communities have attracted a wave of petitions, protests and lawsuits which confirm that the "big dam controversy" is still alive. Kariba and its associated impacts will be examined first because it predated the Katse and Mohale projects.

DAMS AND THEIR INTERACTION WITH HUMANS

Impact of the Kariba Dam on the Tonga and Korekore: Zambezi Valley, Zimbabwe

The Kariba Dam on the Middle Zambezi River at Kariba Gorge was constructed to provide for a substantial source of power (HEP) for the development of industries in Southern Rhodesia (now Zimbabwe) and for the expansion of the Northern Rhodesia (Zambia) copper-mining industry.[32] The dam, which was officially completed in 1959 and opened by the Queen Mother of England on 17 May 1960,[33] was given major priority ahead of the Kafue Dam project following considerable controversy when the Federal government of the two Rhodesias and Nyasaland (Malawi) decided in favour of development at Kariba.

Although originally conceived as a purely national project constructed to provide a functional reinforcement for the somewhat unsteady political structure of the Federal experiment, Kariba owed some part of its existence to international legal institutions in the form of a substantial loan from the International Bank for Reconstruction and Development (IBRD), now the World Bank (WB).[34] In terms of the loan agreement between the IBRD and the Federal Power Board, the WB provided US$80 million for the first stage of the scheme, estimated to cost a total of US$225 million or £80 million. At the time this was the largest loan made by the Bank for a single project.[35] The emphasis was on availing a financial facility to achieve specific settler economic and political objectives which negated any considerations for the environment and the impact of the water on the people residing along the Zambezi River.

At inception, the dam was the world's largest man-made impoundment[36] and perceived as a major technological miracle established at the Kariba Gorge site 398 km below the Victoria Falls (on the Zambezi River) - a famous tourist destination for local, regional and international visitors. However, Kariba reveals some of the ecological

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[31] W. C. Ackermann, G. F. White and E. B. Worthington, *Man-Made Lakes: Their Problems and Environmental Effects*, Washington DC: American Geophysical Union, 1973, pp. 3-40.

[32] W. H. Reeve, "Progress and Geographical Significance of the Kariba Dam", *The Geographical Journal*, Vol. 126, No. 2, June 1960, pp. 140-146.

[33] NAZ GEN-P/FED, *Kariba: Opening by Her Majesty Queen Elizabeth The Queen Mother, Tuesday 17th May 1960*, Federal Power Board, Salisbury: Rhodesian Printers Limited, Southern Rhodesia, 1960, pp. 1-40.

[34] R. H. F. Austin, "International Legal Aspects of the Kariba Project", W. M. Warren and N. Rubin eds., *Dams in Africa: An Inter-Disciplinary Study of Man Made Lakes in Africa*, London: Frank Cass & Co. Ltd, 1968, p. 146.

[35] *Ibid*, p. 155.

[36] The lake is 277 km long with a maximum breadth of 40 km.

calamities of dam construction which include diseases (health hazards) such as malaria, sleeping sickness and the snail-borne infection schistosomiasis (bilharzia).[37] These diseases, though, were not new. They were already there before the Dam was built. This is illustrated by the fact that some of the Kariba Dam workforce died from malaria. Besides, the lake is prone to earth tremors (earthquakes) because the Dam lies in the Great African Rift Valley which is tectonically active. This illustrates the lack of harmony with nature before the inception of the dam. Once constructed, Kariba was also vulnerable to flooding of the Gwembe Valley and other valleys of the Zambezi River. Recently, ecologists and scientists have warned of the serious damage to the environment as a result of such massive construction projects. For example, the Kariba Dam and other large dams create a loading of the earth's crust which produces earthquakes in areas where they were previously unknown. The power generating dam project also led to massive relocation of people and dislocation of traditional subsistence agriculture.[38]

