

# Humanitarian Catastrophe and Regional Armed Conflict Brewing in the Transborder Region of Ethiopia, Kenya and South Sudan: The Proposed Gibe III Dam in Ethiopia



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## **ABSTRACT**

The multiple impacts of a major hydrodam development project on Ethiopia's Omo River are examined through a resource use and natural system analysis focused on the half million indigenous people whose lives would be radically changed by the dam's downstream environmental consequences. The author warns of an impending human rights and ecological catastrophe that is being minimized by the governments of the three nation states that border the Omo and Lake Turkana basins. The very real threat of mass starvation and armed conflict in the border region of Kenya, Ethiopia and South Sudan is attributed to government and development agency inaction and indifference to the impacts of the dam project. Despite ample data to the contrary, development banks, industrial firms and governmental agencies have produced reports and plans that minimize the impacts and exaggerate the benefits. This interdisciplinary report serves as a critique of this process as it examines well funded and ostensibly authoritative studies that use limnological data, biological data, hydrology, and geology to make a case for the dam, while the author expands on the analysis using field data, socioeconomic studies and ecological as well as geological studies to call the wisdom of the project into question. The author has several decades of experience in the area, has published a monograph and articles on the Lower Omo Basin, and is currently engaged in cooperative research within the broader transborder region.

## PREFATORY NOTE

At stake with the planned Gibe III hydrodam on Ethiopia's Omo River is the political choice to either provide for the survival of hundreds of thousands of Sub-Saharan Africa's most impoverished and marginalized indigenous people and maintain the fragile peace in one of the world's most volatile border areas, or to bring mass starvation and death to these people, with the very high likelihood of unleashing regional armed conflict reaching across the borders of all three nations.

More than 500,000 indigenous people depend on the lower Omo River and Lake Turkana for their survival. The environments of both of these major bodies of water would be radically altered by the planned Gibe III dam, in turn causing destruction of the regions key survival systems.

Friends and enemies alike among these indigenous people face a unitary future: either survival or devastation. All evidence points to the reality that it will be the latter if the Gibe III dam is completed.

*This report is based on long-term, field-based research and experience in the region by the author, investigations by the South Omo/North Turkana Research Project, and input from professional researchers and public policy individuals associated with the Africa Resources Working Group.*

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The Omo River is a transborder river flowing southward from its source waters in the highlands of Ethiopia through broad, aridic lowlands to terminate at Kenya's Lake Turkana, which derives 90 per cent of its waters from the river. Access to Omo River and Lake Turkana pasturage, planting, and fish resources is a matter of life and death for more than a half million indigenous people from multiple ethnic groups.

Pushed by their determination to serve the goals of generating economic growth calculated at the national level, as well as revenue generation for the government and investors through the export of hydroelectricity, the Ethiopian government and international development banks have pursued the development of the Gibe III dam without regard for the catastrophic-level social and environmental consequences it will produce.

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**Completion of the dam in Ethiopia would radically reduce the Omo River's downstream flow (by at least 60-70 percent) and cause major retreat of Kenya's Lake Turkana. This precipitous loss of water would destroy the last remaining survival means of pastoralists, agropastoralists, and fishers living along the Lower Omo River and around Lake Turkana.** A extremely large number of people would face famine, disease, and death. Nearly unprecedented in scale of destruction, this human disaster would simultaneously bring war to the entire region, especially in view of the arms trafficking connected to the conflict in South Sudan and the widespread weaponry among the region's inhabitants.

The Gibe III dam is already under construction, and is a uniquely risky venture, in itself. It is located in a major seismic area of the world and subject to 20 per cent risk of 7 or 8 point earthquakes within the next 50 years, according to the U.S. Geological Service and the United Nations. Even a more moderate earthquake, coupled with highly plausible landslides and sediment buildup in the reservoir, could cause dam collapse, producing devastating human and environmental destruction on a scale far surpassing the worst such event in human history.

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**No environmental or socioeconomic impact assessment has been conducted for the actual impact zone of the planned Gibe III dam, which includes the transborder region, by the Ethiopian government or the international development banks financing the project.** The assessments that have been offered were produced three years after construction began, and are both fragmentary in the extreme and pervaded by major omissions and misrepresentations, even fabrications. These failings are not merely shortcomings; they are invalid as appraisals of one of the most consequential developments in recent times. All indications are that the Ethiopian government and international development banks and global commercial investors have operated with the precondition of approval of the Gibe III dam mega-project, despite the blatant absence of adequate assessment.

**Meanwhile, the Ethiopian government has already begun forcibly evicting thousands of indigenous villagers from their riverine lands, replacing them with private commercial and government agribusiness plantations with large-scale irrigation systems (including major canal construction), which a Gibe III dam would facilitate.** These developments were never identified in Ethiopian government planning or foreign advisory documents. These evicted villagers have been forced back into the ecologically degraded upland plains, without sufficient livestock to sustain them, or into the modern Omo Delta region, which is already crowded, with tens of thousands of Dasanech living there as agropastoralists, agriculturalists and fishers.

**Major water diversion from the Omo River is already underway, impacting the Omo River's inflow to Kenya's Lake Turkana and the of indigenous peoples who depend on the Omo Delta and Lake Turkana waters for fishing, agriculture and livestock-raising.**

Government corruption and political repression are rife throughout the Ethiopian region. Villagers are frightened for their lives, objection to eviction is brutally suppressed, and opposition to the dam is impossible to discuss openly among indigenous communities, let alone with the government. Non-government affiliated villagers universally deny that they have been consulted by the government regarding the development, despite government assurances to the contrary.

**Scarcity of water resources has already been identified as a potential major source of international conflict in the coming century.** Protest among Kenya's indigenous people is growing, with far more information and awareness of the planned development than exists in Ethiopia. It remains unclear how the Kenyan government will respond to its own indigenous people and their survival needs.

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Fig. 1. Location Map of Proposed Gibe III Dam and Impact Area





Photo Page 1. Turkana Herders and Fishers in the Lake Turkana Region.

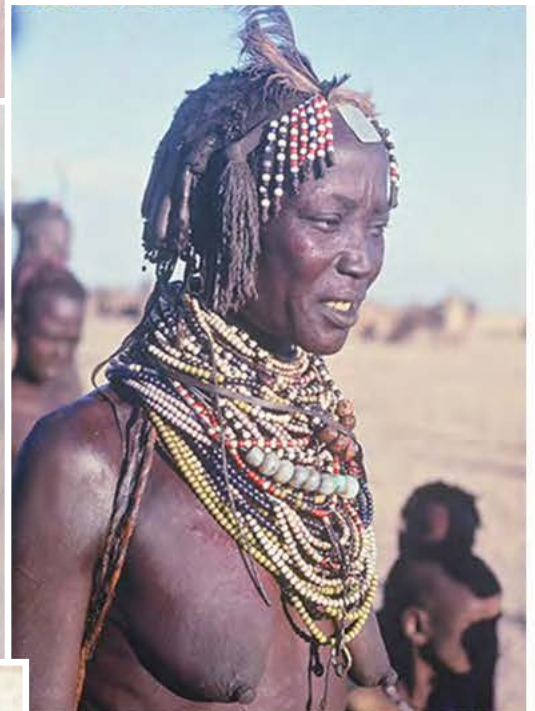


Photo Page 2. Dasanech and Nyangatom Herders, Planters and Fishers along the Lower Omo River.



## VOICES FROM THE TRANSBORDER REGION

*“In the time of our fathers and grandfathers, our land was the land of good grass and it was big [gesturing to the horizon]! The grass was tall for our cows and we moved our herds apart when danger came. Wild animals were everywhere. The river (Omo) gave us what we needed – water and also grass for our animals then. Our life was good... But look at our land now! It is bare and you can find our dying animals everywhere – by the thousands. Look at those carcasses! Our fathers and grandfathers did not know this hunger – they did not know this life. We have had to bring our villages to the river to find grass for our animals and to plant so we can feed our children. The poorest of us are even fishing. Now we are afraid that we will lose our river waters because growing our crops is the only way we can stay alive. What is happening to our land – do you know? Because we are afraid for our children and for their children.”*

(Dasanech male elder, West bank of the modern Omo River delta, in Ethiopia)

*“When I was young, we had much land [gestures to the West and the North]. Now much of the lands have been taken from us and they let others into our lands. Our land now has no grass except for short times when the rains come and even then the grass goes away quickly. Look and you will see carcasses of our animals everywhere! Now we have no camels left among our villagers and we have only a few goats. We have come to the lake (Lake Turkana) to fish with some family who came here before us. We are afraid that these few goats [gestures to four goats] will be gone soon too because we have few places to take them for grass and because the lake is too salty. We cannot go back to raising animals because we can barely survive with fishing. If we cannot fish, we will die here.”*

[Turkana female elder in village at Lake Turkana -West shore, in Kenya.]

*“If our children and our wives are dying of hunger, we will fight!”*

[Turkana male elders from Lokitonyella village, along Lake Turkana-West shore, in discussion.]

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*“They [the African Development Bank consultant party] came to our village and told us that there would be a wonderful new development that would bring us schools and more fish and shillings and a better life. We said that we heard about the dam and that the lake would go down and that we cannot lose our fish who mostly are at the shore. We don’t want the dam. They said that we were wrong and that the dam would be good for us. Then they went away. We do not know what they did after that.”*

[Adult male Turkana, at Lowarengak village, along Lake Turkana near the Ethiopia-Kenya border.]



The information and perspective presented here is based upon investigations conducted between 2008 and 2011. The research was initially supported by a foundation grant for work within Ethiopia, and was continued with funds from private individuals. The author's extensive research in a broader region of the lower basin and the Ilemi Triangle during the 1970s provided useful information and perspective for the present investigation, as did the experience of several other Africa Research Working Group scientists. Within Ethiopia, the author and SONT (South Omo/North Turkana Research Project) investigators focused research efforts along the lowermost Omo Basin, both east and west of the Omo River, and westward to the contested Ilemi Triangle borderlands of Ethiopia, Kenya, and South Sudan. More than a hundred thousand pastoralists, agropastoralists and fishers of several ethnic groups live in this region. Research in Kenya was carried out west of Lake Turkana, from Lodwar and the Ferguson's Gulf areas (Fig. 1) northward to the Ilemi Triangle. Hundreds of thousands of Turkana pastoralists and fishers reside in this broad semi-arid region. Field-based investigations included household surveys in both the lower Omo Basin and the Lake Turkana region, in-depth interviews and small-group discussions, extensive field reconnaissance, mapping with participation of indigenous communities, and discussions with local government, aid and development personnel.

Research in the region is difficult in logistical terms. This is particularly true in Ethiopia, where highly repressive policies by the Ethiopian government prevail. Political conditions within Ethiopia thwart the formation of any community wide 'voice' or dissent, with fear of government reprisal widespread in all village areas. The situation is markedly different in Kenya, where a number of civil society organizations (CSOs), or non-governmental organizations, have emerged in the central and northern Turkana region. These include **FoLT** (Friends of Lake Turkana) – a well-connected organization working in Nairobi (and internationally) as well as in the Turkana region, **OMOTU** (South Omo and North Turkana Project) – a grassroots and expanding organization primarily focused in northern Turkana and the transborder region, **TUDOF** (Turkana Development Organizational Forum) and **TURADO** (Turkana Pastoral Development Organization). These civil society organizations work cooperatively on development issues, as well as in matters related to the proposed Gibe III dam.

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## ACKNOWLEDGMENTS

This report is written with the benefit of communication with members of the Africa Resources Working Group (ARWG), a collection of 10 physical, biological and social scientists with decades of experience in the transborder region or comparable areas in Africa. They have contributed in fundamental ways to several dimensions of this report. Due to the sensitivities involved in conducting professional work within the Horn of Africa – particularly the Ethiopian government’s suppression of objective research and information gathering, most members of the ARWG have chosen to remain anonymous. A major portion of this work has been with the South Omo/North Turkana Research project (SONT), which I had the privilege of directing and working with on a daily basis. Even SONT members from Kenya remain unnamed here, since most of them regularly engage with local communities and officials within the Omo region of Ethiopia. My experience with villagers from three major ethnic groups in the region has long been extraordinarily positive and productive. I extend my deepest thanks to those within Ethiopia for their courage in giving voice to their own people in these times of crisis, as well as to Turkana residents throughout Kenya’s northwestern region, whose welcoming spirit and energy for dialogue is nearly unparalleled. My strongest thanks must go the Turkana SONT co-coordinator of field activities, whose deep intelligence and untiring efforts contributed to all dimensions of this effort, from 2009 to the present.

Apart from the ARWG and SONT, I wish to thank the following individuals for their valuable contribution. James Lindsay has offered critical support and extensive technical assistance and commentary throughout all dimensions of this work; his contributions have been essential to the efforts of many participants. Jeffrey Gritzner, a co-founder of the ARWG and participant since 2008, has offered advice throughout this research effort. Laura Daly has worked closely with me to produce all of the original graphics for this report – a daunting task since the transborder region is one of the least mapped and documented in Africa. Her creativity, technical skills and advice are deeply appreciated. Andrew Kreamer was a major contributor throughout the complex formative phase of the project; his work was absolutely essential to its development. James Carr offered long term support and perspective regarding many aspects of research within the Omo/Turkana region, including as a fisheries specialist and environmental consultant. Others who have made important contributions to this effort are Jason Gritzner, Hydrologist and Watershed Manager at the U.S. Forest Service, with his extensive experience in African river basins, and Steven Walter of the Earthquake Science Center and U.S. Geological Survey for the seismology report regarding the Gibe III region. George Leddy has offered incisive conceptual and technical advice throughout this effort, particularly with regard to his deep familiarity with geographic and political economy issues in developing countries. Richard Brenneman has brought an in-depth investigative approach and contributed in important ways to the final report. Joshua Dimon offered critical information and perspective regarding the expansion of extractive industry development in the region. I gratefully acknowledge the research or presentational assistance by Bertrand Johnson, Michal Karmi, Crossley Pinkstaff, Ann Kroeber, Juan Ramos, Dylan Kasch, Chase Livingston, Adam Gray and Kathy Sheetz. Finally, I wish thank Dr. Marion T. Hall for teaching me to see reality as such; my son Calen for his unwavering encouragement to go beyond what is easy to what is right; and to Leah, Marin and Jenesea for their ongoing patience and support. The views expressed in this report do not necessarily reflect those of any of these individuals.

