

The Downstream Impacts of Ethiopia's Gibe III Dam

East Africa's "Aral Sea" in the Making?



Fishers with their catch, Lake Turkana 2012. Photo: Jane Baldwin

The author of this paper is a natural scientist with many years of field experience in the region. He wishes to remain anonymous. For a list of prominent academics and experts who have read and endorsed this paper, see the last page of this paper.

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Introduction

If Ethiopia completes the Gibe III Dam, now under construction on the Middle Omo River, and continues to press ahead with large-scale irrigation developments in the Lower Omo Basin, the result will be a cascade of hydrological, ecological and socio-economic impacts that will generate a region-wide crisis for indigenous livelihoods and biodiversity and thoroughly destabilize the Ethiopia-Kenyan borderlands around Lake Turkana. The long-term effect could parallel what has happened to Central Asia's Aral Sea, one of the planet's worst environmental disasters. This African crisis is fast becoming an issue that will increasingly engage the international community.

This paper summarizes the technical and scientific evidence derived from decades of high-quality research on and around the lake by local and international specialists, as well as recent studies of current threats. It then reviews expected consequences of a variety of potential strategies that might be pursued by various actors to oppose or moderate these threats.

Lake Turkana's Dependence on the Omo River Floods

Lake Turkana is the world's largest desert lake, and one of the planet's oldest. It occupies two connected troughs in the Gregorian Rift of Northern Kenya.¹ Now a basin without outlet to the sea, in wetter times Lake Turkana was much larger and connected northwards with the Nile system through swamps in the Ethiopia-Sudan borderlands. To this former connection it owes most of its Nilo-Soudanian fish species,² but for the past 7,500 or so years it has been a closed system.³ The lake's fluctuating levels therefore largely reflect the level of run-off from the rainy season over Ethiopia's southern highlands which flow into the Omo River, from which the lake currently receives nearly 90% of its annual water inflow.⁴ In runs of wetter years the lake level rises, and in drier years it falls, and in the course of the twentieth (as earlier) centuries it has alternated wildly. Every year the desert winds that whip across the lake cause around 7% of its total volume to evaporate, which is subsequently replaced by the Omo inflows. These fluctuations, driven by evaporation and river inflow, in turn drive the lake's ecology.⁵ The waters in this giant ancient lake last an average of only 13 years from in-flow to evaporation. The system is easily destabilized.

Since the lake has no outlet, it accumulates salts washed in by the Omo and its minor tributaries as well as those from recent volcanic activity.⁶ Fortunately, mechanisms probably driven by planktonic fixation (as well as sediment/water interactions) causes salts to be largely deposited on the lake floor. By one calculation, 97% of the salts deposited in the lake by the Omo since it was cut off from the Nile have been removed from the water column in this fashion.⁷ This has prevented an accumulation of salts that would make these waters undrinkable, and enables them to continue to remain productive and support considerable biodiversity. Evaporation each year increases the concentration of salts, especially in the

¹ C.S. Feibel "A Geological History of the Turkana Basin" *Evolutionary Anthropology: Issues, news and reviews* Vol 20 (6), pp 206-216, 2011

² Some thirty of its 49 species of fish are Soudanian as per Hopson et al., *A Report of the Findings of the Lake Turkana Project*, ODA London, 1982 (six volumes). (Recent studies have uncovered another dozen species present: Ojwang et.al. *Lake Turkana: fisheries, people and the future*, Kenya Marine and Fisheries Research Institute, 2007)

³ "Lake Turkana and its link to the Nile" in *The Nile: Origin, Environments, Limnology and Human Use*, Ed. H.J. Dumont, Springer, 2009

⁴ Ferguson, A.J.D and B.J. Harbott, "Geographic, physical and chemical aspects of Lake Turkana" in *A Report of the Findings of the Lake Turkana Project* Ed. A.J. Hopson, ODA London, 1982 (six volumes)

⁵ A comprehensive synthesis of the hydrology of Lake Turkana is provided by Sean Avery in his *Hydrological Impacts of Ethiopia's Omo Basin on Kenya's Lake Turkana Water Levels & Fisheries*, a report prepared for the African Development Bank, November 2010. Avery has since produced a second and even more thorough analysis that extends the earlier work to document what would happen under the major irrigation projects under development, *Lake Turkana & the Lower Omo: hydrological impacts of major dam and irrigation developments*, African Studies Centre, the University of Oxford, 2012.

⁶ Beadle, L.C. (1981) *The Inland Waters of Tropical Africa*, Longman, UK

⁷ Hopson et al. (1982) present these numbers a different way: the salinity levels are only reflect a 600 year old lake.

shallow productive areas, reducing their suitability for fish, until the Omo floods bring new fresh water into the lake. Any reduction of the flow of freshwater into the lake increases its salt concentration. Relationships between water chemistry and the composition and productivity of its plankton species in lakes like this are rarely linear. It is likely that if the concentration of salts in Lake Turkana were to pass a certain threshold – a point that is hard to predict – the biotic and chemical mechanisms currently precipitating out these salts would be interrupted, leading to an accelerating and undesirable level of salinity, with potentially catastrophic consequences for people and biodiversity in the lake.

Lake Turkana's ecosystems go through a dramatic annual cycle driven by the Omo flows at its northern end. The floods bring fresh water full of silt, organic matter and nutrients (most importantly nitrogen). The floods are big enough to raise the level of the lake, and rising waters along its shoreline release nutrients from the soil along the banks, as well as from the dung of the animals that access water and graze the plants growing on the retreating lake margin. These fresh nutrients and the reduction in salinity provide conditions for a bloom in microscopic plants and algae that provides the basis for the lake's food chains. Meanwhile, the rising water level floods the Omo delta itself and the bays and shallows around the lake create an ideal habitat for foraging and breeding fish species among the dense architecture of bankside vegetation in the shallows and riverine floodplain.⁸

These seasonal breeding cycles also create opportunities for fishermen, birds and crocodiles to catch fish in near-shore areas during and after their reproduction. Studies of the fishery show that nearly all of the commercially important species are dependent on these floods for their breeding cycles, and by far the largest individual fisheries are found in seasonally flooded shallow bays such as Ferguson's Gulf, which alone accounts for nearly half of the commercial production on the Kenya side of the lake. In addition to supporting the breeding cycle, the sediment and nutrient-rich floodwater plumes provide fish “cover” to access productive surface waters in the main lake area. In years of poor floods and shrinkage of the lake, there are immediate declines in ecosystem productivity. The loss of this flood cycle would therefore lead to significant reductions in fish populations and catch. There would be unpredictable changes in the numbers of fish belonging to different species and knock-on effects throughout the lake's ecology, affecting everything from fish-eating wild animals and lake-shore grazing of domestic and wild animals.

Why Dam the Omo?

The Ethiopian government has staked its political future on achieving highly ambitious economic growth targets and shifting the country to an urbanizing industrial economy. One of its major endeavors, Gibe III, at this writing about half-complete, will be the highest dam in Africa. Together with already built Gibe I Dam and Gibe II power station (which draws its water from the Gibe I reservoir) and the yet to be built Gibe IV and V, it is expected to transform the Omo Valley into an agro-industrial powerhouse.