From the beginning, the project was riddled by physical difficulties such as the tendering process for contracts, the opposition of the local peoples in the wake of the building of the artificial lake, the damage caused by the Zambezi floods and the activities of "Operation Noah" (the zoological rescue of animals and birds).[39] Lake Kariba's creation necessitated the resettlement or translocation of 56 000 people living in the Gwembe Valley.[40] The Gwembe Valley, bisected by the Zambezi River, is the home of the Gwembe Tonga and Korekore people who lived and farmed the rich alluvial soils of the annually flooded riverbanks. The creation of the lake dramatically altered the landscape of the Gwembe Valley. The lake's rising waters covered everything below 120 metres in elevation. The alluvial soils of the river fields so highly prized by the Tonga and the Korekore were lost. The flooding drastically reduced the amount of arable land available. The resources of the Upland Valley were strained by the influx of people moving in from the flooded regions and land pressure ensued as soon as relocation was completed. Intensified agricultural production was difficult due to insufficient land availability. The resettlement lands were less fertile than the river holdings and some of the relocated communities had already claimed all the available arable land just ten years after relocation.[41] The Tonga and their Korekore neighbours resented the loss of ancestral fields, cultivated for generations, as well as the loss of their homeland.[42]

The new fields demanded crop rotation and fertilisation practices which hitherto were not necessary on the fertile and fallowed valley fields. The land tenure system of the Tonga and the Korekore underwent great transformation during

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[37] BMJ, "Menace of Man-Made Lakes", *The British Medical Journal*, Vol. 1, No. 5845, January 13, 1973, pp. 62-63.
[38] T. Scudder, "Kariba Dam: The Ecological Hazards of Making a Lake", *The Unforeseen International Ecologic Boomerang*, pp. 68-72.
[39] D. M. Hughes, "Whites and Water: How Euro-Africans Made Nature at Kariba Dam", Journal *of Southern African Studies*, Vol. 32, No. 4, Heritage in Southern Africa, December, 2006, pp. 823-838.
[40] Jarosz, "Constructing the Dark Continent".
[41] D. Brokensha and T. Scudder, "Resettlement", N. Rubin and W. M. Warren (eds), *Dams in Africa*, New York: Augustus M. Kelley Publishers, 1968.
[42] E. Colson, *The Social Organization of the Gwembe Tonga*, London: Manchester University Press, 1960.

resettlement. Resettlement land was not subject to lineage claims and women's traditional rights to land were seriously curtailed since all new lands were derived from the husband due to men's claims to the lands they had recently cleared. Valley women were traditionally accustomed to cultivating their own fields, so loss of land was a great blow as women firmly fell under the authority of their husbands in a way hitherto unknown. Land was vested exclusively under the husband's control which meant divorced women and widows lost the fields they had cultivated over time.[43] There was insufficient resettlement land or water for either increased livestock production or commercial cropping.[44] Serious food shortages ensued. Kariba was a uni-purpose scheme and "(hydroelectric) power was the only consideration in the cost benefit analysis".[45] No ecological surveys of the lake basin or the relocation areas were initiated during the planning or construction period. The only exception was when the British government undertook some studies (i.e. agricultural surveys) on the Northern Rhodesian side, but generally scientific investigation before the building process was extremely scant by today's standards. In fact, all their fields/agricultural lands went under water or were flooded when the dam was built and women's rights were eroded particularly in the areas to which they were forcibly moved.

The Federal government viewed the lake as merely a by-product of the dam, relatively unimportant in itself, and the people requiring relocation as an expensive nuisance.[46] The result was, in the first year after resettlement, refusal by many people to plant their fields in protest and in the hope that the government would ultimately let them return to their original homelands. This was no longer possible because these lands were now under water or the dam had already flooded them out. Their expectations were therefore not realistic. Shelters, houses and granaries in the Gwembe Valley were burned down to discourage people from returning to their flooded old fields. Neighbours and relatives were separated by several kilometres of lake and bush. Clearly, the Federal government failed to inform both the Tonga and the Korekore about the permanence of the flooding by the dam. Furthermore, no compensation was ever given to these communities for the loss of their lands or wealth. The Federation's offer for assistance to the Tonga and Korekore for clearing the re-settlement lands or for building new homes was, thus, re-buffed by these groups and more vociferously by the Tonga as it was viewed with suspicion. One Tonga elder felt this seemingly kind gesture would lead to further social engineering by the Europeans in their area. In his words:

> We refused saying that if the Europeans helped us to make good houses then they would claim to own the houses and would try to tax us for them … they would try to tell us how we must live in [the new villages] … We do not want to live … according to rules which are strange to [us]. Here a man builds as he

[43] E. Colson, *The Social Consequences of Resettlement*, London: Manchester University Press, 1971, pp. 126-133.
[44] Colson, *The Social Organization of the Gwembe Tonga*.
[45] T. Scudder, "Ecological Bottlenecks and the Development of the Kariba Lake Basin", M. Taghi Far-Var and J. P. Milton (eds), *The Careless Technology*, New York: Natural History Press, 1972.
[46] Brokensha and Scudder, "Resettlement", p. 22.