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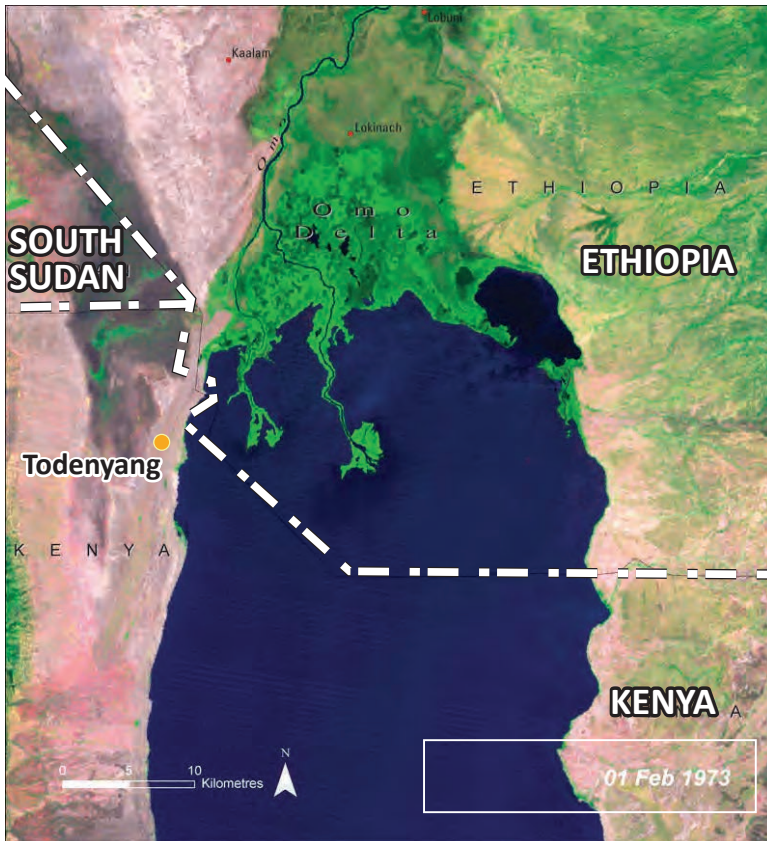
## ABBREVIATIONS

AFDB	African Development Bank
ARWG	Africa Resources Working Group
EEPCO	Ethiopian Electric Power Company
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EPA	Environmental Protection Authority, Ethiopia
ESIA	Environmental and Social Impact Assessment
FoLT	Friends of Lake Turkana
GOE	Government of Ethiopia
GOK	Government of Kenya
KMFRI	Kenya Marine Fisheries Research Institute
mg/L	milligram(s) per litre
NIVA	Norwegian Institute for Water Research
ppm	part per million
SONT	South Omo/North Turkana Research Project
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
USGS	United States Geological Survey
USAID	United States Agency for International Development
WB	World Bank

Fig. 1. Location Map of Proposed Gibe III Dam and Impact Area



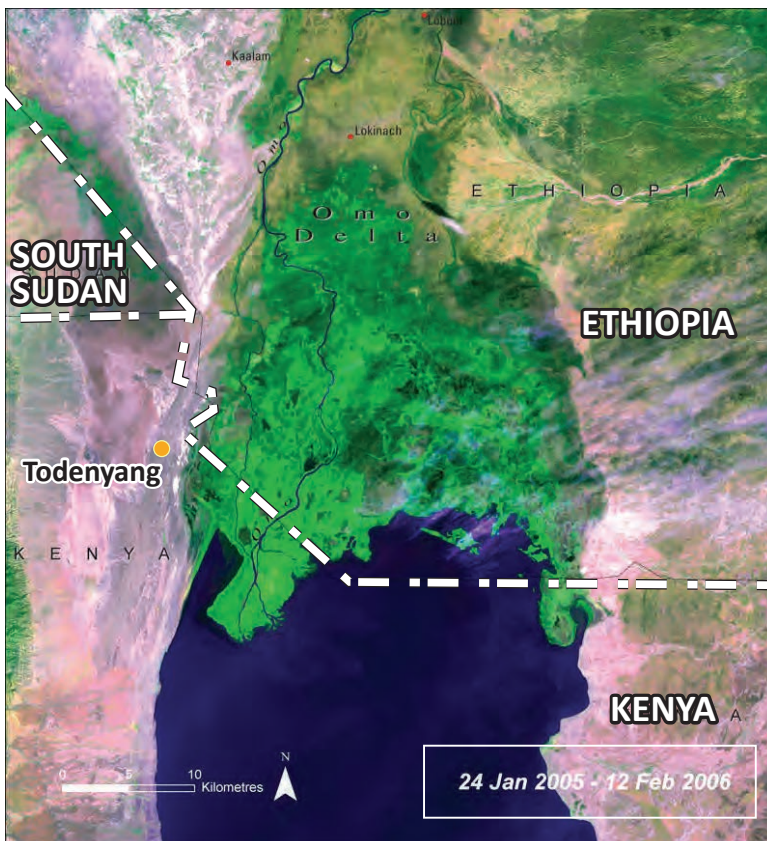
**Fig. 2. Omo Delta Expansion; 1973 to 2005**



**1973**



**2005**



Imagery Source: NASA

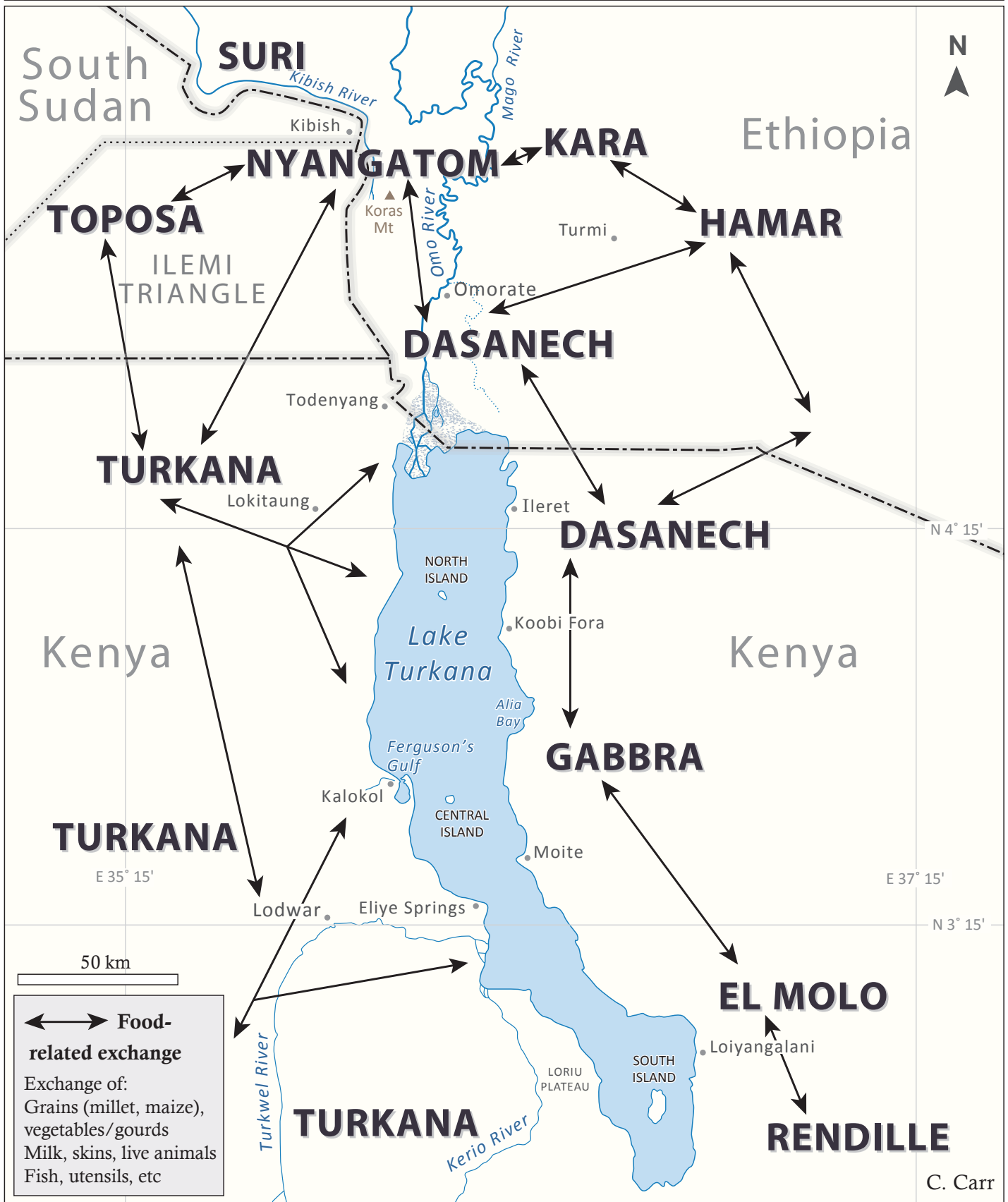
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Fig. 3. Ethnic Groups in Tri-Nation Transborder Region



**Fig. 4. Survival Systems: Food Related Exchange**

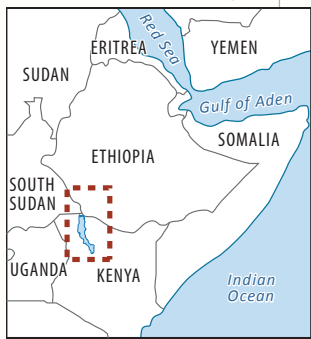
*Herding ↔ Herding-Fishing ↔ Fishing ↔ Agro-Fishing ↔ Agropastoral*



**Fig. 5. Indigenous Village Migration to the Omo River and Lake Turkana: 1960 to Present**



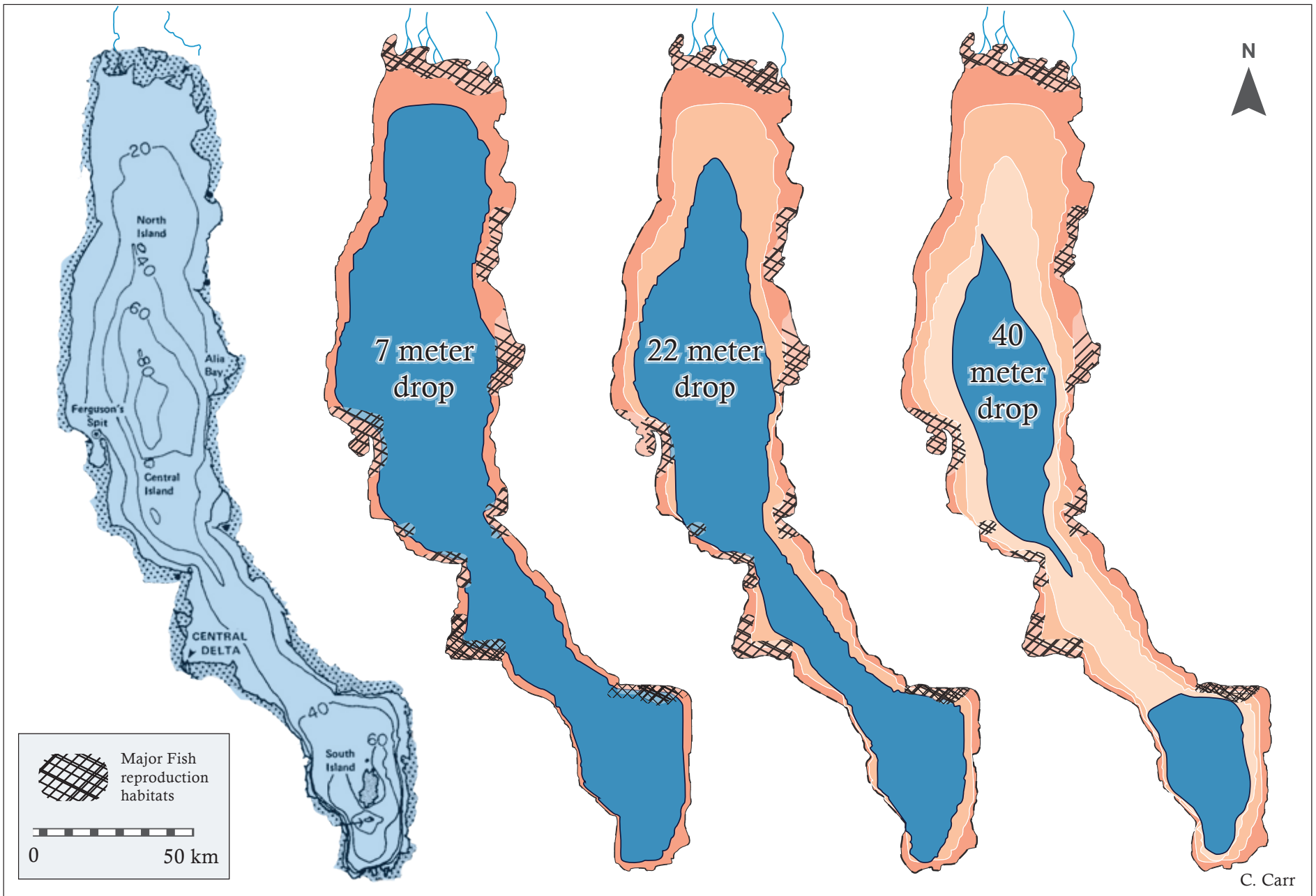
Source: South Omo/North Turkana Research Project