Originally conceived in the mid-1990s, and encouraged by international development agencies, the Ethiopian government moved toward implementation of the Omo hydrological project in the late 2000s. After the striking success of opposition parties in the 2005 election, a phase of democratization in Ethiopian politics came to an abrupt end. Since then the Government has staked its political future on highly ambitious economic growth targets and a shift to an urbanizing industrial economy. In this the land

⁸ Lake Turkana's fisheries ecology has been well studied by the British ODA's Lake Turkana Fisheries Project (1972-75) and then the NORAD/University of Bergen project in 1986-87. Particularly germane is the work of Jeppe Kolding who sought among other things to document and understand the hydrological drivers of instability in the lake caused mainly by changing Omo flood patterns (for example “Changes in species composition and abundance of fish populations in Lake Turkana, Kenya” in *The Impact of Species Changes in African Lakes* Eds. Tony J. Pitcher and Paul J.B. Hart, Chapman and Hall, London, 1995). In recent years new research by Kenyan researchers is diversifying the technical methods necessary to understand changing distribution and abundance and the terrible risks of ending the annual floods (e.g. Musks, M. et al. “The last snapshot of natural pelagic fish assemblage in Lake Turkana, Kenya: a hydroacoustic study”, *Journal of Great Lakes Research* 38 (1), 2012, pp 98-106

and water resources of the Ethiopian lowlands are seen as critical, and the modes of livelihood of their traditional occupants are largely perceived as an obstacle to progress.

In seeking this transformation, the political leadership in Ethiopia has narrowed the space for political pluralism and civil rights introduced during its first 15 years in power. Foreign aid flows support the current state-centered model of development, but the government has invoked nationalist principles to prevent Ethiopian civil society organizations from accessing international funding for work in the field of governance and rights.

A central plank in the government's current development strategy is to allocate land (especially irrigable land) to foreign investors and to members of the Ethiopian political elite. Resistance to this expropriation is suppressed; and coverage by local and international media discouraged.⁹ The government benefits from close relationships with western donors, relying on long-term development support from the United States, the United Kingdom and the European Union. Ethiopia maintains a high level of international diplomatic engagement on issues from agriculture to climate change, delivering political benefits to its allies that include visibility for European leaders in tackling African poverty.

The Omo dams are seen by the Ethiopian government as a key means of modernizing the country and extending its control over a region rich in water and land resources (and likely oil and other minerals), strategically located on its borders with South Sudan and Northern Kenya. The sale to Kenya of a significant proportion of the electricity to be produced by the Gibe project is seen as part of the financial planning of the development (Ethiopian consumers cannot alone cover the project's costs), as well as enabling greater integration with a more developed neighbor. To the Ethiopian government, the dam will also enable the development of large-scale agro-industries to meet expanding consumer markets, especially an anticipated surge in the export of sugar.¹⁰ Extensive tracts of savannah traditionally used for pasturage in the Lower Omo have also been allocated to foreign firms for the production of *Jatropha* for biofuels.

After many years of trying to support the modernization of peasant agriculture, and despite high-level engagement with the Gates Foundation and the Alliance for a Green Revolution in Africa, the dominant view of the Ethiopian political elite now is that it will be large estates, not smallholders, who will transform production and economy. Many of the country's leading families, especially Tigrayans, have the capacity and drive to explore this as they leave formal political leadership. Areas like the Lower Omo have been cast as hopelessly stagnant, where the only solution is to replace their inefficient systems, above all the culture of traditional pastoralism.¹¹

Similarly, in the government view, unregulated floodwaters are seen as an obstacle to national modernization. The failure of a poorly conceived program by the Dutch African Parks Foundation to privatize the game reserves and build a conservation-based economy without local participation (2004-2007)¹² significantly undermined the government's confidence that there were alternatives to plantation agriculture, and perhaps contributed to the decision to excise land from the parks for sugar production. In

⁹ "Peace, Bread and Land: agricultural investments in Ethiopia and the Sudans", Jason Mosley, Chatham House (UK), January 2012; and Oakland Institute *Understanding Land Investment Deals in Africa. Country Report: Ethiopia*, 2011

¹⁰ Extensive savannah traditional pastures have also been allocated to foreign firms for the production of *Jatropha* for biofuels in the Lower Omo.

¹¹ Mr. Abera Deressa from the Ethiopian Commodity Exchange well articulates the Government perspective on this: "... at the end of the day, we [do] not really appreciate pastoralists remaining in the forest like this...pastoralism is not sustainable...we must bring commercial farming, mechanized agriculture, to create job opportunities to change the environment." BBC Interview, November 2010 (quoted by the Oakland Institute, 2011)

¹² For key documents and how this fitted in to the wider history of conservation in the region see <http://www.mursi.org/national-parks> (accessed November 18, 2012)

short, the Ethiopian leadership now sees itself as engaged in a kind of “Great Leap Forward” as a nationalist prerogative. Government rhetoric is shaped substantially by its re-assertion of Ethiopian rights over the Nile waters, which under the Nile Waters Agreement of 1929 were assigned primarily to Egypt, Ethiopia sees its sequestering of water and other resources as a regional re-balancing of power in respect to its neighbors.

The Ethiopian authorities have categorized criticism from international environmental, human rights and development agencies as attempts to prevent the country’s efforts to escape from poverty. The peoples of the Omo Valley themselves are unable to represent their own views on all of this to Ethiopia’s leaders or to the development agencies. On the government’s Gibe III website, the head of the Ethiopian Environmental Protection Agency is reported as describing the end of flooding as beneficial: “The Gibe III dam never dries the Lake Turkana because the water will continue to flow and reach Lake Turkana opponents criticize the project without knowing the specificity of the gorge and location of the site. I would not be surprised if there were some who don’t want for the country to develop ... The interest behind the adverse comment against Gibe III Dam is ignorance”¹³

The Dam and the Lower Omo

The Omo River drains the central southern highlands of Ethiopia, pouring out through a series of gorges a huge volume of water and sediment into the Lower Omo floodplain. The floodplain is largely an extension of what was, up until a few thousand years ago, the north end of Lake Turkana, gradually filled by the southward extending delta. This floodplain traverses a semi-arid to arid savannah and its nutrient rich floods provide a rich annual resource for wildlife, fish and people alike over a vast and variable area. The numerous Omo Valley tribes practice a sophisticated system of flood-retreat agriculture (and fishing) and seasonal grazing – systems that enable significant populations to secure subsistence with marginal environmental impacts on other species and ecosystem services.¹⁴ These populations have therefore been able to co-exist for centuries with Ethiopia’s largest game populations. These wildlife populations similarly migrate with the annual flood cycle of the Omo River, movements that are loosely connected with the extraordinary mammalian migrations of the Boma-Jonglei region (which rivals those of the Serengeti in scale),¹⁵ crossing the Sudanese border into the semi-arid savannahs of the Ilemi and Loelle Regions of South Sudan. Intensive research by conservation biologists has been undertaken in this border area in recent years, where Southern Sudanese (working in collaboration with UNDP, USAID and the Wildlife Conservation Society) are developing a new protected area that would integrate pastoral land access. These studies have shown, for example, that radio-collared elephants migrate between Ethiopia’s Omo Parks and the Loelle in the Sudan.¹⁶

The construction of the Gibe dam series will substantially curtail the annual floods from the Omo River, whether or not there is any irrigated agriculture. This will lead to a more constant flow in the river of relatively sediment-free water, which in turn will lead to the loss of the ecologically productive floodplain used by wild species, fish, domestic stock and agriculture alike. Proponents of the dam initially claimed that ending the floods would be beneficial to all concerned (a common misconception about river basin productivity). But three years after dam construction began, it was proposed to release an annual “controlled flood” from the dam reservoir, lasting ten days, which it was claimed would “fully

¹³ Dr. Tewolde Geber Egziabher (undated, around 2010) on <http://www.gibe3.com.et/tewolde.pdf> (accessed November 18, 2012).

¹⁴ The economies, ecologies and societies of the Omo tribal groups have been well studied by numerous European, Japanese and Ethiopian ethnographers, and chronicled by members of the groups in question. See www.mursi.org and Olisarali Olibui “Shooting with Mursi” (2009).