> wishes, and within his homestead he follows his own law. We do not want regulations.[47]

Before the colonialists' decision to build the dam, the absence of such social engineering points to a Zambezi Valley environment which was assumed to be in complete harmony with nature, but evidence exists to illustrate that it is an erroneous view to presuppose that there was no environmental conflict before the dam was built[48] as evidenced by the fact that there were floods in the area, tsetse flies and periods of hunger to which Colson testifies.[49] For millennia, the lives of the people who inhabited the area around the site of the dam and along the alluvial deposits of the valley (which provided farming and hunting opportunities) depended on changing climatic conditions. According to Balon who has a romantic view of the valley, changes from wet to arid phases determined both river topography and the human culture of the area - a unique culture and a way of life intimately related to natural resources which was the people's common heritage.[50] For Reynolds, the lowland communities knew how to use the alluvial river margins for their crops as well as every edible plant and animal from their ecosystem.[51] Makaye also perceives the Zimbabwean Tonga as materially better off in the post-resettlement period than before. In other words, he argues that it is a misnomer to believe that the Tonga materially benefitted from the creation of Kariba.[52] Such sentiments were as consistent with the Merrie Africa approach propounded by Hopkins as they were also part of a similar romantic perspective of the valley as that of Balon.[53]

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[47] Colson, *The Social Consequences of Resettlement*, pp. 172-173.

[48] For Daschuk and Marchildon, before the 1970s putting water to "use" for the agricultural community rather than having it "wasted" as it travelled downstream was widely accepted as the best means to support economic development in the arid regions of the southern prairies of Canada. By the 1970s, however, this assumption was increasingly challenged. With a growing awareness of the inherent value and fragility of natural ecosystems, governments - particularly at the federal level - began to weigh the economic benefits of large-scale water diversion projects against their potential harm through formal environmental assessments. See J. Daschuk and G. P. Marchildon, "Historical Chronology of the Oldman River Dam Conflict" at http://www.parc.ca/mcri/pdfs/HistoricalChronologyoftheOldmanRiverDamConflict.pdf, accessed on 12 December 2014, p. 2 and C. Wallis, "Keeping the Oldman Rolling Along: The Courts as a Tool for Riparian Habitat Preservation", *Environment Network New*s, May-June 1993, p. 19.

[49] Colson, *The Social Consequences of Resettlement*. N.B. Colson's testimony, however, does not intend to relativise the extreme disruption that came with Kariba.

[50] E. K. Balon and A. G. Coche (eds), *Lake Kariba: A Man-Made Tropical Eco-System in Central Africa*, The Hague: Junk Publishers, 1974, pp. 51-101.

[51] B. Reynolds, *The Material Culture of the Peoples of the Gwembe Valley: Kariba Studies 3*, Manchester, Manchester University Press, 1968.

[52] P. Makaye, "The Economic and Social Consequences of the Creation of Lake Kariba upon the Tonga People with Particular Reference to the Zimbabwean Tonga, 1955-1994", BA Honours dissertation, 1995, p. 51.

[53] This Merrie Africa and indeed romantic view of the valley perceives the Tonga and Korekore inhabitants of the area as materially better off in the post-resettlement period than before. For an analysis of the Tonga see P. Makaye, "The Economic and Social Consequences of the Creation of Lake Kariba upon the Tonga People with Particular Reference to the Zimbabwean Tonga, 1955-1994", BA Honours dissertation, 1995, pp. 1-61. N.B. The myth of Merrie Africa imagines "the pre-colonial era [as] a Golden Age, in which generations of Africans enjoyed congenial lives in well-integrated, smoothly functioning societies. The means of livelihood came easily to hand, for foodstuffs grew wild and in