**Fig. 6. Seasonal Dependence on Omo River and Lake Turkana Resources by Pastoral, Agropastoral and Fishing Villages**

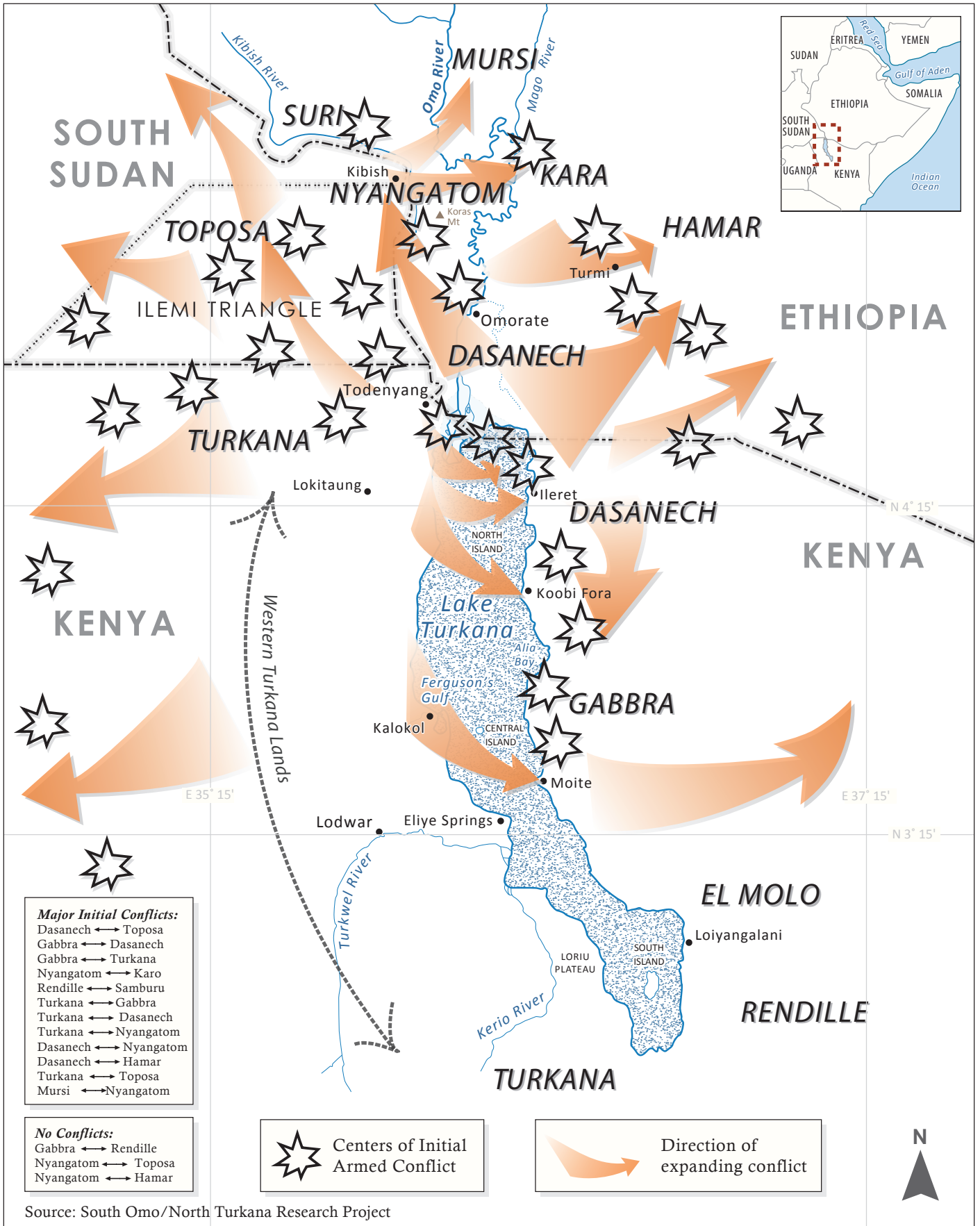


**Fig. 7. Lake Turkana: Effect of the Gibe III Dam  
Progressive Lake Retreat**

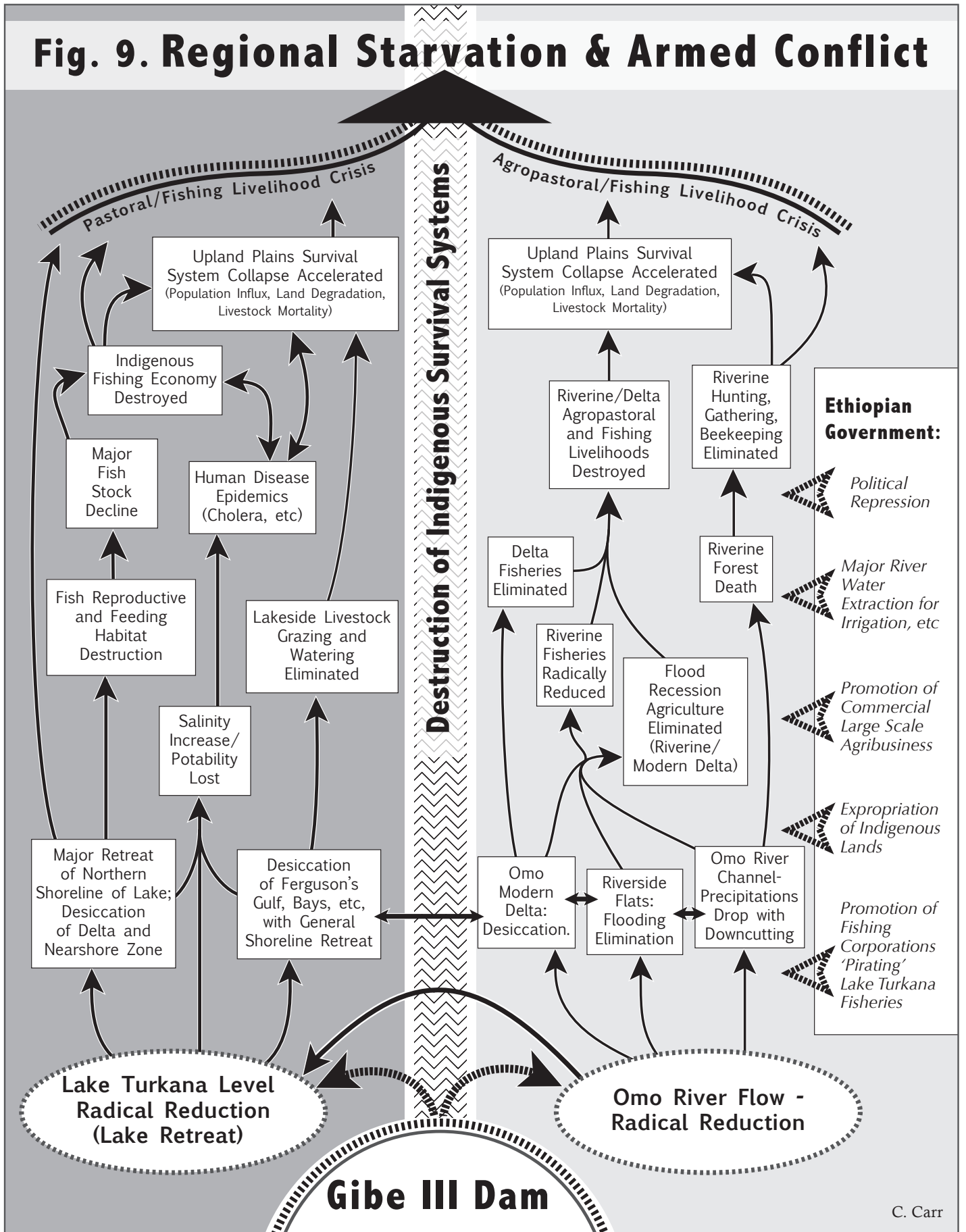




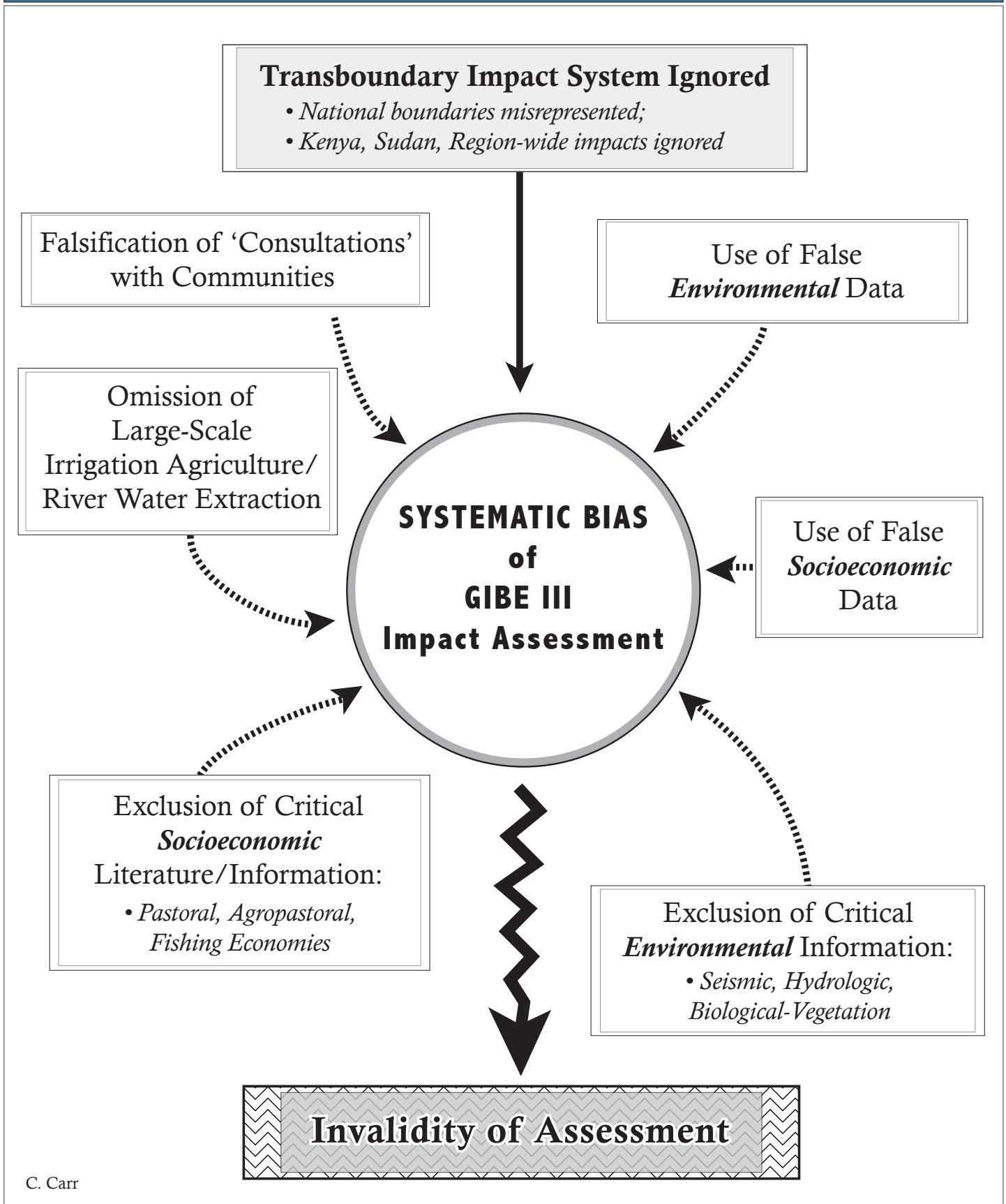
**Fig. 8. Expanding Armed Conflict From Proposed Gibe III Dam**



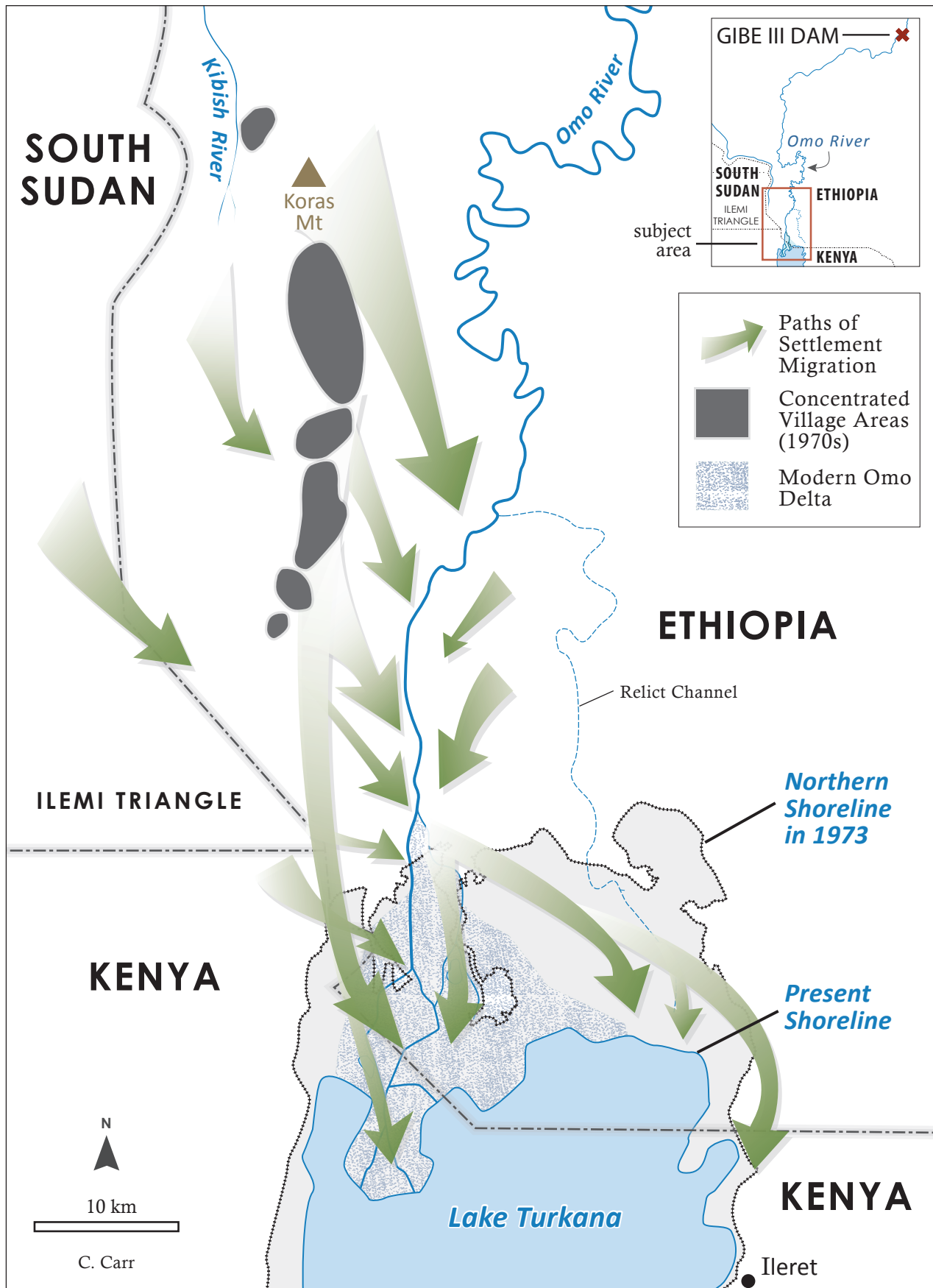
# Fig. 9. Regional Starvation & Armed Conflict