¹⁵ “Seasonal migration by white-eared kob in relation to resources” J.M Fryxell and A.R.E Sinclair, *African Journal of Ecology* 26 (1), pp17-31, March 1988; “Is South Sudan Africa’s New Serengeti”, P.E. Winter, unpublished paper, August 2007; and “South Sudan Works to Aid Wildlife That Survived the War” F. Langfitt, National Public Radio (USA), June 15th, 2011

¹⁶ “Launching Protected Area Network Management and Capacity Building in Post-Conflict South Sudan”, UNDP-GEF Project Document, 2010. These South Sudanese efforts have aimed to collaborate with Ethiopian and Kenyan conservation efforts in a cross border fashion.

compensate” for the loss of the natural flood. The likely effectiveness of this proposal, however, was criticized in an independent review of the Gibe III project by French engineering firm SOGREAH. The study, commissioned by the European Investment Bank, concluded that the controlled flood had been planned without an adequate study either of the problem it was intended to solve or of its likely effectiveness.¹⁷ A press release issued by the dam’s builder, Salini Costruttori, stated that the controlled flood was in fact intended only as a temporary measure, to be withdrawn “when deemed appropriate”.¹⁸

It is doubtful whether a controlled flood of any kind, temporary or not, is compatible with irrigation development on the scale now being implemented. The Ethiopian government has already designated several hundred thousand hectares for large-scale plantation-based irrigated agriculture, primarily for the production of sugar cane (including extensive tracts within the legally protected Omo-Tama-Mago complex, the most important wildlife area in Ethiopia).¹⁹ The newly formed Ethiopian Sugar Corporation (which benefits from \$640m of Indian Export-Import low interest loans) has been allocated 245,000 hectares,²⁰ and fifteen other concessions comprising 111,000 ha have been given for cotton, with a further 89,000 ha still held in the federal “land bank” for subsequent allocation.²¹ (Avery estimates that 150,000 hectares are actually suitable for irrigated sugar cane.²²) This includes extensive lands along the river separating the National Parks and preventing the seasonal migrations upon which the wildlife depend. This is also prime territory for the local agro-pastoralists. A substantial unlined canal system, up to 200km in length, is being dug to irrigate the plantations and at least another 70,000 hectares have been allocated to private investors, both Ethiopian and foreign. A 500m long earthen dam was constructed across the Omo to drive water supplies into these emergent estates, flooding small villages and cultivation areas upstream (by May 2012). The designation of Omo riverbank lands for industrial agriculture immediately makes clear that artificial floods for ecological benefits will not be released as proposed, since these would harm the estates. The Ethiopian government has been secretive about these estates, but visual evidence has now been made public, with satellite imagery, on the Human Rights Watch website.²³

To enable implementation of the agricultural scheme, Ethiopia has begun resettling (“villagize”) 1.5 million people, despite the disastrous consequences of similar efforts under the Emperor and then the Menghistu dictatorship, and the current government’s laudable commitment to end resettlement when it came to power.²⁴ Reports by human rights groups have documented an absence of consultation and growing resistance on the part of indigenous Omo peoples.²⁵

Strenuous efforts have been made, with the help of police and army units, to intimidate them into compliance with government wishes and to prevent them from talking about the project to outsiders, especially foreigners. Access by foreign journalists and others likely to be critical of the government has been rigorously denied and the reports of international human rights and environmental organizations have been robustly dismissed. In general, the entire project has been surrounded by a wall of secrecy. Meanwhile, Ethiopia’s donors are publicly silent on the matter, even as many of their officials privately

¹⁷ “Concerns about Gibe III,” David Turton, 2 Feb. 2012, <http://allafrica.com/stories/201202030801.html>

¹⁸ “The Downstream Impact”, D. Turton, unpublished paper given at the School of Oriental and African Studies, University of London, 2010

¹⁹ *Existing Challenges: plantation development versus wildlife conservation in the Omo-Tama-Mago Complex*, Cherie Enawgaw, Derbe Deksis and Girma Timer, Ethiopian Wildlife Conservation Authority, September 2011.

²⁰ Later corrected by the Ethiopia Sugar Development Corporation to be a maximum of 175,000 ha.

²¹ “Half a Million Lives Threatened by Land Development for Sugar Plantations in Ethiopia’s Lower Omo Valley”, Land Deal Brief, September 2011, Oakland Institute

²² Avery op. cit 2012

²³ <http://www.hrw.org/news/2012/06/18/ethiopia-pastoralists-forced-their-land-sugar-plantations>, and associated reports and maps, accessed November 18, 2012

²⁴ History has important lessons here as well, such as the huge problems with the Ethio-Korean joint venture estates in this area (at Omorate), where a previous government displaced local people to introduce large-scale agriculture. The effort was abandoned in 1991.

²⁵ For increasingly comprehensive documentation of these problems and local responses see the websites of Survival International, Human Rights Watch, International Rivers and the Oakland Institute and a considerable amount of press coverage (for example “‘We are ready to die for our land’ say pastoralists in Ethiopia’s Lower Omo Valley”, Elizabeth Hunter, *The Ecologist*, May 3rd, 2012

report increasing alarm. Since the government appears to be using donor funds, such as those provided by the World Bank and other donors under the Protection of Basic Services Program, to underwrite some of these costs in both Gambela and the Omo, there have been various efforts to legally challenge donors with responsibility.²⁶ This political context has become no less relevant since the untimely death of Ethiopia's Prime Minister Meles Zenawi in August 2012.

The Dam and the Lake

Beyond the impact of the dam within Ethiopia, there will be a series of consequences for Lake Turkana in neighboring Kenya.²⁷ There are no treaty rights between the two countries over the use of Omo water. The impacts on Lake Turkana reflect the crucial role of the Omo in the lake's hydrology, not only as its dominant source of water but also because of the massive seasonal pulse it provides of fresh and nutrient rich water.

First, the dam itself will hold a proportion of the total water in the Omo-Turkana watershed system. This will drop the lake level about 2m. How rapidly the lake's level drops will reflect how quickly Ethiopia chooses to fill the dam and the amount of rain that falls in the years in question. As a generalization, initial dam filling would radically reduce inflow for between one and three years and increase the level of salinity by a similar proportion. Some equilibrium of these effects would occur over subsequent decades if no further dams were built or water extractions take place.

Second, dam construction will dramatically change the annual flood cycle to the detriment of the lake as well as the Omo floodplain. Gibe III lies at a point in the Omo Basin where around 67% of the total river inflow can be captured. This means that about two-thirds of the annual flood cycle, and some proportion of the nutrients and sediment, would be curtailed during reservoir filling. After filling, the naturally shaped flood hydrograph will be reshaped into wildly fluctuating hydropower releases on a daily basis that will cause the downstream river to rise and fall each day by a few meters. Based on the discussion of the lake's ecology provided above, this substantial reduction of the flood cycle will permanently transform and could ultimately devastate the primary productivity of the lake and its fish, bird, crocodile, lakeshore and other species.²⁸ This effect, whilst most dramatic in the northern part, will be lake-wide. Research shows how plumes of fresher nutrient rich water penetrate far down the lake during this flood, and fishing communities at the southern end of the lake vividly link the seasonal fish breeding cycle to the annual lake level cycle, a fluctuation they perceive to be driven by changes in the stars, so far are they from the Omo Delta.

The greatly diminished flood levels and interruption of the river's silt delivery will very likely have another dramatic effect which has plagued similar floodplains and deltas on dammed rivers worldwide: the Omo will scour, or "downcut" an increasingly deep channel within the delta. This channel will, in effect, destroy much of the network of swamps and shallow pools that provide the largest fish spawning nurseries for the lake as a whole. These swamps and pools also provide grazing for wild and domestic

²⁶ See "Anuak indigenous people of Ethiopia submit Inspection Panel complaint" (Bank Information Center, September 24th, 2012 (for the situation in neighboring Gambela); and 'Ethiopian threatens to sue DFID over human rights abuses' Guardian (UK), September 6th, 2012

²⁷ These consequences are systematically detailed by Sean Avery, 2010 and 2012 (op.cit).