While the Kariba project brought employment to many people from Rhodesia,[54] the flooding of the valley meant the displacement and a new life and economy for the over 50 000 people who lived there.[55] Despite such projects spearheading economic growth, the destruction to the valley ecosystem was clear. At inception, some of the benefits that were promised, but never accrued to the displaced Tonga or Korekore communities included the development of irrigation and fish farming. Generally, it is important to differentiate between the Southern and Northern Rhodesian Tonga. In fact, in the south, people were just "dumped" far away from the reservoir (Kariba), whereas in the north, they had the right to return to the lakeshore (sometimes undertaking fishing) as there were significant differences in terms of compensation and post-settlement assistance. However, since the introduction of various fish species such as the Kapenta, the Kariba Bream and Tilapia, fish farming is now a flourishing activity. That is why the Lake Harvest company has been established in Kariba. The establishment of fishing firms like Lake Harvest are, therefore, providing local employment and contributing revenue to the fiscus.

Splendid as the Kariba project appeared to be, the local Tonga and Korekore population resisted it as they saw it as negatively interfering with their natural ecosystem. The envisaged benefits would be short-term and would be nullified by a long-term destruction of their environment after their forced removal from their original habitats under the aegis of the Native Land Husbandry Act (NLHA) of 1950/51. With the advent of the lake, in the dry season the changing climatic conditions compelled the government to deliver water to the resettled people. The lack of ample water and sanitation amenities and the public consternation arising from the plight not only of the "refugees", but also of the animals trapped on the 293 islands created by the rising waters of the lake caused a great deal of anxiety among the resettled population. Their grievances were tapered by provision of a two-year government subsidy (relief) for essentials such as grain and medicines as well as a short-lived boost in fish production of the Barbel, Bream, Chessa, Kapenta, Nchila, Sardines and Tiger to name a few.[56] By the time the lake began to stabilise and the catches of local species decreased, that is, before the introduction of the three major fish species (Kapenta, Tiger and Tilapia),[57] the people who had expected sustainability and benefits to filter from the project started to count their losses as the once deemed natural and harmonious ecological landscape presented new and insurmountable challenges. Man no longer seemed to be part of the ecosystem due to the intrusions on the social and ecological harmony never experienced before.

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abundance, and this good [fortune] enabled the inhabitants to concentrate on leisure pursuits …" However, Hopkins attacks the Merrie Africa thesis. Details on the Merrie Africa approach can be gleaned from a review of Hopkins by Dalton. See G. Dalton, Review of A. G. Hopkins, *An Economic History of West Africa*, *African Economic History*, No. 1, 1976, pp. 51-101.

[54] The project actually used a lot of contract workers from Malawi who laboured under extremely exploitative conditions. Probably half of the workforce was recruited like that. See J. Tischler, *Light and Power for a Multiracial Nation: The Kariba Dam Scheme in the Central African Federation*, (Cambridge Imperial and Post-Colonial Studies), New York: Palgrave Macmillan, 2013, pp. 1-323 especially Chapter 4.

[55] Balon, "Kariba", p. 44.

[56] ZG3/LAK44, *1980 Fisheries Statistics: Kariba, Lake Kariba Fisheries Research Institute (LKFRI) Project Report*, No. 43, Department of National Parks and Wild Life Management Zimbabwe, July 1981, pp. 1-91.

[57] It can be noted that a dramatic decline in fish stocks mainly occurred in the 1990s when fishing licence permits were tempered with.

Clearly, the Kariba Dam project led to widespread flooding and environmental and social damage of a once dignified ecosystem[58] - an ecosystem which was premised on long-time indigenous experience with water management systems. The electricity generated at Lake Kariba, Kafue or Kebrabassa (Cahora Bassa) dams simply accelerated the exploitation of non-renewable resources for the benefit of the industrialised Western world. To a large extent, the assertion that Kariba benefited the industrialised western countries is true for the mining companies, but it is important to note that the (local) settler government also had vested interests. For Zambia, the energy generated by Kariba led to the fast depletion of the country's copper resources and it was mostly out of the people's reach. For Balon, the Kariba hydroelectric scheme is an example of how large dams built in vulnerable ecosystems can irreversibly upset the ecological balance of entire regions as developing countries' delicate and vulnerable environments are exploited in pursuit of the goals of industrialisation.[59] Nevertheless, there were benefits that accrued from the flooding of the dam. For example, the Lake Harvest firms and tourism which emerged following the construction of the dam generated employment. A mixture of similar and different social and environmental consequences have been experienced by Lesotho as a result of the commissioning of the LHWP.