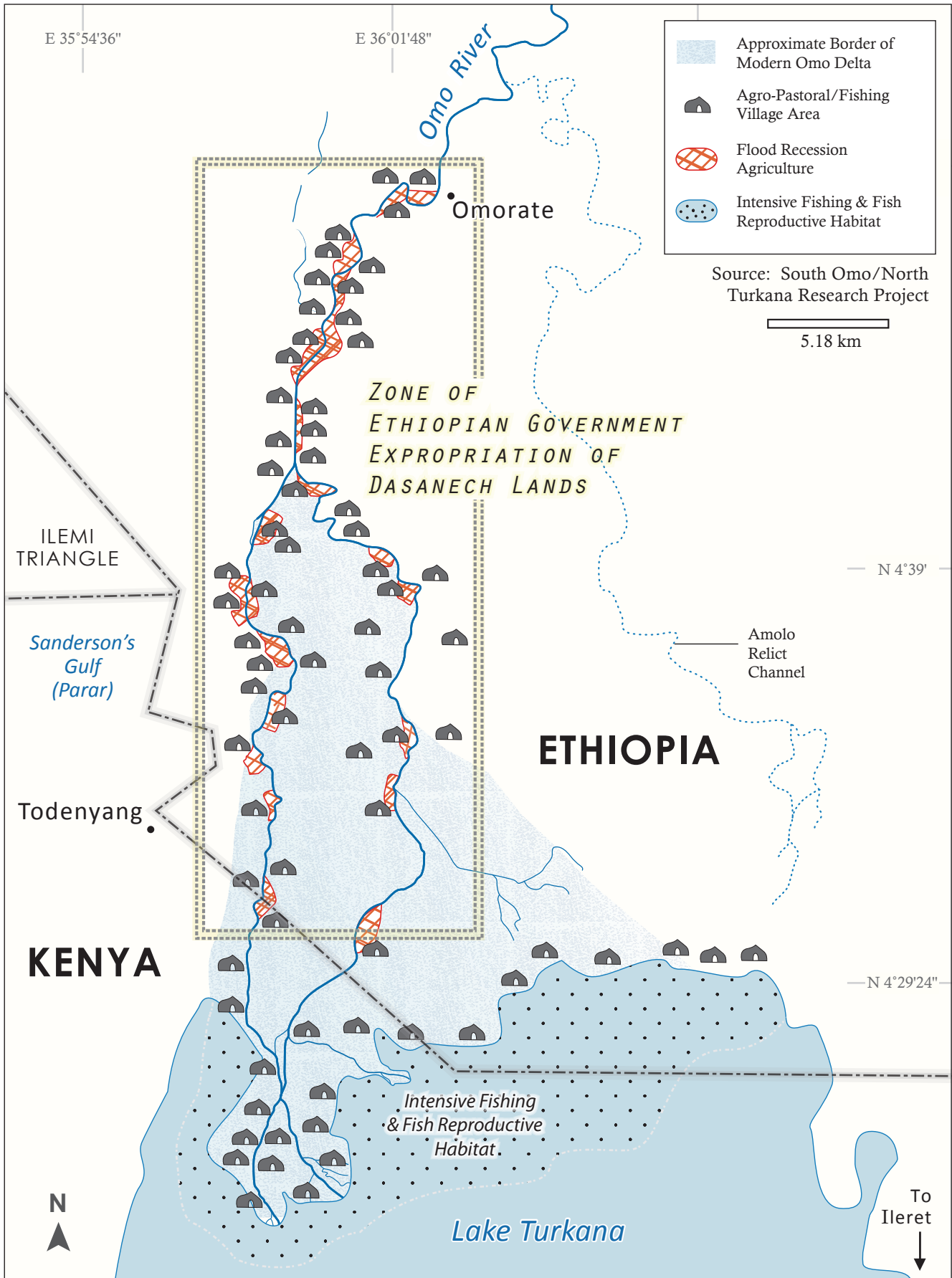
**Fig. 10. Invalidity of Ethiopia's GIBE III Impact Assessment:  
Dimensions of Systematic Bias**



**Fig. 11. Dasanech Settlement Migration to the Omo River/Lake Turkana: 1960 to 2010**

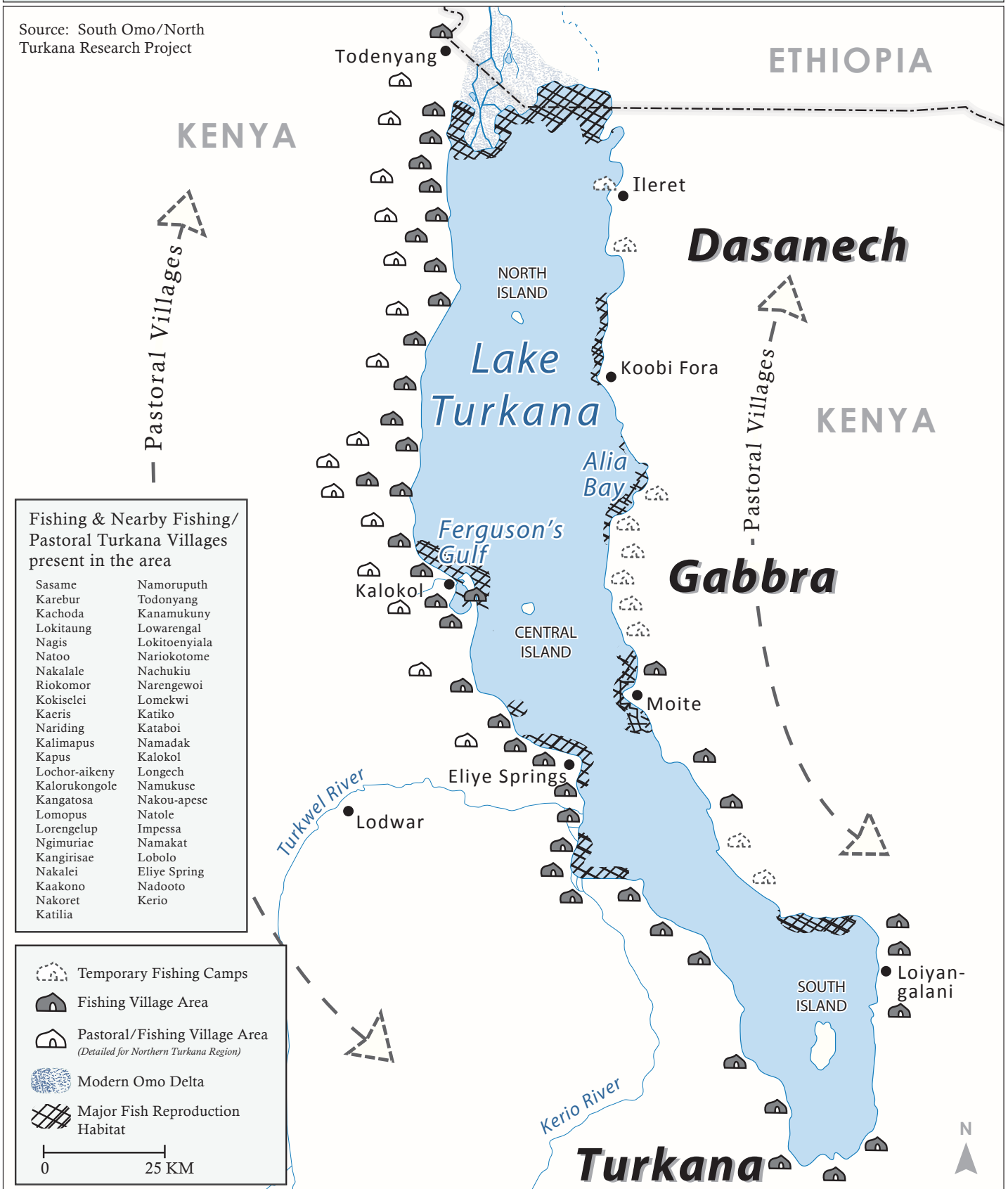


**Fig. 12. Dasanech Villages along the Omo River and Government Expropriation Zones**

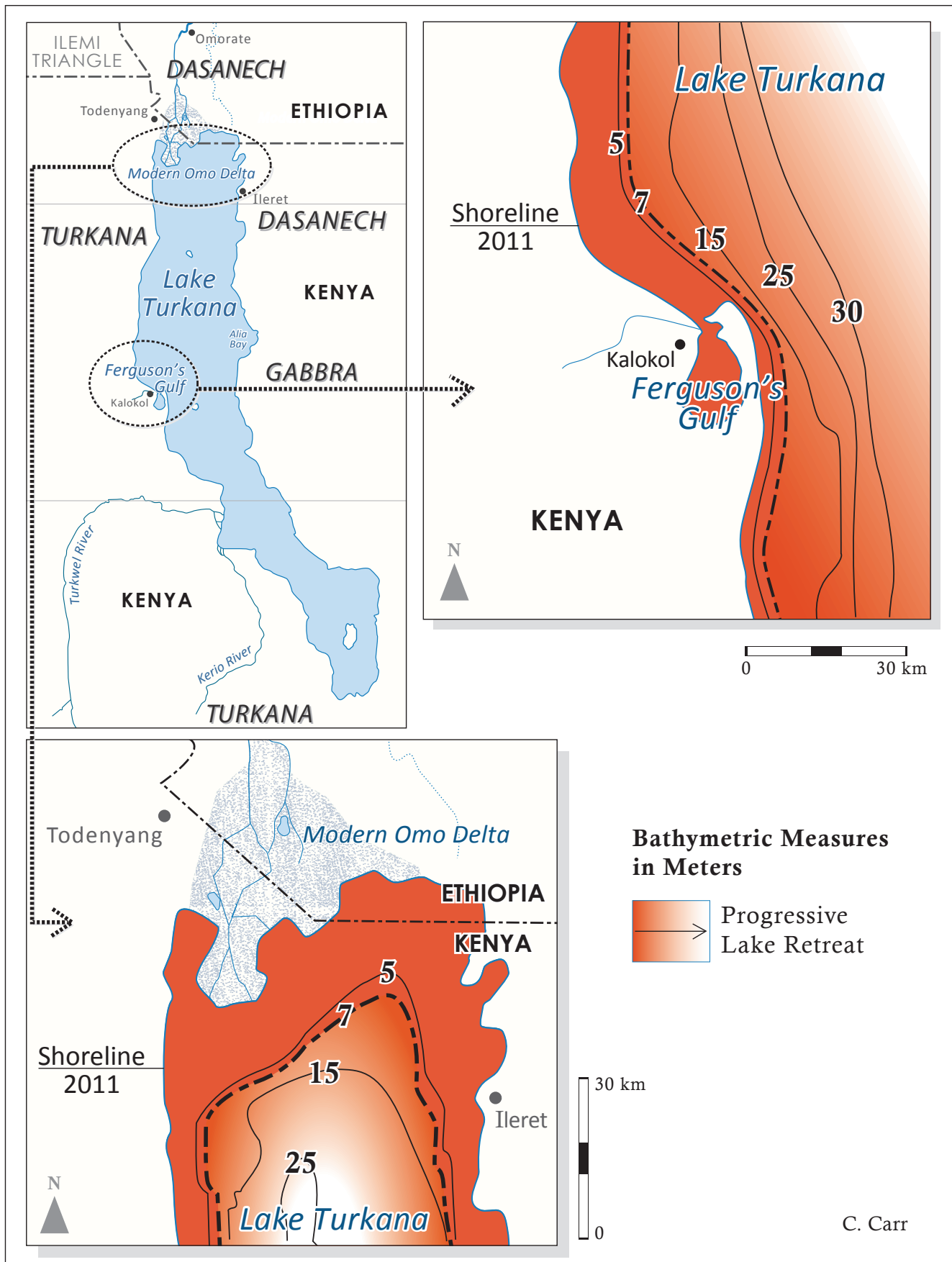


**Fig. 13. Turkana Villages Dependent on Lake Turkana Resources: A Fishing and Pastoral/Fishing Survival System**

Source: South Omo/North Turkana Research Project



**Fig. 14. Projected Lake Turkana Retreat in the Modern Delta and Ferguson's Gulf**







**Fig. 16. Lake Turkana Fish Species: Importance to Turkana Economy & Sensitivity to Lake Retreat**

Scientific/Common Names	Turkana Name	Area most fished by Turkana & Spawning Habitat	Importance to Turkana Survival System	Sensitivity to Lake Retreat
Tilapia spp, including: <b>T. nilotica</b> <b>T. galilaea</b> <b>T. zillii</b> Oreochromis <i>niloticus</i>	Kokine	Delta, near shore, Ferguson's Gulf, bays <b>Spawn:</b> Delta, Ferguson's Gulf, shorelines	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Loss of spawning habitat; desiccation of delta, shoreline, Ferguson's Gulf & bays.
Lates niloticus Nile Perch	Iji	Delta, north shore, North & Central Islands <b>Spawn:</b> Pelagic, but juveniles feeding in delta	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Feeding habitat & catch habitat destruction
Labeo Horrie	Chubule	Delta, nearshore, some throughout lake <b>Spawn:</b> Grassy shore areas	◆◆◆ Critical Consumption Marketing	<b>3 Extreme</b> <b>Loss of spawning habitat &amp; catch habitat destruction</b>
Distichodus niloticus	Golo	Delta, north shore, shorelines <b>Spawn:</b> Delta-Omo R. (grassy shoreline)	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning & catch habitat destruction
Clarias lazera Catfish	Kopito	Delta, north shore, near shore <b>Spawn:</b> Muddy shallow water, grassy reeds	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning habitat destruction
Synoclonotis sp.	Tir	Shoreline <b>Spawn:</b> Shoreline	◆◆◆ Critical	<b>3 Extreme</b> Spawning/ juvenile habitat loss
Alestes - including: A. dentex A. baremose A. nurse	Juuze	Delta, north shore, Ferguson's Gulf, bays, offshore, flood shallow <b>Spawn:</b> Delta, bays, North Island	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning/ juvenile habitat Destruction (except North Island)
Citharinus citharus	Gesh	Delta, north shore, near shore, general lake <b>Spawn:</b> Delta	◆ Significant Consumption (limited)	<b>3 Extreme</b> Spawning & feeding habitat destruction
Hydrocynus forkalii Tigerfish	Lokel	Delta, shoreline, offshore <b>Spawn:</b> Delta	◆◆ Major Consumption	<b>3 Extreme</b> Spawning habitat destruction
Barbus turkanae B. bynni	Momwara	Delta, near shore, offshore (schools) <b>Spawn:</b> Delta	◆◆ Major Consumption (limited) Marketing	<b>3 Extreme</b> Spawning habitat
Bagrus spp. Balck Nile Catfish	Loruk	Offshore/ demersal. <b>Spawn:</b> General lake	◆◆◆ Critical Consumption, Marketing	<b>1/2 Moderate/high</b>
Schilbe uranoscopus	Naili	Delta, north shore <b>Spawn:</b> Delta	◆◆ Major Consumption (northern region)	<b>3 Extreme</b> Spawning habitat destruction
Cichlidae	Loroto	Deltas, shallow water	◆ Significant Consumption Marketing	<b>3 Extreme</b>
Bagridae- (giraffe catfish)	bulubuluch	Delta only	◆ Significant Consumption	<b>3 Extreme</b>

**Key:**

- Importance to Turkana Survival System: ◆ = significant, ◆◆ = major, ◆◆◆ = critical
- Sensitivity to Lake Retreat: 1 = moderate, 2 = high, 3 = extreme

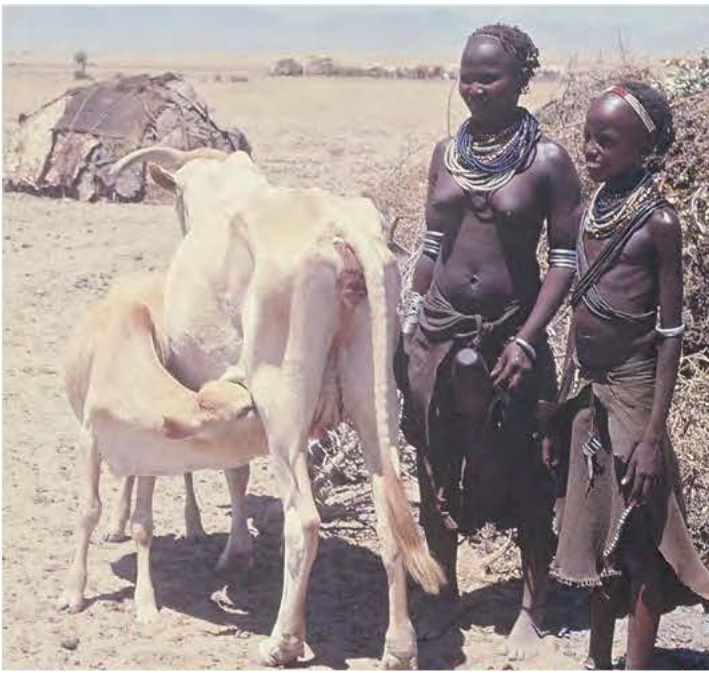
## I. THE TRANSBORDER CHARACTER OF GIBE III DAM IMPACTS

The transborder character of the indigenous peoples and habitats in the impact zone of the proposed Gibe III dam is essential to understanding its geography. In recent decades, the indigenous peoples and environments throughout most of the transborder region have been facing common external forces that challenge not only their way of life, but also their very survival.