²⁸ Dr. William Ojwang Oweke, the Assistant Director of Kenya Marine and Fisheries Research Institute, summarized the threat as follows in a paper given in Cambodia at the USGS Asia Summit *Connecting Great deltas, Great Rivers and Great Lakes* in 2009: "Imminent impacts include regulated river flows thus reducing frequent devastating floods characteristic of the lower Omo plains and other proposed socioeconomic interventions, reduction of the Omo delta wetlands used by fish for breeding, nursery and refugia; loss of the highly productive delta fertile soil and naturally irrigated livestock grazing fields, enhanced environmental vicissitudes from reduced freshwater influx affecting fisheries productivity, and loss of livelihoods and income for the riparian communities and the country respectively. We note that the Lake Turkana situation is dire and the time is apt for establishment of transboundary consultative fora to address resource use conflicts, undertake rapid surveys on the delta and propose mitigation measures on the anticipated impacts." See "Impacts of River Impoundments: The Case of Hydro Power Projects on Omo River of Lake Turkana", William Ojwang Oweke, Ojuok, J.E., Omondi, R., Malala, J., Abila, R., and P. Ikmat

species, flood-retreat agriculture, and feeding areas for water birds that use the lake for their annual migrations between Eurasia and Eastern Africa,²⁹ and countless other species.

Third and even more dramatic, if dam construction is indeed followed by the large-scale irrigated sugar plantations now under development, and depending on the volumes of water diverted by the river and the precise locations and nature of the plantation practices, the result for Lake Turkana will be a variable but far more significant drop in water level. The 150,000 ha Kuraz Sugar plantations would alone require 28.2% of the Omo River's flow,³⁰ according to careful estimates by Sean Avery – and that is if the scheme achieves 70% water use efficiency, a level highly unlikely in what is a massive, under-capitalized and rapidly implemented effort. (Avery did not include in these deliberately conservative estimates water losses from the extensive canal system.) Although the Ethiopian government is seeking to develop perhaps 300,000 ha (some estimates are even higher), Avery believes that much of this will prove unsuitable and estimates that to irrigate only the remaining areas will immediately require another 5.3% of the river's water. This level of irrigation will reduce the lake to 59% of its current volume, lowering the water level by 13m, and nearly doubling the salinity.³¹ More realistic assessments of water use efficiency in these irrigation projects suggest that the lake would reduce to a mere 42% of its current volume and decline 22m in depth (note that the average depth of the lake is 30m). Needless to say, a cycle of dry years and/or impacts of global climate change could severely exacerbate this tragic effect.³²

A reduction of Lake Turkana to around half its current volume in this first round of Ethiopian land development would be dramatic for the region and for Kenya. The long-term effect could parallel what has happened, for example, to the Aral Sea³³ in Central Asia, which has now practically disappeared. In that slow-moving environmental disaster, by the time the predicted consequences became visible to the governments involved, multiple catastrophic and almost irreversible problems had emerged.

Lowering of the lake level will lead to uneven consequences geographically.³⁴ The northern end of the lake is very shallow – indeed, it is merely the edge of an expanding delta that has already moved over a hundred kilometers southward since the lake's formation. Even as the curtailing of sediments will slow the southwest expansion, the lowered water level will expose a very large area of former lake floor. A 20m reduction in water level³⁵, for example, will shift the northern end of the Lake as much as 40km southward, creating a land bridge entirely within Kenya to the south of the current Dassanetch territory in the Delta, bisected by a much-reduced river. It will also mean that the Dassanetch ("the people of the delta"), most of whom are officially Ethiopian, will be under enormous pressure to follow the lake as it recedes southward into Kenya territory. Here they are known as Merille and greatly feared for their

²⁹ There are 34 Palearctic migrant bird species that use the lake as a feeding ground in their migrations between Europe and East-Central Africa (L. Bennun & P. Njoroge, *Important Bird Areas of Kenya*, 1999), particularly important being the Little stint (*Calidris minuta*), and in terms of residents there is also a population of African skimmers (*Rhyncops flavirostris*) of special note. These are reasons why Birdlife International has been so concerned about the dam "Ethiopia Dam project rides roughshod over heritage of local tribes people", February 27th, 2012 Birdlife International Community Page <http://www.birdlife.org/community/2012/02/ethiopia-dam-project-rides-roughshod-over-heritage-of-local-tribes-people/> (accessed November 15, 2012)

³⁰ Avery (2012) observes that this block of land alone represents a similar area to all the irrigated land in Kenya.

³¹ Such a doubling would lead to changes in flora and fauna, according to Mbogo, D.K., *Baseline Study of Lake Turkana Limnology and Fishery*, consultancy undertaken for the African Development Bank, 2010 (as reported by Avery, 2012); one would expect reductions in diversity and productivity of the fisheries.

³² Lake Turkana water levels are extraordinarily sensitive to the evaporation rate, a function of temperature and wind: modeling suggests that a 10% increase in that rate above 7.2mm/day would result in a further 4m reduction in lake level. (Avery, 2012)

³³ Once the world's fourth largest lake, the Aral Sea shrunk to less than half its original size as a result of Soviet diversion of rivers feeding it to grow cotton. The ecosystem was destroyed, and a major fishing industry, which pulled in 40,000 tons/year, dried up along with the lake. The region is now perennially poor and plagued with health problems. Read about an effort to restore part of the lake: <http://news.nationalgeographic.com/news/2010/04/100402-aral-sea-story/>

³⁴ Lake Turkana was the subject of a thorough British bathymetric survey (1972-75) by Hopson et al. (*op cit*) who measured the depth of water around the whole lake, which means the consequences of lowering the water level are very clear. Apparently Tullow Oil has recently undertaken another survey that is not (yet) in the public domain.

³⁵ Such a drop is well within the bounds of reality, based on scenarios found in Avery (2010 and 2012).

fighting prowess. This drying process will begin immediately the lake starts falling, including the initial 2m, and indeed has occurred over the last century each time a low rainfall period has shrunk the lake in this fashion. The fall of the lake level by just the 2m, which will be the effect of filling the Gibe dam, will lead to some of the most productive shallows being lost to fisheries, including Ferguson's Gulf on the west bank where about half of the lake's commercial fishing catch is made, in areas typically only about 1-2m deep.³⁶

If the lake level continues to fall beyond 20m it will eventually bring dry land right to the north island, and then split the lake into two parts at the shallow midpoint where the main Gregorian Rift branch that contains the southern lake connects to the local Turkana rift that contains the waters to the north. If and when this happens it will initiate a new cycle of change, probably an unstable one, because as soon as the lake is split the northern part will begin to rise relative to the southern part, due to the fact that the northern part will continue to receive Omo inflows that will at least partially offset evaporation in the northern lake, whereas the southern lake will receive no inflows to offset evaporation. Therefore periodic breaching of the boundary between the two lakes may well occur, and indeed they may end up being connected by a river that cuts a channel between them from time to time. Such effects notwithstanding, the division of the lake will cause the northern section to become fresher and more seasonal and the southern rapidly to become more saline as it slowly dries down to a much lower level. Meanwhile it will lose even the pulse of the limited floods deriving from rainfall below the Gibe dams, being sustained instead from the dwindled Turkwell River and underground seepage.