LHWP: An Example of Engineering Ingenuity and Effects of LHDA Dam Projects

In October, 1986, the Lesotho Highlands Water Project (LHWP) was sanctioned following an agreement which made provision for the development of the scheme.[60] The LHWP is one of southern Africa's largest engineering enterprises built in the mountain kingdom. Infrastructural work on the Maluti project commenced in 1988 after the signing of the 1986 Treaty which ushered in an unequal relationship in water transfer in favour of South Africa. At the commencement of the project, for the people who were going to be affected, there were various perceptions, fears and feelings about "being made to emigrate".[61] The welfare of the highlands inhabitants who were affected by the construction of dams and related infrastructure is covered under Article 7 of the Highlands Water Treaty and in the Lesotho Highlands Development Authority (LHDA) Order of 1986. Both pieces of legislation required the LHDA to ensure that the quality of life of the communities affected by the activities of the Project did not fall as a consequence of such activities and that their "standard of living and income … shall not be reduced from the standard of living and the income existing prior to the displacement of such persons".[62]

[58] Balon, "Kariba: The Dubious Benefits of Large Dams".
[59] *Ibid*.
[60] M. Ginster et al, "Views on unlawful water abstractions along the Liebenbergsvlei River, South Africa", *TD: The Journal for Transdisciplinary Research in Southern Africa*, Vol. 6, No. 1, 2010, pp. 1-24.
[61] M. Thabane, "Shifts from Old to New Social and Ecological Environments in the Lesotho Highlands Water Scheme: Relocating Residents of the Mohale Dam Area", *Journal of Southern African Studies*, Vol. 26, No. 4, Special Issue: African Environments: Past and Present, December 2000, pp. 633-654.
[62] The Lesotho Highland Development Authority Order, 1986 cited in Lesotho Highlands Development Authority, "Resettlement and development action plan", *Environmental Action Plan*, Vol. 3, October

The LHWP started with Phase 1A which was followed by the implementation of Phase IB. Infrastructure development further entailed facilitating transport and communication and the smooth delivery of a myriad of other social services which, *inter alia*, included access roads, power supply lines, winter sports and other forms of recreation",[63] telecommunication systems and housing. These did not only improve accessibility for the LHWP, but also facilitated tourism. That before and after 1998, when water from the LHWP started to flow to South Africa, Basotho life was and continues to be transformed in many ways is indisputable.

What can be disputable is that bigger scholarly debates than ever before have been engendered by the contention that the benefits accruing from this engineering ingenuity are overshadowed by the losses in respect to the environment both in terms of quantity and quality. The colossal investment injected into the LHWP by the government of Lesotho, Britain and the World Bank is indeed dwarfed by the socio-economic and environmental consequences and controversies brought by this project's hydro-politics.[64] For Mwangi, the hydro-strategic interests of the political elite of South Africa and Lesotho far outweigh social and environmental considerations in Lesotho, thereby constituting a threat to human security.[65]

The project, anticipated to transfer 2 200 million cubic metres (mcm^3) of water per annum[66] from Lesotho to the Republic of South Africa through the Vaal River conveyance channel, was envisaged in the Treaty as a four-phased development to be achieved in a 30-year period. Phase 1A comprised a giant dam at Katse in the central Maluti Mountains and an 82 km transfer and delivery tunnel system reaching to the Ash River Outfall structure across the border in South Africa. Muela hydropower station and associated structures were completed in 1996.[67] Phase IB has also been completed and comprises Mohale Dam, a 145-metre high concrete-faced rockfill dam on the Senqunyane River some 40 km south-west of Katse; a 32-kilometre long transfer tunnel between Mohale and Katse reservoirs, a 19-metre high concrete diversion weir on the Matsoku River and a 56-kilometre long tunnel.[68] The entire project was estimated to cost US$8 billion (about R480 billion) whilst Phases 1A and IB cost approximately $2.5 billion and $1.5 billion respectively. The remaining three phases (II, III and IV) have not yet been implemented.[69] On completion, the 185 metre-high Katse Dam (Phase 1A) was expected to transfer water to the Gauteng region of South Africa at a predetermined price by the South African government

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1997, p. 3. See also Thabane, "Shifts from Old to New Social and Ecological Environments in the Lesotho Highlands Water Scheme", p. 645.