The following are key components of the transborder impact system:

- **The Omo River is an international river**, flowing southward from Ethiopia's highlands to Kenya's Lake Turkana, terminating in Kenya where it provides at least 90 per cent of the lake's waters. The recent southward movement of the lake and expansion of the modern delta has increased the proportion of the Omo River Basin that lies within Kenya. Lake Turkana is the largest lake in Kenya and the fourth largest in Africa.
- **The annual flood of the Omo River** (generally between August and December) generating In the Ethiopian highlands creates a 'pulse' of fresh water, sediment and nutrients into Kenya's Lake Turkana - sustaining the lake's waters and critical fish reproductive habitat in the northern shoreline/ delta area, as well as in Ferguson's Gulf and other bays and inlets around the lake.
- **An integrated, transborder and complex food-related exchange network is essential to the survival systems of the region's ethnic groups.** Survival stresses with loss of food production in one portion of the transborder region spread rapidly throughout the multi-ethnic exchange system, so that the fate of one ethnic group becomes the fate of nearly all.
- **Dispossession of pastoralists in all three national areas (Ethiopia, Kenya and the Ilemi Triangle/South Sudan) by powerful external economic and political forces - governmental and commercial - has caused major overcrowding and decline of herds in all three transborder regions.** Recent government policies promoting 'development' of water, agricultural and fishing commercial ventures have also adversely and profoundly affected the survival of groups throughout the border area. The assertion of specific national boundaries and 'proxy' use of ethnic groups by the three governments to assert 'rights' within the region in recent decades have created an arms epidemic and further destabilized the region.
- **A major seismic event in the main Ethiopian Rift Valley system has a 50 per cent likelihood of occurrence within 50 years**, posing the real possibility of dam collapse (a possibility even with more moderate seismic activity if combined with landslide occurrence or sediment buildup behind the proposed dam) which would cause unprecedented catastrophic human, livestock and environmental destruction throughout the entire Ethiopian downstream zone along the Omo River and throughout Kenya's Lake Turkana region and would reverberate throughout the broader region.

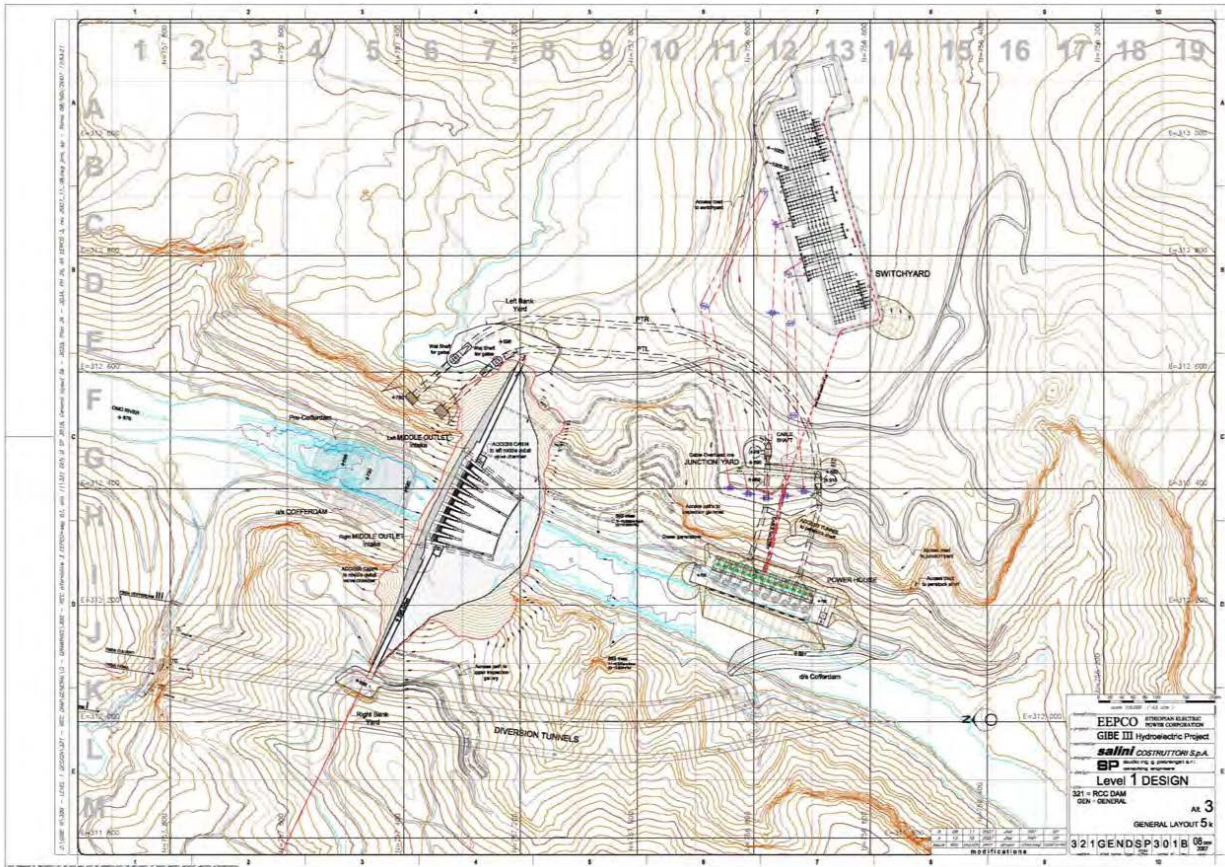
### Livelihoods in the Transborder Region



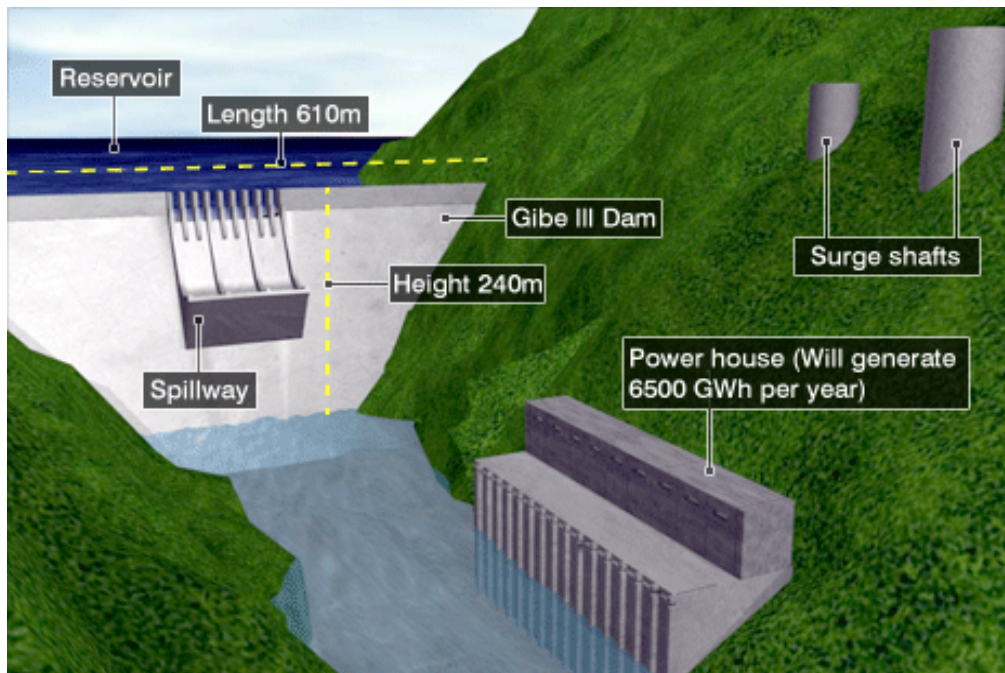
**Photo Page 3. Major Livelihoods in the Transborder Region.** Left photos: Dasanech - Herding and Flood Agriculture Along the Lower Omo River. Right photos: Turkana fishers (fish drying, boats along lakeshore) and herders at deep well in dryland plains West of Lake Turkana.

## II. THE RUSH TO RATIONALIZE: PLANNING THE GIBE III DAM

- Plans to dam the Omo River were initiated at least four decades ago by the World Bank and its Ethiopian associates. These plans have persisted through three major government transitions - from the Ethiopian monarchy through the Soviet-backed Derg, to the present-day authoritarian Ethiopian regime.
- Actions taken by the Ethiopian government to build the Gibe III dam have violated that nation's own domestic laws. And international development banks, notably the World Bank and the African Development Bank (AFDB), have likewise failed to meet their own procedural requirements for assessment, consultation, and oversight, as well as those of their major donor countries.
- The Ethiopian government (GOE), in response to intensifying pressure from critics, produced an impact assessment of the Gibe III dam in early 2009, two years after project construction began. This assessment omitted the proposed dam's major impact zone – namely, the vast downstream region where 500,000 of Africa's most malnourished indigenous people struggle for bare survival. A subsequent downstream assessment was produced in 2009 – one portrayed as sufficient for environmental and socioeconomic impact analysis. Like its predecessor, this document too must be regarded as invalid as an impact assessment, due to its:
  - (1) Pervasive bias, with major omissions, misrepresentations and fabrications of the environmental and social realities of the downstream region;
  - (2) Failure of disclosure, including the massive scale of forcible eviction and repression of indigenous communities along the Omo River, and plans to replace them with private corporation and government export agriculture schemes; and,
  - (3) Disregard of transborder impacts in Kenya and South Sudan and the Ilemi Triangle, including on 300,000 indigenous Kenyans who live around Lake Turkana, the fisheries and water quality of Lake Turkana, and indigenous pastoralists in the transborder region. These impacts can be reliably expected to intensify the serious armed conflict already underway in this area, generated by desperate competition for rapidly diminishing natural resources.
- Political repression by the GOE has blocked dissemination of basic information and consultation and suppresses all Ethiopian dissent concerning the project – sometimes brutally so - particularly among the indigenous people most directly affected.
- Kenyan government complicity and now active participation in the project is increasingly opposed by its own indigenous people and other critics pointing to its mandate to protect this most marginalized population within its border and its failure to responsibly assess the project's impacts or consult with communities. The outcome of this intensifying situation remains unclear.



Source: Gibe III – Environmental and Social Impact Assessment, 300 ENV R CS 002 C - A9003099, page 5, CESI SpA - Mid-Day International Consulting Engineers



Source: grandmillenniumdam.net <http://grandmillenniumdam.net/gilgel-gibe-iii-dam/>

The Ethiopian government holds that economic ‘progress’ rests with massive hydropower projects, even though most analyses have shown that these huge and costly projects generally undermine the survival systems of the rural poor and do not contribute to the nation’s broad development, whereas smaller scale water projects can actually meet the needs of the poorest people while bringing lasting benefit to the nation.

- The Ethiopian government (GOE) maintains that the proposed megadam would improve life conditions for the rural population in the project area and is ‘the pillar of Ethiopian development’ and its ‘national interest’. However, electricity generated for Ethiopia itself would be sold to commercial agriculture, industries and others who could purchase it.
- Revenue from electricity export (primarily to Kenya) would benefit top government officers and a small number of foreign investors and local elites. By contrast, the Ethiopian citizenry faces hundreds of millions of dollars of new debt along with major financial risk and predictable humanitarian and political disaster.

**The indigenous population downstream from the proposed dam – facing eviction and certain to suffer grave consequences from radically reduced river flow – needs food and access to *more* water and land, not less.**

- **If completed, the Gibe III dam, at 242 meters, would be the largest power project in Ethiopia and one of the tallest dams in the world – surpassing the Three Gorges dam in China, for example.** The Gibe III reservoir would be 150 km long, in a narrow gorge with an area of 211 square kilometers and a storage volume of 11,750 million cubic meters, an amount equal to about two years of the Omo River’s flow at the dam site. A roller-compacted concrete (RCC) gravity dam is now under construction; the Gibe III private-public project was initially designed as a rock-filled structure. Its infrastructure construction was already well underway before the ill-advised earlier design was replaced.

**The Goliath among dam projects in Ethiopia to date, the Gibe III is expected to have an electricity generating capacity of 1,870 megawatts, roughly doubling Ethiopia’s installed capacity. Much of the power generated, however, is slated for export: at the time of this writing \$400 million in export earnings are planned – primarily from purchase by Kenya.**

Initially, the Ethiopian government (GOE), the World Bank, and other potential international investors considered the export market for the planned dam’s power generated to include Egypt, Sudan, Yemen, and Kenya, specifically, export capacity of 200MW to both Djibouti and Sudan, and 500 MW to Kenya. Recent political events, however, have necessitated a shift to marketing primarily to Kenya, with possible World Bank funding for power transmission development<sup>1</sup>.

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<sup>1</sup> The World Bank reports that an investment of “US\$1.3 billion at completion, eventually benefiting 212 million people living in five countries with a combined GDP of US\$107 billion” would be planned.

Political changes in Egypt, for example, sustain, albeit in uncharted fashion, the major controversy between Egypt and Ethiopia regarding Ethiopia's plan for major dam construction on the Blue Nile. This controversy, historically fueled by the enthusiasm of international development banks for funding such development, continues to unfold and, along with the general economic challenges in Egypt, promises to curtail any plan for export of substantial quantities of energy from the proposed Gibe III dam. Yemen, too, may have receded as an export market due to the political upheaval underway there.

- **Planning for hydrodam along the Omo River in Ethiopia has been underway for decades, with the World Bank playing a key role.** The World Bank acknowledges involvement in the dam's planning only since the early 1990s, whereas in fact it has been actively engaged since at least the early 1970s.<sup>2</sup>

The fall of the Haile Selassie monarchy and the thirteen-year, Soviet-backed Derg regime effectively put the implementation of large dam construction on the Omo River on hold. Only one power project was implemented during the Derg regime. The downfall of that regime and its replacement by the pro-western government in the early 1990s clearly facilitated the continuation of active hydrodam planning.

A major turning point in the nation's progression of dam development transpired from the release by the Ethiopian government (GOE) of the Omo-Gibe Basin Integrated Development Master Plan in 1996. This plan was updated for the GOE in 2005 by a Canadian firm, Acres International Ltd., with an aggressive program aiming to triple Ethiopia's power production within five years to 2,842 MW at a cost of 4 billion Euros.