The Aral Sea witnessed similar divisions and consequences, including a desperate effort by local administrations to create a smaller live lake with the remaining inflow. A grim prospect for Lower Turkana is illustrated by the conditions of the Suguta Valley, a section of Turkana even further to the south, which was earlier separated from the rest of the lake by volcanic intrusions and has become an almost uninhabitable area of salt pans with a tiny saline lake at its deepest point.

There are further potential consequences of large-scale irrigated agriculture, depending on its agronomic practices and precise location, and in particular on fertilizer and biocide use and the degree of post-irrigation flows of water back into the Omo system. In similar circumstances elsewhere in the world, pesticide and herbicide use has had complex and substantial effects on flora, fauna and people downstream, and fertilizer use has resulted in eutrophication and at times oxygen depletion and even dead zones. (Smaller quantities of nitrogen leaching back into the rivers could initially boost the Lake's planktonic productivity.)

A Summary of the Environmental and Social Consequences

The cumulative impact of these developments on the ecosystems and societies of the Lower Omo and Lake Turkana will be severe in the short and medium terms, and potentially catastrophic in the longer term.

In Ethiopia, the destruction of agro-pastoral and fishing livelihoods in the Lower Omo and the coercion necessary to appropriate their lands for plantation agriculture will severely disrupt the lives of an estimated 200,000-300,000 people of a dozen ethnic groups. The importation of large numbers of plantation workers and the likely introduction of agro-chemicals will almost certainly lead to social conflict.³⁷ (For example, the expansion of cotton estates elsewhere in lowland Ethiopia has destroyed the

³⁶ The likely impact of declining water levels on the fish species of the Gulf is currently the subject of doctoral research by Natasha Gownaris of Stonybrook University (see <http://www.petridish.org/projects/saving-the-samaki-of-the-world-s-largest-desert-lake>, accessed 11/16/2012).

³⁷ Similar developments in Ethiopia's other lowland valleys have had these same consequences in recent decades. For the Awash see Kloos, H. "Development, drought and famine in the Awash Valley of Ethiopia" *African Studies Review*, XXV (4), pp 21-48 (1982)

livelihoods of the hunter-gatherer peoples because insecticides have devastated bee populations.) Unlike the slow development of smaller and mixed scale private sector agriculture, there are no examples of rapid large-scale plantation agriculture in Ethiopia or elsewhere in Africa that have led to widespread improvements in the welfare of local communities.

Effects of similar scale in terms of population size and regional import are expected to happen on the Kenya side of the border, except that here the environmental damage to the lake will impact several dimensions of the broader economy, and not just the lives of several hundred thousand local people. Much of the Turkana fish catch is exported, not only to Kenya (for which it is sundried) but in salted form across Uganda to Rwanda and Burundi. Nothing will replace current ways of life around the Lake, and because of the loss of access by livestock for watering and grazing the consequences will be felt far inland in this nomadic region. And Northern Kenya's nascent tourism industry, one of Kenya's most important sectors, will be curtailed.

Under proposed dam and agricultural development schemes, the Lower Omo can be expected to lose most of its large mammal populations as they will lose habitat (including, under current plans, a significant proportion of the existing National Parks), as well as the ability to follow historic migration corridors through plantation land. Furthermore, they will lose most of their food supplies in their remaining areas since these are created by the seasonal floods. Elephants and other game in the Lower Omo will therefore be driven into tight conflict with traditional farmers and estate land operators over agricultural fields. Because the wildlife populations of the Omo floodplain migrate seasonally into South Sudan, this will again create international issues and concerns.³⁸ Wildlife on the Kenya side of the border will be affected as it, too, depends on the seasonally flooded areas around the lake. For example the *Tiang*, the local endemic³⁹ variant of the *Topi*, relies on lakeshore grazing and the flood cycle in the Sibiloi National Park in Kenya.

The impoverishment of the wetland and lake ecosystems of Turkana, the Delta and Lower Omo will lead to unpredictable changes in biodiversity and ecosystem functions and services. Especially of concern locally will be the damage to the fisheries. Internationally there will be concern about harm to one of the world's largest wild Nile Crocodile populations,⁴⁰ and the damage to an important staging area for the bird migration routes through the Great Rift Valley between Africa and Eurasia.

The Future: Local, Regional and International Political Consequences

The disruptions to the lands, waters, ecology and livelihoods of the peoples in this region will have immediate and substantial political consequences. Starting at local levels, these will in turn end up having regional consequences that will ultimately be of global importance, given the wider situation in the Horn of Africa.

Local groups displaced from their livelihoods and homelands are likely to seek out resources on the neighbors' lands in the Kenya-Ethiopia-Sudan borderlands. Based on the recent history of conflict among local communities in this region, they are expected to react largely through raids and warfare. Well

³⁸ A similarly tragic story is already unfolding in neighboring Gambella "Agribusiness Boom Threatens Key African Wildlife Migration", Fred Pierce in the Yale Environment 360, March 7, 2011

http://e360.yale.edu/feature/agribusiness_boom_threatens_key_african_wildlife_migration/2377/ (accessed November 18, 2012)

³⁹ According to UNESCO: "[Lake Turkana] Mammals include Burchell's and Grevy's zebras, Grant's gazelle, Beisa oryx, hartebeest, topi, lesser kudu, lion, cheetah and crocodiles. Lake Turkana is an important flyway for north-bound migrants. A total of over 350 species of aquatic and terrestrial bird have been recorded in Lake Turkana.

⁴⁰ Crocodiles vividly and famously documented by Alistair Graham and Peter Beard in *Eyelids of Morning: the mingled destinies of crocodiles and men*, Chronicle Books, San Francisco (1990) (First edition, 1973)

armed, primed by past grudges, and often divided by support from different state and local governments, these conflicts can be expected to be bloody and persistent. In fact they are already underway.

Pressed out of the floodplains and the delta the Omo tribes will move across adjacent borders into such lands as the Ilemi Triangle, a disputed 10-14,000km² region of these borderlands (where Uganda, Southern Sudan, Ethiopia and Kenya meet) with a brutally complex history that has prevented its resolution (and even proper administration) since the beginning of colonial times (even when the British ran three of the countries that bound it).⁴¹ Comprising seasonal and/or emergency grazing lands in overlapping claims for each of the tribes that surround it, the breakdown of traditional governance systems and the ever-changing but unequal access to armaments – both caused by the penetration and interests of the various governments – have created a rolling and seemingly unsolvable conflict. Initially claiming the whole Turkana region, Ethiopia's modern claims to the Ilemi have been intermittent, and tangled up with Italian disputes with the British, and their engagement largely reflects the level of armament of the Dassanetch and Nyangatom and hence the penetration of these peoples into the area. But the issue of a potential swap for the Baro Salient (Aniak and Nuer lowlands to the immediate north), originally proposed in 1913 and returned to intermittently may again be raised.