[63] G. Leistner, "Prospects of Increasing Regional Co-operation: A South African Perspective", *Africa Insight*, Vol. 25, 1995, p. 59.

[64] A. Turton, "Hydropolitics: The Concept and its Limitations", A. Turton and R. Henwood (eds), *Hydropolitics in the Developing World: A Southern Africa Perspective*, Pretoria: African Water Issues Research Unit, 2002, p. 16.

[65] O. Mwangi, "Hydropolitics, Ecocide and Human Security in Lesotho: A Case Study of the Lesotho Highlands Water Project", *Journal of Southern African Studies*, Vol. 33, No. 1, March 2007, pp. 3-17.

[66] *Ibid*.

[67] *Ibid*.

[68] *Ibid*.

[69] A. Tanner, S. Tohlang and P. van Niekerk, "An overview of the engineering components of the proposed Phase II Lesotho Highlands Water Project based on the feasibility study", *Civil Engineering*, Vol. 17, No. 5, June 2009, pp. 28-35.

denoting an unequal relationship because the people who were losing were not the ones determining the price of water. About 26% of the project's total envisaged water delivery was available to the Vaal region on completion of Phase 1A.[70]

Invariably, South Africa monopolised the bi-national Lesotho Highlands Water Project thereby implying that the Republic of South Africa's water security lay beyond the country's borders. Most of the water used for irrigation by the country's farmers in the Free State and for industrial and other purposes by Gauteng, Mpumalanga and the North West Provinces is delivered from Lesotho through the Wilge, Liebenbergsvlei and Vaal River conveyance systems.[71] This, though, was at variance with public policy pronouncements that the Katse and Mohale dams were built for the benefit of Lesotho. The benefits were to be derived from the use of water, electricity and employment creation, but more importantly for the mutual benefit of both States, among other things.

In return for transferring water to the Republic, Lesotho benefitted from ancillary developments, in particular, revenue accruing from fixed royalties of about $55 million per annum for Phases 1A and IB.[72] Additionally, the government of Lesotho established a special Development Fund in terms of Legal Notice No. 91 of 1992. The fund was used to invest and save all the royalties and 75% of other water-transfer-related payments. These huge investments could, however, not help compensate the Basotho for the socio-economic and environmental problems they suffered as a result of the implementation of the LHWP installations. Indeed, the safety of these engineering installations is a much neglected but important issue.

Besides, there was no deliberate effort on the part of the government to give priority to highland communities in its strategy to use the fund created in 1992 for purposes of poverty alleviation and as a social cushion against the adverse effects of the LHWP.[73] Whilst it was expected that the Muela Hydropower Station would help Lesotho to avoid 98% of electricity imports from South Africa,[74] the direct and indirect impact of the project on the poor social classes in the Highlands regions was great. As enunciated in the 1986 LHWP Treaty, the LHDA failed[75] to ensure that local highland communities were not affected by flooding, construction works or other project-related causes. They were neither compensated by the Authority nor accorded a standard of living that was not inferior to that obtaining at the time of the first disturbance.[76] Consultation with the grassroots was not only missing, but it often

[70] African Development Bank, *Regional Economic Co-operation in Southern Africa*, Mimeo, 3, 1993, p. 195. cited in K. Matlosa, "Changing Socio-Economic Setting of the Highlands Regions as a Result of the Lesotho Highlands Water Project", *Transformation*, 37, 1998, pp. 29-45.

[71] South Africa, Department of Water Affairs and Forestry, Vaal River system: large bulk water supply reconciliation strategy: first stage reconciliation (DWA, Pretoria, 2006), Appendix A-2. See also Ginster et al, "Views on unlawful water abstractions along the Liebenbergsvlei River, South Africa".

[72] Mwangi, "Hydropolitics, Ecocide and Human Security in Lesotho", p. 3.