In order to streamline and promote the aggressive new hydroelectric development program, administrative changes were made soon after the 1996 Master Plan was released. These changes included the formation of the state-owned electric utility company, the Ethiopian Electric Power Corporation (EPPCO), which manages and develops electricity generation transmission and distribution operations in Ethiopia. While strengthened over its predecessor agency, EPPCO is subordinated to the Ethiopian government's highest Executive offices.<sup>3</sup> Hydrodam construction became an accelerating enterprise on the part of both the Ethiopian government (GOE) and potential international investors.

- **The Ethiopian government and its supporters consistently characterize the hydropower development program as critical to national energy security and the national interest, both to meet domestic demands and reduce poverty and to increase exports of electricity.** The Gibe III has been consistently referred to by the GOE as the "Pride of Ethiopia" with criticism of it taken to be against national security.

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<sup>2</sup> The World Bank's involvement dates back to at least the 1960s when it was engaged in overall planning for Ethiopia, including the Koka Dam in the highland portion of Ethiopia's Awash River. (The author met a World Bank engineering consultant just above the Omo delta in 1972, for example, a specialist who described his mission as "studying the river's hydrodam potential for dam construction.")

<sup>3</sup> EPPCO replaced the Ethiopian Electric Light and Power Authority (EELPA), which was established in 1955 and oversaw the development of numerous dams, including the Koka Dam on the Awash River, as well as subsequent Awash River dams (Awash II and Awash III).

In this way, the groundwork was laid for fast-tracking the program, including by nonexistent (and later, fully biased) assessment that disregards the project's grave effects on even the bare survival of Ethiopia's downstream indigenous people who will bear the brunt of such development. In contrast, the urban classes, industrialists (manufacturing and agribusiness), and those affiliated with the export market are expected to benefit, and those benefits are cited as a key justification for the project.

The authoritarian character of the present government has facilitated the 'fast track' approach with what quickly emerged as a negligent and corrupt process, with major repressive policies immediately imposed in the Lower Omo River where major new physical infrastructure as well as new administrative and police presence were developed.

**The Ethiopian executive offices and EEPCO submitted no project documents to the government's Environmental Protection Authority (EPA) prior to the beginning construction of the project (roads, infrastructure, etc.).** Nor did the EPA perform the task of an environmental and socioeconomic impact assessment, despite national legislation requiring such oversight. The Ethiopian government's insistence that required procedures have been adhered to is false.

Since the Ethiopian EPA is also directly subordinated to the Ethiopian government's top executive office, there is no accountability transparency in the system beyond window dressing in purely formal bureaucratic terms. This reality is well known to the World Bank (WB), African Development Bank (AFDB) and the European Investment Bank (EIB), all of which ultimately declined to fund the project but did little by way of criticism of it. The development banks have consistently turned a blind eye to this breach of assessment or oversight within the GOE.

**No competitive bidding process was initiated, although Ethiopian law requires it.**

The lack of a competitive bidding process rendered the project ineligible for explicit World Bank funding, creating a more complicated situation for the World Bank's longstanding involvement in hydrodam planning within the country. The Bank continued to press for the project, however, including through its close affiliate, the African Development Bank (AFDB) and later re-entered the project as the potential 'lynchpin' funder for the transmission of electricity marketed to Kenya.

**Insufficient funding for the Gibe III project notwithstanding, construction commenced in 2006.** This action could be easily interpreted as reflecting the major political as well as financial significance of the Gibe II project to the Prime Minister and his associates in the government, as well as assurances from private financial investors. For example, the Italian construction firm, Salini Costruttori S.P.A., international development banks, and western nations – particularly the United States – have their own agendas that support the project.

- **Investigations of public investment projects by externally based researchers (European/Ethiopian diaspora) elucidate the top-down project approach and the lack of accountability within the GOE.** These studies are consistent in indicating:



- Absence of communication between project officials (in the formation and implementation of policy) and those affected by them.
- Disregard for feasibility studies that would not justify the projects, along with pervasive bias, inaccurate cost estimations, and project failure.<sup>4</sup>

➤ **The first environmental impact ‘assessment’ for the project was produced two years after construction began**, and even then, only for the immediate dam construction zone. *[REF]* Reaction by civil society was swift, although not within Ethiopia, given the repressive political conditions there.

**In 2008, the GOE (EEPCO) released its "Gibe III Hydroelectric Project Environmental Impact Assessment (EIA),"** prepared by the Italian firm Centro Elettrotecnico Sperimentale Italiano (CESI) for the GOE and the Italian firm, Salini Costruttori S.P.A. The Italian company included vendors who were scheduled to profit from the project, underscoring the illegitimacy of the ‘assessment’ process. Salini was the major contractor for Gibe II and other associated development, as well. The scope of that assessment was limited to environmental description in the immediate vicinity of the proposed Gibe III dam. The absence of environmental and social impact assessment of the planned dam's major impact area - namely, the vast region downstream from the proposed dam - sparked outrage from international environmentalists.

Critics of the GOE's alleged assessment of the project included the esteemed Kenyan paleontologist, scientist and former Minister, Richard Leakey, a variety of non-governmental organizations (NGOs) including Survival International, International Rivers, Campagna per la Riforma della Banca Mondiale (CRBM), and an emergent Kenya based civil society organization, Friends of Lake Turkana (2010). Added to these voices were those of individual academics, including David Turton and associates at Oxford University, and the Africa Resources Working Group (ARWG), co-founded by the author. With varying emphases, these critics pointed out the dire social and environmental consequences of the planned dam for half a million indigenous people residing downstream from the dam who depend on the Omo River or Lake Turkana for their survival.

A new assessment was released by the GOE, in April 2008, although it was not generally available until months later. This commissioned GOE report, prepared by Agriconsulting of Italy in association with MDI Consulting Engineers, is entitled **“Gibe III Hydroelectric Project: Environmental Impact Assessment - Additional Study on Downstream Impact”**. **[Note: Unless otherwise specified, references to the GOE’s assessment of the downstream impacts of the Gibe III dam refer to this 2009 report.]**

Meanwhile, J.P. Morgan Chase and SACE (the Italian export credit union) rejected funding the hydropower project in 2008 (apparently, following strong concerns raised by a number of Italian NGOs, and the Italian Foreign Minister). Construction continued, however, despite insufficient funding.

The ARWG responded to the GOE's 2008 (Agriconsulting/MDI) assessment in January of 2009 with its report, "A Commentary on the Environmental, Socioeconomic and Human Rights

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<sup>4</sup> For example, see Klakegg and Haavaldsen (2011, n.a.) and the World Bank (2004).

Impacts of the Proposed Gibe III Dam in the Lower Omo River Basin of Ethiopia." On the basis of its evaluation and long-term experience in the region, the ARWG concluded - with some detail - that the GOE's downstream environmental and socioeconomic assessment rests on a series of faulty premises and that it is further compromised by pervasive omissions, distortions and obfuscation, despite the GOE's presentation of copious allegedly 'empirical' data. The ARWG Commentary enumerated these failings for a number of impact dimensions - primarily for the lowermost Omo basin.

In response to a GOE request for funding of the Gibe III project, the European Investment Bank (EIB) commissioned an independent review of GOE's downstream environmental (and socioeconomic) impact assessment with Sogreah Consulting. The EIB released its Final Report, "Independent review and studies regarding the Environmental & Social Impact Assessments for the Gibe III Hydropower Project" in May 2010. The EIB review raised several major criticisms of the GOE's assessments (discussed in a later section). By its own Terms of Reference, however, the EIB review had major shortcomings, not least of which is its fundamental reliance on invalid information from the GOE assessments. The EIB ultimately declined funding the project, after 'several studies', but according to a 2012 report by Human Rights Watch, it later issued a statement that *'the decision was not the results of [these] preliminary studies.'* In other words, while declining funding, the EIB did not explicitly challenge the soundness of the project.

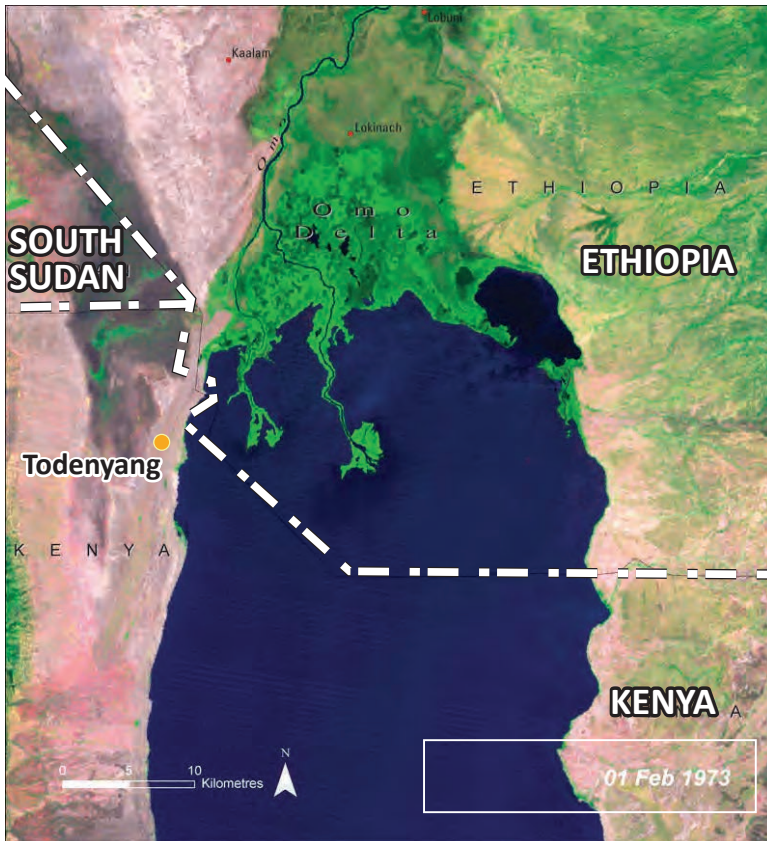
China came to the GOE's assistance on the project in 2010. China is a major player in extractive industries throughout the Horn region, including in Ethiopia. The state-owned Industrial and Commercial Bank of China (ICBC) entered into negotiations and signed an agreement in May of 2010 for a \$459 million contract to be awarded to Dongfang Electric Corporation for turbines and electro-mechanical works. This included a \$420 million loan from the Industrial and Commercial Bank of China (ICBC) to finance construction costs.<sup>5</sup> A Chinese construction company was also contracted to build the Tekeze Dam. There is additional support for the Gibe III from Exim Bank of China, for the transmission line to Addis Ababa). At the time of this writing, the World Bank is negotiating to finance the transmission lines to Kenya, despite no transparent review process Chinese participation in funding the Gibe III, whether fully implemented or not, effectively intensified the struggle over support for the Gibe III project.

**The expansion of the Omo River's modern delta southward into Kenya's Lake Turkana by at least 500 square kilometers in recent decades has increased the transborder nature of the Omo River and its environments, as indicated in Fig. 2.**

**The transborder nature of the impact system – both because the Omo River largely terminates in Kenya and because Kenya's Lake Turkana receives 90 per cent of its waters from the Omo – has been critically ignored in development bank and Kenyan government considerations and statements.**

<sup>5</sup> As reported by International Rivers ("China's Biggest Bank to Support Africa's Most Destructive Dam," May 13 2010, <http://www.internationalrivers.org/2010513/china%E2%80%99s-biggest-bank-support-africa%E2%80%99s-mostdestructive> dam (accessed July 6, 2011).

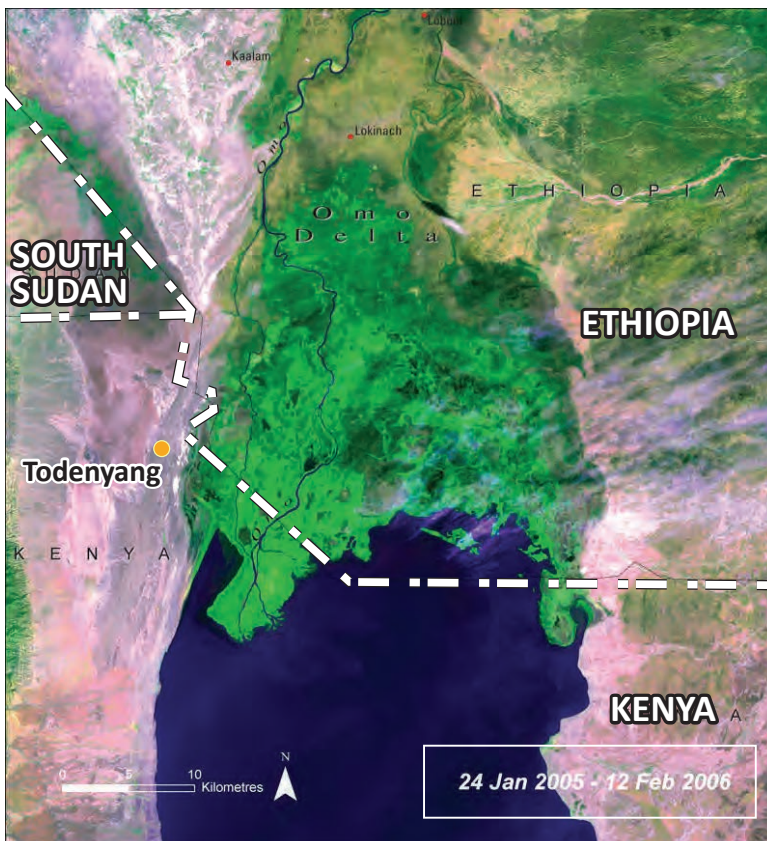
**Fig. 2. Omo Delta Expansion; 1973 to 2005**



**1973**



**2005**



Imagery Source: NASA

C. Carr

There is clear precedence for the omission of Ethiopia-Kenya transborder concerns on the part of policy makers with regard to the Omo River, prior to this downstream EIA for the Gibe III. For example, the World Bank, in a 2004 document, states:

*“There is no significant use of the Omo River by any other country and the river enters Lake Turkana within the boundaries of Ethiopia. It should therefore be relatively easy to negotiate a ‘no objection’ from Kenya should that be required for multilateral/bilateral funding.”* (The World Bank was already actively investigating the economic potential for hydroelectric development along the Omo River by the early 1970s).

Despite of its well developed administrative structure for environmental and social evaluation of development projects and their potential impacts on Kenya’s rural people, the Kenyan government (GOK) has not undertaken significant investigation of Gibe III effects on at least 200,000 to 300,000 Kenyan indigenous people, including tens of thousands of people in the Omo Delta, living in the region. The Kenyan National Environmental Management Authority (NEMA) is designated as a key player in such assessments. An increasing number of local citizen groups and professionals view this inaction as in violation of the recently established Kenyan Constitution.

Kenyan government (GOK) statements concerning the proposed Gibe III project have in fact been increasingly in support of the dam, including with Kenya’s internationally supported Memorandum of Purchase of 500-megawatt hours of hydroelectricity from the dam. Most recently, the Kenyan government has reportedly been negotiating with foreign investors for possible irrigated commercial agricultural development in its border region at the northwest extreme of Lake Turkana, west of the Omo River where the Ethiopian government has already undertaken canal building for major diversion (abstraction) of the river’s waters.