The Sudanese have had little access to Ilemi and since 1950 have patrolled only its northwestern edge (the "patrol line") to hold back the Ethiopian tribes. Consequently, in recent decades the area has become increasingly claimed by Kenya. Kenya's claims are based on continuing various arrangements whereby the British military (out of first what was then Uganda and is now Kenya) administered for Sudan the southern slice of the triangle – up to initially what is called the "red line" (1931/1938) and then to the "blue line" (1947) – which marked the edge of the plateau deemed required for Turkana dry-season grazing. The British needed to do this in order to protect the Turkana (whom the British had then disarmed to ease administration within Kenya) from Ethiopian Nyangatom and Dassanetch, and the formidable Toposa who can raid from the Sudan side. Subsequently the Kenyans re-armed the Turkana in 1978, perhaps leading the Ethiopians to re-arm their peoples in the early 1990s, and the Kenyans to reinforce their presence within the Triangle to regulate interactions between the Ethiopian and Kenyans. During the latter phase of the Sudanese civil war some have claimed that the Kenyans made a deal with the (now Northern) Sudanese government to effectively cede the territory, whilst others believe that on the contrary it was the southern leader John Garang who made a similar promise in exchange for Kenyan support of their independence. Meanwhile the Northern Sudanese supposedly distributed substantial numbers of weapons to the Toposa to make life difficult for the SPLM and to effectively close the border, while leading the Toposa to be pressed further into the Triangle by conflicts with the SPLM. Now that the civil war is over the Southern Sudanese will want to reassert control of the area, not least because the Kenyans have allegedly been secretly prospecting for oil there, and Kenyan maps now include the Ilemi in their territory. While officially denied, it is reported that South Sudan has already written to the UN and the African Union over the border delimitation.⁴²

Disruption of the Omo Valley livelihood systems, and the impossibilities of life in resettlement villages, will also press these peoples into the remaining conservation areas on the Lower Omo, and into the Sibiloi/Koobi Fora National Park in Kenya. Meanwhile other groups will press against the northern area of the Turkana people, potentially displacing Turkana pressure across the Ugandan border towards Karamajong and Jie. At the same time, the retreat of the lake south into Kenya will create a kind of conflict corridor through which the Turkana will be able to move overland eastward into the lands of the Gabbra (and vice versa) which will lead to an explosion of raiding and conflict (the lake, the Ethiopian

⁴¹ The Ilemi Triangle has been written about from a variety of historical perspectives, see for example: R.O. Collins "The Ilemi Triangle" *Annales d'Ethiopie* 20(20) pp5-12, 2004; N. Mburu "Delimitation of the Elastic Ilemi Triangle: pastoral conflicts and official indifference in the Horn of Africa" *African Studies Quarterly* Vol 6 (No. 4) <http://web.africa.ufl.edu/asq/v7/v7i1a2.htm>

⁴² "South Sudan denies claim on Ilemi Triangle take over", *Standard* (Kenya), August 23rd, 2012

border and Dassanetch of the delta currently serve as a crucial buffer). Recent years have demonstrated that a domino effect results, with impacts far from initial conflict zones. If the Gabbra lose access to lakeshore grazing on their western territory because of lake level changes and Turkana and Dessanetch raiding they will press into the lands of the Borana to the north and east, pushing them across the Ethiopian border and towards Moyale. Even if the Borana limit this expansion, they will nevertheless relocate their herds further east against their border with the Somali. And so on. The security services will seek to suppress the violence by making local alliances that enable some parties to stabilize their winnings while those who lose store up deeper grudges. These arrangements will further tip the balance of leadership of local groups away from traditional governance systems with their ritual leadership and peace-building capacities toward that of war lords and big men. The cycle will deepen.

Faced with a collapse in local livelihoods, increased violence and heightened integration with the outside world, there could be substantial distress migration. This is already a region where substantial populations are partially relief dependent. Groups of internally displaced people and refugees from southern Ethiopia could establish themselves in neighboring regions of South Sudan and peri-urban settlements in northern Kenya. These will resemble the famine and refugee camps of earlier decades (and those in Kenya's infamous northeastern province) and will breed their own violence and despair. The presence of groups from conflicts in neighboring countries could further inflame cross-border tensions, leading to raids between countries by militia or worse. External interests will likely seek to exploit these conflicts, offering training and weaponry, as has been seen time and again in the Horn and elsewhere. Increasing numbers of people will relocate out of the region entirely to urban centers like Eastleigh in Nairobi where they will survive but will lack the capacity – for one or two generations – to enter the regular economy and society. Crime, fundamentalism and instability will thrive here, driving more repression with the same vicious cycle of consequences.

Such local conflicts, then, could lead to a marked rise in instability, which will create and/or heighten border disputes between these countries. Kenya and South Sudan will resent Ethiopia for generating displacement of violent desperate peoples into their territories. Ethiopia will resent them in return for "harboring" people who are resisting, including violently, their expulsion from their homelands in Ethiopia. In the case of South Sudan this will get tangled up in the appalling situation in Gambella and (at a macro-level) in Ethiopia's handling of the likely unraveling situation between North and South Sudan. The dislocation of Oromo people in the Ethiopian-Kenya borderlands will inevitably raise tensions around the so-called Oromo Liberation Front about which Ethiopia is particularly sensitive, and which Kenya and Ethiopia have sought to defuse in recent years. The Ilelmi Triangle conflicts will likely become untenable and the international community will be called upon to mediate, while no state in the region will actually be able to implement any agreements on the ground there for the present.

These local and border disputes aside, the Kenyan people and future governments may step back and demand what right Ethiopia has to exploit such a large share of the Omo/Turkana waters. Given the possibility that the regional electricity shortfall has been exaggerated, they may even step away from the Gibe III purchase agreements. This could lead to tripartite tensions between the Chinese (if they end up funding the turbines), the Ethiopians and the Kenyans.

This instability and enhanced tension will furthermore occur at the very moment that oil field and pipeline development is occurring in the areas to the northeast of Turkana on these same borders, and in areas of Marsabit District to the east side of the lake just south of Ethiopia.⁴³ There are also prospects of oil and gas fields in the neighboring areas of southwestern Ethiopia and South Sudan, which would all depend on the same Kenyan pipeline. It is not a pleasant recipe: violently displaced people, gaining minimal

⁴³ "Kenya strikes more oil in Turkana", *Mwakilishi* (Kenya), May 7th, 2012

financial advantage from oil extraction while losing their traditional livelihoods in a situation of growing cross border conflict. Add to the picture the uncertainties and risks of climate change. Even just a few months after the discovery of oil the air is replete with the imminent conflicts and distress over land expropriation and loss of freedom of movement.⁴⁴

Ethiopia and Kenya have maintained good relationships in recent years, and have developed substantial plans for the joint development of these and neighboring areas. The emergence of South Sudan is welcomed. This moment of cooperation will become increasingly strained by the above factors, and in particular by Ethiopian lack of transparency about agricultural land development, and by its perceived bellicose behavior predicated in large part on its military supremacy in the region. Kenyan officials cite intimidating behavior in the diplomatic exchanges, including those at high level, between Kenya and Ethiopia over the Gibe III issue. Ethiopia not only maintains a massively larger and better equipped force, but even more importantly is able and prepared to fight and lose men, unlike Kenya where the public is much less accepting of casualties.

Under such circumstances where confrontation with Ethiopia is believed to be ineffective as well as undesirable, Kenya might be expected to accept a junior role. It appears to have decided, for example, to explore the development of its own irrigated production (10,000 ha in the Omo Delta at Todonyang) rather than to oppose Ethiopia's use of irrigation water.⁴⁵ To some in the Kenyan leadership this would enable the Turkana to transition from aid dependence to agriculture as it becomes oil producing. Unfortunately this approach will likely face a multitude of technical and well as socio-economic challenges, including the risk of damaging floods (the dam notwithstanding), cultural resistance, and enhanced Desso-Turkana conflict over land conversion. Meanwhile such an effort could serve mainly to reduce Kenyan moral leadership on the use of Omo water and the impending crisis of Turkana waters. As one recent review of irrigation schemes in this region of Kenya observed:

“Governments and other development operators have been supporting the creation of irrigation schemes in North-Western Kenya for the last 30 years. Such well-planned projects are meant to enhance food self-sufficiency, promote economical diversification, increase rural incomes and provide employment opportunities. Irrigated agriculture is considered as a solution to a variety of problems. However, most initiatives do not achieve their goals. Some projects abort and some schemes disappear a few years after their implementation. Some persist but only with large subsidies, while others remain as projects.”⁴⁶

On the other hand, Kenya has substantial chips that it could play, and even before Lake Turkana loses half its volume and plunges the region into chaos. Ethiopia depends on integration with Kenya for access to the sea. Unlike Ethiopia, which is essentially an island surrounded by poor and risky players, Kenya has plenty of other growth opportunities through integration to the south and west with the East African Union. Kenya, needing Ethiopia less than Ethiopia needs Kenya, may well decide to play harder and seek leverage. Furthermore, Kenya may not need to buy hydroelectricity from Gibe III as it develops its own resources and other projects enter the regional grid. Kenya is currently developing its substantial geothermal and wind resources. A single wind farm (Africa's largest), currently under development with a Danish firm on the southeastern edge of Lake Turkana, is intended to produce 300MW which is within

⁴⁴ “Why Turkana resident curse day oil was found”, *The Standard* (Kenya), J. Ng'etich, September 23rd, 2012

⁴⁵ “Raila launches Sh 20 billion irrigation project at Todonyang”, D. Lomuria, *Kenya Daily Nation*, August 21st, 2012. Unconfirmed reports link this effort to Ethiopian and Israeli technical assistance, following a bruising encounter to Kenyan prestige with the late PM Meles Zenawi of Ethiopia.