[73] World Bank, *Lesotho Highlands Water Project: Questions and Answers*, Washington DC: 1995, p. 1.

[74] World Bank, "Lesotho Highlands Water Project", *Staff Appraisal Report No 8853-LSO*, Washington DC: 1991.

[75] LHDA, "The Economic and Social Aspects of the Project: An Update", Presentation to the *NGO Workshop on the Lesotho Highlands Water Project,* Maseru: November 11-12, 1997.

[76] *LHWP Treaty*, 1986.

operated at different levels between the project administration (authorities) and the intended beneficiaries of the project. The project has not always positively impacted[77] on many Basotho lives due to loss of arable and grazing land, as well as the resettlement and relocation of about 3 000 households under Phase 1A following the inundation of the area by the Katse reservoir.[78] In carrying out this work, therefore, no Basotho representatives from the grassroots were included especially in the planning process.

Relocation of households due to flooding has negatively affected people around the Katse Dam. The Maluti Mountains and the dam water are extremely cold throughout the year. It is not safe to go near the dam as people have died from drowning in freezing water temperatures. However, this is a climatic phenomenon and cannot be attributed to the dam, but the reality is that cattle and many other animals have been "swallowed" by the dam. Water has flooded the land which was the Basotho's main source of firewood. Firewood, fertile river banks, croplands and good pastures are no longer plentiful and there is no peace of mind for some members of the community. The dam has also resulted in lost family ties as families now live far apart and people cannot attend the funerals of relatives and friends because of the water. Phase IB (which houses the Muela HEP Station) displaced approximately 1 000 and 2 000 people most of whom were household heads because of the construction of the Mohale Dam. With these projects, valuable food-producing land and livestock grazing lands (pastures) were lost.[79] The widespread loss of land has prompted highland communities affected by Phase IB to demand what has been termed a "land-for-land compensation".[80] The issue of any compensation was mainly considered in response to the protests by the displaced inhabitants of the area. The lack of land, social security, health and other amenities was exacerbated by the environmental challenges associated with these two major phases of the LHWP.

Land degradation is rampant throughout Lesotho, with some areas now bare of any soil available for erosion. The extreme environmental degradation caused by the LHWP which entailed soil erosion and overgrazing as a result of settling people in adjacent, but overcrowded lands, coupled with the lack of an effective Environmental Impact Assessment (EIA)[81] and the failure to produce an Environmental Impact

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[77] Some positive impacts have, however, been witnessed with the provision of electricity and employment among other things.

[78] M. Khitsane, "Issues of concern about the impact of the Lesotho Highlands Water Project on affected communities", Paper delivered at the *Lesotho Highlands Water Project Workshop,* Johannesburg: August 29-30, 1996.

[79] J. Gay, D. Gill and D. Hall (eds), "Lesotho's Long Journey: Hard Choices at the Crossroads", Maseru: *Sechaba Consultants*, Mimeo, 1995, p. 61.

[80] Matlosa, "Changing Socio-Economic Setting of the Highlands Regions".

[81] An Environmental Impact Assessment (EIA) is an administrative technique designed specifically to resolve environmental problems. It provides a systematic process for the evaluation of the anticipated environmental impacts, including social, political and cultural factors, from a proposed development (e.g. a dam, power station etc). The explicit aim of EIA is to encourage the developer, whether government department or private company, to incorporate environmental considerations into its decision-making processes. The USA led the way in the use of EIA when its *National Environmental Policy Act* of 1969 required that an Environmental Impact Statement (EIS) accompany all major legislative proposals or federal actions that might affect the human environment. See N. Carter, *The*

Statement (EIS)[82] for Phase 1A worsened the situation of the affected communities. This confirms the merit of the argument that large dam projects invariably cause adverse environmental effects requiring major solutions. For example, referring to the environmental effects of large dams Postel argues that

> Large dams and river diversions have proven to be primary destroyers of aquatic habitat, contributing substantially to the destruction of fisheries, the extinction of species, and the overall loss of the ecosystem services on which the human economy depends. Their social and economic costs have also risen markedly over the past two decades.[83]