Coordinating with the two major development banks active in Kenya, the World Bank and the African Development Bank (AFDB), executive offices of the GOK, along with private corporate oil and gas, infrastructure construction, and other interests in East Africa, have essentially ignored the predictable impacts on the indigenous people around Lake Turkana, Kenya’s major internal Rift Valley lake. Indigenous pastoralists and fishers living around Lake Turkana already face severe malnutrition and periodic famine, as well as some of the worst outbreaks of cholera and other diseases in Sub-Saharan Africa.

Although the World Bank earlier ‘declined’ funding for the Gibe III project because of Ethiopia’s violation of environmental/socioeconomic impact assessment, the Bank is apparently in the final phase of its consideration of large scale funding (possibly \$700 million) for a 1,000 kilometer transmission line that would link Kenya’s power grid to the Gibe III dam. No impact assessment of the project generating the electricity for the proposed transmission lines has been made available and there is no indication of the World Bank’s own prescribed safeguard policies having been followed.

**The African Development Bank (AFDB) is second only to the World Bank among the international organizations in its promotion of the proposed Gibe III hydrodam, with a major role in legitimating the project, if not outright funding it.**

Like all other agencies ostensibly conducting objective assessments of the project, the AFDB has produced only segmented appraisals of small fragments of the actual impact system, and even these have been with major failings that render them fundamentally invalid. The AFDB's most visible roles have been:

- (i)* A review of potential impacts of the Gibe III dam on the hydrological character of Kenya's Lake Turkana, the 'Assessment of Hydrological Impacts of Ethiopia's Omo Basin on Kenya's Lake Turkana Water Levels, Final Report' (2010), prepared by Sean Avery. [NOTE: Unless otherwise specified, discussion in this report of the AFDB's assessment process refers to this hydrological review],
- (ii)* A socioeconomic impact assessment, prepared by S. Kaijage and N. Nyagahand (2009) A 2010 final report was issued, but it has not been made available.
- (iii)* A mediation process with the Kenya based NGO, Friends of Lake Turkana.

The African Development Bank (AFDB) hydrologic study is detailed and accurately portrays major aspects of the lake's present hydrological and fisheries based systems. Although the African Development Bank (AFDB) hydrologic study of Lake Turkana is detailed and accurately portrays major aspects of the lake's present hydrological and fisheries based systems, it does not suffice for adequate assessment of the proposed Gibe III dam's impact on Lake Turkana's physical and biological processes. This failing stems from:

- Its reliance on GOE provided data, assumptions, and projections
- Its failure to identify and detail the implications of Ethiopia's extensive program of irrigation agriculture throughout the Lower Omo River Basin (including just upriver from the AFDB consultant's study and with major impact on inflow to the lake. (Note: The report does state that should any irrigation program develop, the environmental impacts on the lake would have to be reevaluated, but this point is completely obfuscated in the text and not included in the summary or conclusions.
- Its reluctance to consider substantive information counter to a the viewpoint of dam proponents, namely, that the Gibe III dam would create minimal impacts on the sustainability of Lake Turkana, despite cursory mention of this more critical view in the report.

The other major impact assessment released by the AFDB, the socioeconomic impact review, is unacceptable as an assessment of the nature of the Lake Turkana region's livelihood systems and the predictable impacts of the Gibe III dam on them. The document provides no basis whatsoever for rationalizing the AFDB or World Bank support for the Gibe III project in terms of the project's impact on the indigenous people, and in fact, is one of the poorest quality assessments the author has encountered in decades of professional work - a view shared by other ARWG scientists.



**Omo River in meandering section. Inside bends with well developed forest (with dominant tree species to 27 meter heights), and sandy spits & silt berms with flood recession agriculture.**



### III. THE SEISMIC THREAT AND DAM COLLAPSE: A DISASTER IN WAITING

- The Gibe III dam is located near the Main Ethiopian Rift (MER), which is the 'failed' northern arm of the East African Rift (EAR) – the northern arm of which is an active seismic area capable of producing large magnitude, destructive earthquakes.

There is a 20% risk of 7 or 8 intensity earthquakes occurring within the next 50 years in the Main Ethiopian Rift (MER), according the U.S. Geological Survey, with utilization of data from the United Nations Office for the Coordination of Humanitarian Affairs Regional Office for Central and East Africa OCHA-ROCEA

- An earthquake of this magnitude poses significant threat of dam failure. Collapse of the Gibe III dam would result in catastrophic destruction of the human population, along with full-scale destruction of livestock, wildlife and environments in the entire downstream riverine zone and Lake Turkana.

This destruction would be far in excess of the worst known dam collapse in history - the Vaiont disaster in Italy.

- Even more moderate seismic events, combined with highly probable major landslides, sediment buildup and pressure from impounded water behind the dam also pose a serious threat to dam stability.

- GOE and development bank assessment disregard for seismic and seismically related dangers render them invalid.

The Ethiopian government (GOE) discounts the seismic danger to the planned Gibe III, ignoring the available geological information. All three international development banks (the World Bank, the European Investment Bank and the African Development Bank) also ignore the available data pointing to seismic danger, leaving the GOE's statements unchallenged.

- **The vicinity of the planned Gibe III dam is an active fault zone.** Woldegabriel, in his Ph.D. dissertation, describes the walls of the Omo Canyon as fault controlled (Woldegabriel, 1987). The topography is developed along a structural grain parallel to a rift that is developed along a system of faults in the area. The canyon contains several Pliocene units, including the Moiti Tuff that is ~4 Ma old and a volcanic rock of approximately the same age (WoldeGabriel, thesis). Woldegabriel and Aronson (1987) describe this part of the rift system as 'failed.' The 'failed rift' is a system partially formed but interrupted through migration.

**Faults between Sodo and the Omo rivers are young and active. Hot springs occur within the region and these are most likely generated by deep circulation along faults.** A query of recorded earthquake activity between 4.1 and 5.4 magnitudes, even *within the past twenty-five years*, reveals at least sixteen such occurrences between 5-8° N. and 36-38° E. Some of these earthquakes have been very close to the project area. For example, a 4.7 magnitude earthquake was recorded near the town of Arba Minch in 1999 (approximately 60 km from the proposed dam; the well known ‘forty springs’ of Arba Minch result from fractures in volcanic rocks contiguous with those at the proposed dam site) and a 5.0 magnitude earthquake just east of the town of Sodo (about 63 km from the dam site) was recorded in 1989.

- **According to geologists working in the dam region for several decades, reservoir filling is likely to extend over many years due to heavily fractured volcanic rock throughout the Gibe III dam site, including in the planned reservoir natural walls. Woldegabriel (1987) also documents these fractures.**

Even if the roller compacted concrete (RCC) construction of the proposed Gibe III performs ‘well’, the fractured and jointed volcanic rock at the dam location would produce seepage conduits. Ongoing seismic activity will likely open up more fractures over time. This is especially true because of the high hydrostatic pressure from impounded water behind the dam that will promote reservoir seepage (and slowing filling of the reservoir thereby decreasing flow downstream from the dam - a disastrous situation in itself for the indigenous people downstream Omo River and throughout the Lake Turkana region.

Even if the dam itself remains intact after a seismic event, it is highly plausible that springs, leaks and seepage developing in the adjacent rock in the adjacent rock abutments could cause a dam failure. This danger stands, despite the design of the Gibe III dam calling for ‘grouting fractures’ within the native rock around the dam.

- **Filling of the reservoir may promote the possibility of a major landslide, particularly as a result of the steep, highly fractured ‘natural walls’ of the proposed reservoir.** Impoundment at Gibe III will change the base level of the river in the immediate area: local aquifers are fracture controlled, and it is possible that some ‘slip surfaces’ (landslide soles) may become lubricated so that rock masses are more likely to slide. Saturation of clay-rich soils along the canyons exacerbates the risk of swelling and landslides, as well.

The high probability of landslides, along with highly likely buildup of sediment behind the dam - even with mild to moderate earthquake occurrence, let alone a major seismic event – presents a risk to the dam’s integrity. Sedimentation is promoted, for example by soil erosion upstream, enhanced by deforestation and overexploitation of soils for agricultural purposes.



**The 1963 disaster of Vaiont in northern Italy illustrates the significance of dam failure.**

In Vaiont, more than 2600 people were killed when 260 million cubic meters of a slide block moved suddenly into the newly filled Vaiont Reservoir – behind a very tall dam that blocked a deep valley. The intensive landslide occurred within seconds and displaced more than half of the reservoir's water, generating a giant wave that reached a height of 250 meters and then created an enormous wall of water that swept into nearby villages and towns, destroying everything in its path. The dam itself remained intact. In the Vaiont case, the rockslide and ensuing flood could have been readily foreseen by logical consulting. The cause of the landslide may also be pertinent to a consideration of the Omo situation. The sedimentary rocks of the Vaiont River Valley include layers of shale, a clay-rich rock. And the rocks comprising the nearby mountain (Mt. Toc) tilt steeply toward the reservoir. When the dam was finished in 1960, filling of the reservoir introduced groundwater into the shale layers, causing them to swell and become unstable. At first, the mountainside began slowly creeping down slope at a rate of half an inch per week. As filling continued and more groundwater seeped into the mountain, the rate of slippage increased to eight inches per day, and ultimately to 30 inches per day, just before the 1963 disaster.

In view of Vaiont, the catastrophic effects of a Gibe III dam failure are much understated. At least 200,000 indigenous pastoralists, agropastoralists and fishermen along the lower Omo River would be obliterated, and at least 300,000 indigenous fishermen and pastoralists managing to subsist at or near the shores of Lake Turkana would also be affected. The essentially permanent destruction of livestock and environmental resources from such an event is of such magnitude as to be inestimable.

**The Failure of Ethiopian Government Seismic Review of the Proposed Dam**

The seismic threat, along with the related dangers landslide, sediment buildup and seepage are entirely discounted by the GOE, and the GOE's position remains unchallenged in both the EIB and AFDB assessments.

- **The GOE downstream impact assessment ignores altogether the seismic threat to the region and its own downstream indigenous people, along with that of Kenya's portion of the Omo delta and its entire indigenous population around Lake Turkana.** This assessment rests on the assumption that the matter was 'sufficiently' addressed in the prior GOE impact assessment that was produced two years after dam construction began.

The GOE's downstream report for Ethiopia refers to a 2007 (February) GOE Seismic Hazard Assessment that considers seismic events during the past century. The report concludes that there is no real evidence of 'present' seismic activity in the project area'.

- 'The project area (East-North East quaternary trending) does not seem to be active at this time, as illustrated in detail in the above mentioned report.' and
- 'Despite the evidences that a certain seismic activity affected the region in historical times, according to the L1D Geological Report no evidences seem to exist of present seismic activity in the project area' (GOE, Gibe III – Environmental and Social Impact Assessment, 300 ENV R CS 002-A9003099, p. 86).

Section 5.13 of the GOE's assessment, by noting only earthquake occurrences within the recorded time, clearly implies that this narrow window of time is indicative of the (lack) of potential for future earthquake activity. Typical seismic design, however, looks much further back in time to faults showing activity: assessment through Quaternary time (~1.8 Ma).

**Although failing to critically evaluate the GOE's treatment of the seismic danger to the region, the AFDB hydrological assessment of Lake Turkana does note that dam collapse would immediately add the equivalent of two meters to the level of Lake Turkana (AFDB, Section 2.7.3).** The report does not seriously consider the level of destruction for the lake that would result from such an event – noting only that it would produce a 2 meter rise in lake level in the body of the text, but omitting any reference to the matter in the summary and conclusions. Such a major release of water, sediment and other materials from the dam, for example, would occur as a violent wave or series of waves along the river and into the lake, almost inevitably destroying people and other life forms in its path.

The suggestion in the GOE assessment that a 'warning system' with *scattered sirens* throughout the riverine zone downstream from the Gibe III dam, in order to warn of 'necessary releases' of flood pulses from the dam – or imminent dam failure – is nonsensical in the extreme. The area of impact of a major water 'release' or dam failure – one encompassing both the Lower Omo Basin and the Lake Turkana region, is so massive, with hundreds of thousands of agropastoralists, pastoralists and fishers confined to Omo riverside/delta lands, or the level plains around Lake Turkana, that such a warning system would be simply useless.

### **The U.S. Geological Survey Report on Seismic Risk in the Region**

In response to a request by the author in 2011, the U.S. Geological Survey's (USGS) Earthquake Science Center in Menlo Park issued the 'Gibe 3 Seismicity Review', included below. Additional detail for the Gibe III dam locale follow the USGS Review.



### Seismicity

This process of extension along the East African Rift produces frequent earthquakes on or near the normal faults that define the rift valleys. Less frequent are earthquake on the strike-slip faults that separate the rift valleys. Earthquakes within the East African rift system thus occur as the result of both normal faulting and strike-slip faulting.

Nearly 50 years of seismic records show that earthquakes in eastern Africa are largely confined to the various zones of the divergent East African Rift. While small (M4 and less) and moderate (M5) events are common, only scattered strong (M6) events have occurred in the region during this period, with the exception of 2 major (M7) events near Juba in southern Sudan in May of 1990.

The most seismically active area during this time was the Afar triangle (see Figure 4) where the active rifts in the Red Sea and Gulf of Aden join the failed Main Ethiopian Rift. Historically as well, numerous large, sometimes devastating, earthquakes have been reported in this region.

The M7 events in southern Sudan occurred at the northern end of the western arm of the EAR. They are notable because, not only are they the largest earthquakes in this region in the past half-century, they were part of a swarm that occurred along a section of the rift that had previously been largely inactive. Thus they demonstrate the potential that many of these apparently quiet rift zones have to produce large and potentially damaging earthquakes. In this case, the UN reported that these large events produced only minor damage and no deaths, largely because they occurred in remote and undeveloped areas.