⁴⁶ “Local Irrigation Projects in North Western Kenya, conceptual frameworks and development practices: the missing links” J. Huchon & J. Maisonneuve in *Shared Waters, Shared Opportunities: hydropolitics in East Africa* (Eds. B. Calas and C. Mumma Martinon), Mkuki wa Nyota (Tanzania) and the French Institute for Research in Africa (Nairobi), 2010, p185

the range of the amount of electricity than Kenya would import from Gibe III (which is said to be 500MW).⁴⁷ Kenya also has substantial relationships, of equal or greater weight, with the international powers who are presently engaged so deeply in Ethiopia: namely the US, EU and China. It can say to these actors (and may already be doing so) that developments on the Omo that destabilize northern Kenya and the border region are not acceptable, even as the rise of Ethiopia is otherwise welcome and its peaceful transition following the death of Meles Zenawi urgently valued.

The Industrial and Commercial Bank of China is scheduled to finance the state-owned Dongfang Electric Machinery Company to install the hydropower turbines on Gibe III at a cost of around \$450m, backed by contracts for sales of electricity to Kenya.⁴⁸ This was presumably initially conceived as an effort to provide mutual benefit from supporting economic integration between Ethiopia and Kenya, facilitating and driving other energy and mining developments in the region from which both countries (and China) would benefit. China is therefore now finding itself in an increasingly awkward situation as its support could instead be seen as dividing two of its friends. The US will similarly find that two of its closest military and political allies in Africa are being driven apart, and in ways that could shift the fault lines of instability westward to connect with its long standing concerns in South Sudan, northern Uganda and northeastern Congo.

Can We Avoid the “Aral Sea” Outcome?

Currently, the situation unfolding on the ground appears little constrained by the growing outcry locally and internationally. Even the international recognition and publicity occasioned by the award of the Goldman Prize for Africa to Ikal Angelei in April 2012 for her work to protect Lake Turkana has yet to drive change in Ethiopia or Kenya. But this could change. Broadly speaking there are eight vectors of change in the wind that might, singly or together, tackle this threat or significantly reduce its impacts.

1. *Funding for ongoing dam construction is halted.* Due to international refusals to fund construction of the dam, the Ethiopian government is currently meeting this substantial cost (\$1.7b) through the regular state budget and government bonds, at the very same time it seeks to build more large dams, including the \$4.5b Grand Renaissance Dam on the Nile (again, without external funding). The extent of this investment is leading to major distortions in the economy, which appears to have numerous structural flaws and to be based at least in part on overly optimistic statistics.⁴⁹ This becomes an international issue, given how substantially the Ethiopian budget is underwritten by its major donors (the US and EU), who might choose or be obliged to question such deployment. While the donors have taken the political decision to allow Ethiopia to juggle the aid budget very flexibly in recent years, this position could change as a result of pressure from international civil society, from within the donor community itself,

⁴⁷ A press release dated October 16, 2012 describes this project as Kenya's single biggest investment in its history (582m Euro) and quotes Mugo Kibati, Director General of the Kenyan Government's Vision 2030 Delivery Secretariat as saying "this project reduces the need to depend on unreliable hydro and on expensive, unpredictably priced fossil fuel based power generation". <http://ltwp.co.ke/press-room/press-release>. This appeared to make the decision of the World Bank in July 2012 to provide \$684m to build the transmission lines for Gibe III even more curious, notwithstanding the fact that the Bank had earlier refused to fund the dam itself citing lack of transparency. The Bank claims that even without Gibe III this 1,000km transmission line would be viable "World Bank approves contentious Ethiopia-Kenya Electric line", C. Brown Inter Press Service, May 22, 2012; its European Governors ultimately recommended technical clarifications on regulations preventing funding of activities linked to negative projects. Intriguingly it has more recently emerged that the World Bank has been threatening to decline to underwrite the wind power deal on the basis that Kenya Power held the exclusive power purchase agreement and that this "monopoly" would keep prices high for consumers "Energy Ministry to give report on World Bank Deal", W. Kagwe, The Star (Nairobi), October 24th, 2012

⁴⁸ "Ethiopia, China sign agreement for Gibe III hydro project construction" May 2010, <http://www.hydroworld.com/articles/2010/05/ethiopia--china-sign.html> (accessed November 15th, 2012)

⁴⁹ This problem has been quietly talked about for some time by economists, but is starting to come out more publicly. See for example: "IMF Urges Ethiopia to Slow Nile Dam Project to Protect Economy," W. Davison, September 14th, 2012, Bloomberg.com (<http://bloom.bg/X13y5u>)

and/or from the Ethiopian diaspora. Legal cases against bilateral donors from communities displaced by these programs within Ethiopia are already apparently under preparation.⁵⁰

Meanwhile, the kinds of Italian and Chinese injections that have apparently occurred in the past look less likely going forward, given the financial circumstances at home. This might cause the Italian construction company Salini Costruttori and/or the Chinese contractors to get nervous if the Ethiopian government appears to falter financially. Indeed, simultaneously with a potential squeeze on foreign aid are likely to be other pressures. Gibe III has required significant changes in construction methods, leading to delays and (unreported) cost overruns.⁵¹ Ethiopia will have to meet these costs even as the continued politically driven acceleration of the number of mega-projects could lead to fiscal overload, including from the Millennium Bond (which is currently paying 6-8% even though it will be years before there is a real dividend). It is also widely feared that even when these dams come on-line, initial sales of electricity will be insufficient to cover interest payments given the anticipated levels of export and the inability of the Ethiopian population to pay market rate and/or consume sufficient power. If Ethiopia's Great Leap Forward flounders in a fiscal gap, the consequences could be devastating.

2. *Funding for the turbines is rescinded.* While the Chinese initially indicated that they would cover the costs of these turbines, they could shift their calculus as they see the damage that this could do to Kenya-Chinese relations (as well as to the stability of this key region for oil development).

3. *The Kenyan government ends its acquiescence in the project.* The growing awareness of the downstream effects of the Gibe project could affect the purchase of electricity by the Kenyan government. Kenya could refuse to purchase power from Gibe III, or to insist that Ethiopia not divert the Omo waters without agreement, or to raise the question of Ethiopian access by road and pipeline to the Indian Ocean, then the Ethiopian Government might retreat, particularly over the extent of irrigated land development. As the current coalition wraps up its tenure, pressure for this is most likely to come from the Kenyan civil service and intelligentsia, combined with the mobilization of public opinion nationally. It is possible that this could come to a head in the election or post-election period. Intellectual support for the project is mostly restricted to the Ministry of Energy with its centralized model for meeting demand; there has otherwise been widespread criticism of the deal, including in August 2011 a resolution in parliament asking for the suspension of the project pending further studies. Many believe that official Kenyan government support has reflected an unfortunate combination of military/diplomatic pressure from Ethiopia, financial arrangements with key Kenyan leaders, and fear of the legal consequences of breaking electricity purchase contracts. When it is more fully understood in Kenya just what the scale of impact on Lake Turkana and the region would be, significant movement is possible.