In Lesotho, a variety of wild flora and fauna in the Maluti Mountains was never protected initially until a botanical garden was created. Whilst no comprehensive EIA was conducted prior to Phase 1A, it is partially gratifying to the affected communities to note that in order to avoid the mistakes of the initial phase, the World Bank imposed a condition for the financing of Phase IB.[84] The World Bank actually made it clear to the governments of Lesotho and South Africa that the funding of Phase IB was contingent on effective implementation of the Phase 1A Environmental Action Plan (EAP) in addition to the EIA and an economic evaluation of Phase IB in order to facilitate the start of the appraisal process.[85] It is, however, ironical that in spite of the World Bank and its Western financiers being some of the pioneers of Kariba and the LHWP's ecosystem destruction they are now in the forefront of environmental conservation and preservation not only in Africa, but also in their own countries. In fact, the EAP and EIA that were demanded comprised key elements of the Rural Development Programme (RDP). The success or failure of the RDP will need to be evaluated in a separate enquiry.

Conclusion

The foregoing discussion has demonstrated that large dams in Zimbabwe (Kariba) and Lesotho (Katse and Mohale) are more in acrimony than the assumed harmony with social and environmental resource management paradigms. It raises so many questions than answers about large dam projects and their impact on a country scale. One does not want to imagine the economic, social and environmental outcome for the people of the Zambezi Valley and the Highlands if more water projects of a similar magnitude were undertaken in the future. Currently, Zimbabwe and Zambia are jointly planning the Batoka hydropower dam project through the Zambezi River

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Politics of the Environment: Ideas, Activism, Policy, Cambridge: Cambridge University Press, 2001, pp. 263-64.

[82] An Environmental Impact Statement (EIS) is a non-technical report based on extensive consultation with a wide range of affected government agencies, professional experts, interest groups and the public. See Carter, *The Politics of the Environment*, p. 264.

[83] S. L. Postel, Water for food production: Will there be enough in 2025? *BioScience*, Vol. 48, 1998, p. 636.

[84] Hunting-Consult 4 Joint Venture, "Environmental impact assessment for Phase IB", *Consultancy Report,* Maseru: LHDA, 1996.

[85] World Bank, *Lesotho Highlands Water Project: Questions and Answers*, Washington DC: 1995, p. 13.

Authority (ZRA)[86] and the expansion of the Kafue Scheme bearing in mind the environmental, social and economic lessons we have learnt from the schemes discussed in this paper. The ZRA is also planning the upcoming rehabilitation of the Kariba Dam complex, which will be funded by the Zimbabwe and Zambian governments, with support from the European Union (EU), World Bank, African Development Bank and individual European countries like Sweden.[87] Based on the lessons derived from the Kariba, Katse and Mohale dam projects, the loopholes of previous EIA plans should be avoided in the Batoka project so that questions are not asked about the real social and environmental benefits of the project as happened with Kariba, Katse and Mohale dams. Clearly, at inception of these projects there was an obvious utilisation plan for that water which seemingly did not anticipate potentially baneful challenges to economic growth, environmental and social justice or equity issues. Thus, the positive contribution of dams and damming to human life seems to have been over-emphasised to the detriment of attendant environmental consequences and costs. Broadly conceived, large dams are major unnatural processes that have shaped the natural environments along major river valleys and people's responses to the changes. Kariba and the LHWP, therefore, constitute massive dam projects which have caused deleterious environmental consequences as well as upset not just people's value systems, but also their very livelihoods.

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[86] The Batoka scheme will be built under the auspices of the Zambezi River Authority (ZRA). The ZRA is a bi-lateral organisation between Zimbabwe and Zambia mandated to manage the Zambezi River and come up with strategies of ensuring that electricity is always available. The organisation aims to ensure that there will be no disruption to electricity supply due to any problems from water and flooding. In addition, the project is expected to create employment for about 3 000 people from both Zimbabwe and Zambia. Rafting companies also seek to provide employment through rafting activities. * The Batoka hydropower project, on completion, will have a 181 metre high dam wall that will hold back 1 680 million cubic metres of water, covering an area of approximately 26 square kilometres. See R. Ngwenya, "Batoka to employ locals", *Southern Eye*, Thursday, December 11, 2014, p. 4.

[87] Ngwenya, "Batoka to employ locals", p. 4.