4. *The regional and international security concerns attract international attention.* As the likely breakdown in local livelihoods and security becomes clearer with its potential to lead to cross-border and then regional conflict, pressure will be brought to bear on Ethiopia by regional and other security forces (including the US) to moderate their dislocations of water and people. Kenyan concern will also be focused once it realizes how serious this situation may become, right in the heart of the country's new oil fields, while threatening to expand the threats already posed in northeastern Kenya and to places like Eastleigh in Nairobi. The problems in Ilemi will particular capture attention, accelerated by the oil prospecting issue and cross-border movements. Since regional security concerns play the major role in constraining international pressure on the Ethiopians, a realization of the security consequences of these

⁵⁰ Studies were indeed conducted by USAID to explore this exposure, and they identified, albeit in a more preliminary way, most of the issues identified in this paper: Leslie Johnson *Ethiopia – Gibe III Hydropower*. Trip Report – January 12-30, 2009, and L. Johnson, *Kenya Assessment – Ethiopia's Gibe III Hydropower Project*. Trip report, June-July 2010, USAID Washington DC

⁵¹ As of mid-2012 Gibe III was reported approximately 50% completed, having been begun in 2006. Its imminent operation is reported each year by the authorities.

policies in the Omo Valley could lead to dialogue with the Ethiopians as to the extent to which the irrigation development and villagization are wise.

5. The international community and United Nations take action. The Lower Omo and Lake Turkana comprise a series of World Heritage Sites for their exceptionally important biodiversity and for the central role of this region in the human evolutionary story. The current development plans have caused UNESCO's World Heritage program to recommend placing these sites on the "at risk" list and have led to field investigations and consultations by UNESCO and the IUCN. These have enabled Kenya to express its concerns and been an embarrassment to Ethiopia, which is justifiably proud of its central role in the story of human evolution and civilization. As the profile of this case grows, the possible violation by Ethiopia of its World Heritage Convention Treaty obligations will strengthen the hand of responsible authorities in Ethiopia who are looking for policy approaches that better harmonize heritage and development. The surprising developments at the World Heritage Committee meetings in St Petersburg in June 2012 where the member governments on the committee (which included Ethiopia) declined to endorse the technical recommendation of "utmost concern" on the Gibe III issue (or virtually any other censure of government damming, mining or logging World Heritage Sites) has evolved into a wider debate about reducing political interference in the World Heritage Treaty, and is not a foreclosing of this issue for the Kenyan and Ethiopian Governments.⁵² As the situation worsens its profile will grow. Indeed, HRH Prince Charles noted concern in a speech during his African tour for:

"...the threat to Lake Turkana that supports the peoples and desert ecosystems of much of Northern Kenya and neighboring Southwest Ethiopia, including two World Heritage Sites, which would be devastated if its main source of water, the Omo River, were to be dammed and diverted for sugar and biofuels."⁵³

6. The rights of indigenous peoples are given greater attention. The expropriation of the lands of local people in the Omo Valley, and the consequences of all this for other indigenous peoples such as the El Molo of Lake Turkana, are clearly a violation of international human rights laws, notwithstanding the fact that the Ethiopian constitution declares that all land belongs to the state. At present it is only time (for these peoples to understand what is happening to them and to organize) and the security considerations of the major powers that are preventing these documented abuses having consequence for Ethiopia's aid and international relations. This acquiescence is likely to change as the pressure rises through instruments such as UNDRIP and the African Peoples Charter on Human Rights, as well as through growing international advocacy and publicity. Internal voices within the international agencies and western governments will intensify, questioning why the Ethiopian government is being enabled to do things which will have consequences that the international community will have to address. The question is whether this change will happen early enough to prevent the worst outcomes.

7. The unfolding environmental crisis receives international attention, and calls for solutions. To date, there has been little official international public outcry concerning the devastation of the Lower Omo and neighboring areas of South Sudan and Kenya, and the large scale imminent damage to, and potential destruction of, the ecology of the world's largest desert lake. As the effects of the hydro project begin to become visible, this may change. Lake Turkana is a region whose crucial ecology is well understood, with changes easily documented. It is also one of the most important areas for the study of human evolution. The importance of Turkana within the Rift Valley flyway to the bird populations of Europe will attract another set of advocates. Kenya is changing, and Kenyans may also raise environmental

⁵² For the thorough UNESCO review of the problem and the recommended decision see <http://whc.unesco.org/en/decisions/4411/>

⁵³ A speech by HRH The Prince of Wales on climate change and the environment at Cape Town University
Published on 5th November 2011

voices.⁵⁴ Internationally, one aspect of the story will be about the compliance of western donors with this destruction. The destruction of Turkana, if it proceeds, will become as notorious as that of the Aral Sea, tainting all those who perpetuate it.

8. *Northern Kenyans raise their voices and demand action.* The peoples of northern Kenya have won considerably more voice in Kenyan affairs in recent years, although they remain marginal to some aspects of decision-making. The rapid growth in the number and effectiveness of their local civil society organizations, the strong group of Members of Parliament and other representative elected leaders as well as many civil servants (including and especially in the Ministry of State for Northern Kenya and other Arid Lands) all mean that as they unite around this issue there is some chance that it will give the government cause to pause and tackle the problem.

Conclusion

This paper has sought to summarize the scientific and technical information available on the diverse consequences of the Omo River dams and irrigation developments on Southern Ethiopia, Northern Kenya and the wider region. Teasing out the multiple ways in which these schemes will undermine development, security and environmental and social well-being in the wider Turkana region, it points up the pathways which could help resolve this issue and which, if focused on and attended to now, could enable effective action before irrevocable damage is done. Urgent discussion in Africa of these risks is critical. The risks are too big for these efforts to fail.

⁵⁴ The Kenya government and Nature Kenya have developed a national program for understanding and protecting Kenya's deltas, and while that of the Omo is yet to be included in this effort, disruption to the delta will mobilize Kenyan concern.

As of Dec. 10, 2012, this paper had been endorsed by the following:

- Dr. Richard Leakey, Turkana Basin Institute, Stony Brook University
- Professor Eric Odada, University of Nairobi, Geology Department, Nairobi, Kenya
- Dr. William Oweke Ojwang, Assistant Director, Kenya Marine and Fisheries Research Institute, Kisumu, Kenya
- Dr. Alex O. Awiti, Ecosystems Ecologist, Aga Khan University, Nairobi
- Dr. David Turton, Oxford University African Studies Centre
- Robert Goodland, Formerly of World Bank Environmental Dept.
- Dr. Kate Showers, University of Sussex
- Sandra Postel, Director, Global Water Policy Project
- Brian Richter Director, Global Freshwater Strategies
- Dr. Lyla Mehta, Institute of Development Studies
- Mark Angelo Chair Emeritus, Rivers Institute at British Columbia IT
- Dr. Getachew Begasha, Harper College, Illinois
- Dr. Gregory Stanton, George Mason University, Washington, DC
- Professor David Woodruff, Director, Sustainability Solutions Institute, University of California San Diego
- David Hales, President, Second Nature; former Chair, UNESCO World Heritage Committee
- Dr. Richard Beilfuss, President of International Crane Foundation; Adjunct Professor for the University of Wisconsin-Madison College of Engineering and the University of Eduardo Mondlane in Mozambique