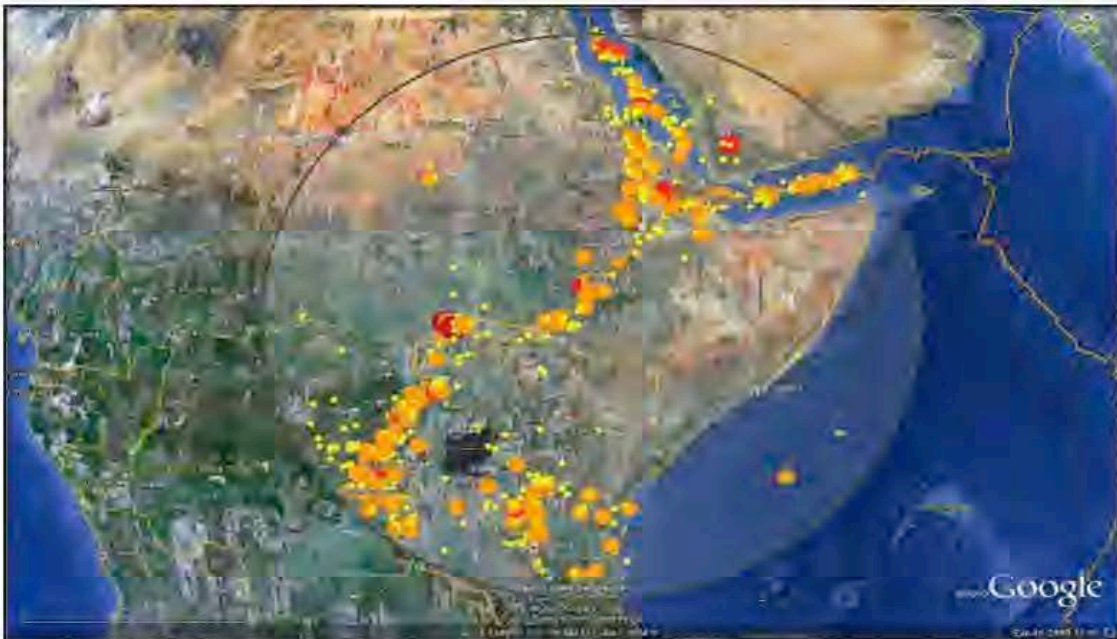


Figure 3. Seismicity located within 1600km of Gibe 3 Dam site for the period 1963 to March 16, 2011 (M4.0 and larger). Gibe 3 Dam represented by red "push pin". Earthquake magnitudes are indicated by color: M4 – yellow; M5 – Orange; M6 – Red; M7 – Dark Brown. The orange line indicates the location of the tectonic plate boundaries. Seismicity from the Advanced National Seismic System world-wide catalog (<http://www.ncedc.org/anss/>).

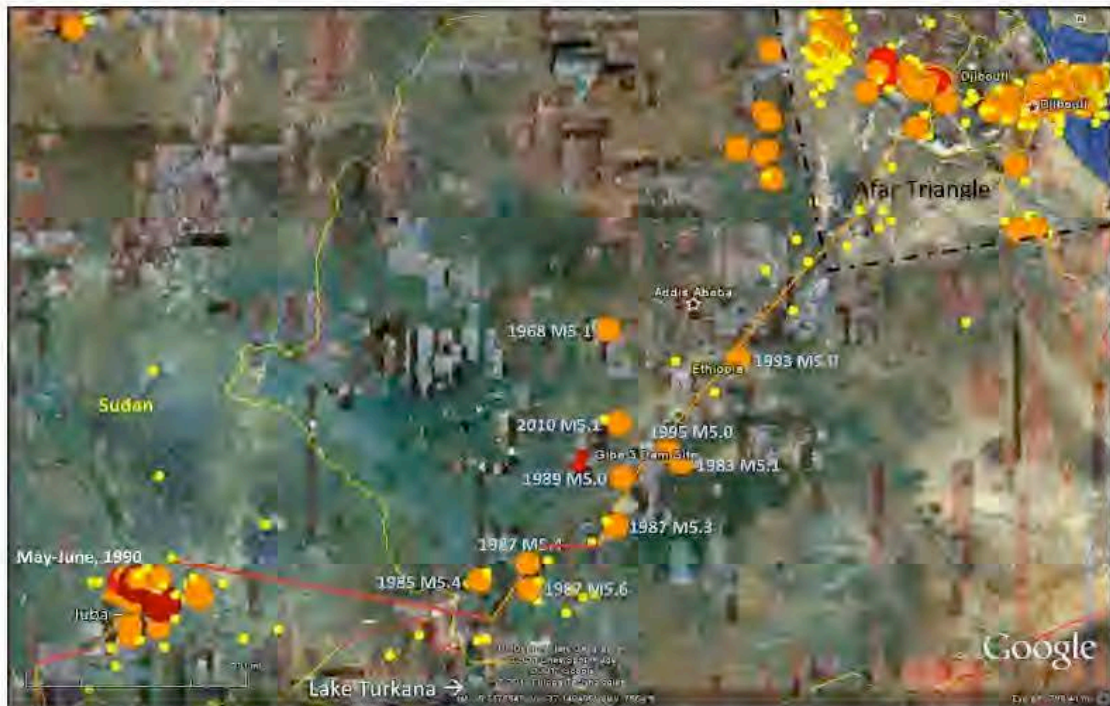


Figure 4. Instrumentally located Seismicity within about 900km of Gibe 3 Dam site for the period 1963 to March 16, 2011 (M4.0 and larger). Gibe 3 Dam is represented by the red "push pin". Earthquake magnitudes are indicated by color: M4 – yellow; M5 – Orange; M6 – Red; M7 – Dark Brown. The orange lines mark the extensional "normal" faults; the brown lines mark the lateral "strike-slip" faults. Seismicity downloaded from the Advanced National Seismic System world-wide catalog <http://www.ncedc.org/anss/>

According to the worldwide ANSS catalog, only ten instrumentally recorded earthquakes as large as M5.0 have occurred along the MER segment between Addis Ababa and Lake Turkana in the past 48 years, an average of about just one moderate earthquake every five years. However, there is clearly more variability in seismic activity than the average would imply with some decades producing no events as large as M5 and one decade, the 1980's, producing six large earthquakes. The 1980's events were not part of a swarm but were scattered along the length of the southern half of the MER. Had the 1980's earthquakes not occurred, moderate seismicity along the MER would have been sparse indeed.

Even though these were only moderately sized earthquakes, nearly half were reported to have produced injury and/or damage. The 1983 M5.1 near Wondo Genet apparently produced damage in the rift area. Damage also resulted some 60 km farther north near Lake Langano in 1985 from an earthquake that, for some reason, is not included in the ANSS catalog. The 1993 M5.0 earthquake occurred 20 km south of the small city of Nazret where some injuries and damage was reported; it was reportedly felt 100 km north in Addis Abeba. More recently, the 2010 M5.1 earthquake occurred just 4 km from the town of Hossana where 26 students sustained minor injuries while escaping their classrooms.

An earlier catalog of historic Ethiopian earthquakes suggests larger damaging earthquakes have occurred within the Ethiopian Rift. The most complete record was collected by Pierre Gouin, founder of the Geophysical Observatory of Addis Ababa and head seismologist through 1978. His 258 page book on the "Earthquake History of Ethiopia and the Horn of Africa", published in 1979, contains a history, both oral and written, of earthquakes in northeastern Africa for almost 6 centuries through 1977, including 30

years of instrumental observations by the author. Gouin's investigation of notable historic earthquakes in Ethiopia identified one large swarm in 1906 that included at least two M6 earthquakes that likely occurred within the EMR. His own observatory also located another large (M6.3) earthquake here in 1960. These large events are indicated in Figure 4.

Respecting the 1906 swarm, Samuel Kinde quoted Gouin in his paper on "Earthquake Risks in Ethiopia" in the Jan 16, 2010 issue of *Ethiopian Review* (<http://www.ethiopianreview.com/content/12201>):

*"the magnitude of the main shock of 25 August 1906 was 6.75; the estimated epicentral location, 100 km south of Addis Ababa. The August tremors were exceptionally violent. It is also reported that the shock of 28 October was strong enough to cause the bells of the Church in the Finfine district to ring spontaneously." He further adds, "The population of Addis Ababa was greatly afraid. Damage, however, was slight because: the town, being barely 10-years-old, had not yet fully developed."*

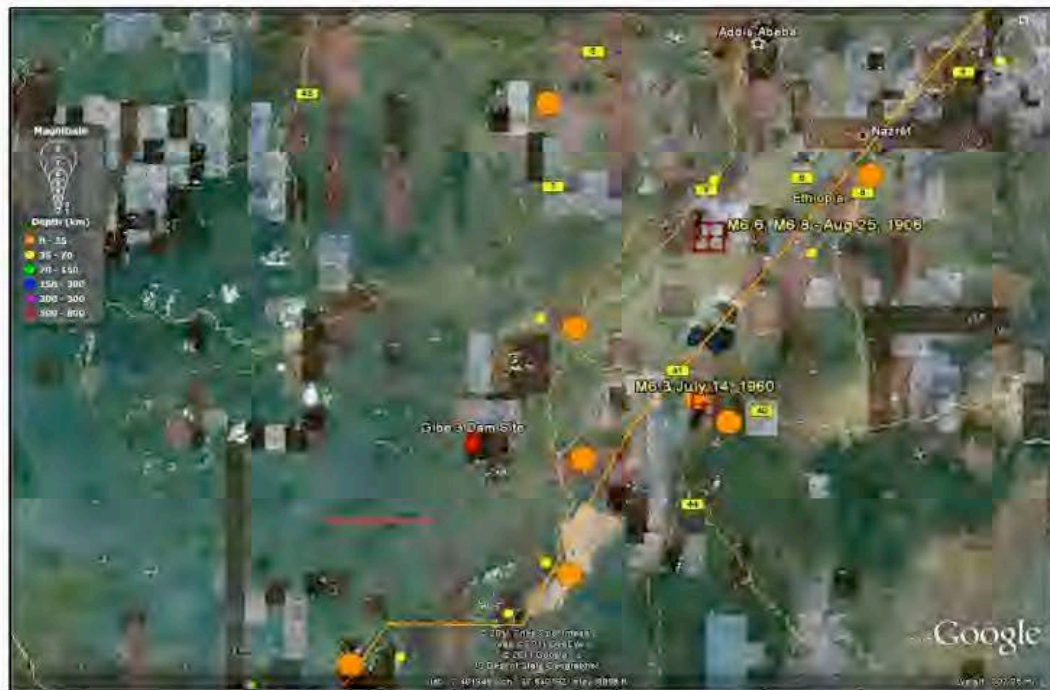


Figure 5. General location of August 1906 seismicity, as determined from shaking intensity map, and the instrumentally determined location of a strong earthquake in the EMR in 1961. Locations and magnitudes from Gouin (1979). These historic earthquakes are plotted along with the ANSS earthquake locations from 1963 – 2011 shown in previous figures. As in Figure 3, the orange lines mark the extensional "normal" faults; the brown lines mark the lateral "strike-slip" faults.

Gouin's location of the M6.8 earthquake, 100 km south of Addis Ababa, places it squarely in the Main Ethiopian Rift (MER). He also notes that it was preceded 2 hours earlier by a M6.6 foreshock. A shaking intensity of 7 (very strong) for the foreshock was reported in Addis Ababa while an intensity of 8 (destructive) was reported for the mainshock. Near Lake Langano, roughly 150 km south of Addis Ababa, the mainshock was reported to have produced a shaking intensity of 9 (ruinous). Coincident with the earthquake, a hot water Geyser formed on an island at the north end of Lake Langano that pulsed twice a

minute with water heights of between 25 and 30 meters. Twenty years later, the geyser still continued, though at a reduced height (1 -2 meters) and period (once every 30 minutes).

Gouin documents another seven earthquakes over the following 3 days that were felt in Addis Ababa with intensities ranging from 4 to 6 (moderate to strong). Another two shocks were felt in that city two months later, one with an intensity of 7, similar to that of the foreshock. Both were presumed to be part of the earlier swarm in the rift zone.

The significance of the 1906 activity is twofold: 1) it demonstrates that earthquakes capable of producing destructive to ruinous shaking intensities can occur within the rift zone, and 2) it demonstrates that, like the Juba, Sudan swarm, areas along the rift that had been relatively quiet prior can produce large earthquakes – present activity is no guarantee of future activity as it were.

This was demonstrated again in 1960 when a smaller swarm occurred in the rift area south of Lake Langano. The M6.3 main shock was felt over a radius of 200 km but produced no surface rupture nor structural damage. Aftershocks were recorded by the Addis Ababa seismic station for two weeks afterwards.

Date	Magnitude (NEIC)	Magnitude (Gouin)	Distance from Gibe 3 (km)	Distance from plate boundary
8/25/1906		6.6	185	35
8/25/1906		6.8	185	35
10/28/1906		6.?	?	?
7/14/1960		6.3	134	23
1/23/1968	5.1	5.1	207	152
12/2/1983	5.1		145	40
8/20/1985	5.4		196	42
10/7/1987	5.3		89	11
10/25/1987	5.6		171	19
10/28/1987	5.4		137	3
6/8/1989	5		63	15
2/13/1993	5		274	11
1/20/1995	5		130	17
12/19/2011	5.1		95 km	59

#### IV. TRANSBORDER INDIGENOUS SURVIVAL SYSTEMS AND THEIR ENVIRONMENTS: A PROFILE OF VULNERABILITY

At least a half million indigenous people in the aridic transborder region depend on the Omo River or Lake Turkana for their survival.

Friends and enemies alike among indigenous peoples in the region face the same future, whether one of survival or devastation. All evidence points to the fact that it will be the latter if the Gibe III dam is completed.

- The Omo River flows from the Ethiopian highlands southward to its terminus at Kenya's Lake Turkana, which derives at least 90 per cent of its water from the river's inflow.

The Omo River's meandering pattern in the lower basin, with its fringing forest and wetlands of its modern delta, as well as Lake Turkana habitats, scattered volcanic highlands and ancient landforms, contribute to the semi-arid region's overall biodiversity.

- The transborder zone is also one of Sub-Saharan Africa's most culturally diverse areas, with indigenous languages of Cushitic, Eastern Nilotic, and Omotic or Afroasiatic origin (Fig. 3 and Photos 4-6).
- At the core of the region's indigenous economies are complex survival strategy systems that are highly adaptive for changing environmental and social conditions - systems linked together by food-related exchange networks and patterns of cooperation, along with competition for increasingly scarce resources.
- Largely through increasing dispossession of their land base and resource access by external economic and political forces in recent decades, much of the region's indigenous people have had to move to the Omo River or Lake Turkana, where they depend on those resource systems for their survival.
- The Gibe III dam would cause a sharp reduction (with a minimum of 60 to 70 per cent reduction of Omo River flow volume and inflow to Lake Turkana. This radical drop in river flow and Lake Turkana waters would quickly cause the collapse of indigenous riverine and lakeside survival systems, producing mass starvation, accompanied by region-wide violent conflict over disappearing food resources.



## Indigenous Survival Strategies and the Regional Exchange Network

The survival of each transborder ethnic group is intricately bound up with that of its neighbors so that the fate of one will truly parallel the fate of all (Fig. 3, Photo 4).

The region's ethnic groups most directly dependent on the Omo River or Lake Turkana are the Mursi, Bodi, Kwegu, Suri, Kara, Nyangatom, and Dasanech, in the lower Omo River basin, and the Turkana, El Molo, Rendille, Samburu, Gabbra (and some Dasanech) along the shores of Lake Turkana.<sup>6</sup>

Numerous neighboring groups also have significant dependence on Omo River or Lake Turkana resources, either seasonally or through exchange networks. These include the Me'en, Hamar, Dizzi, Chai, Toposa, Arbore and Pokot.

- **The survival strategy systems of transborder ethnic groups have emerged from centuries of adaptational indigenous knowledge unfolding alongside changes in their environmental and social circumstances.** These groups have historically been pastoral or agropastoral in emphasis, at least until recently, when very large numbers of them have resorted to fishing for their subsistence.

Indigenous survival strategy systems are linked together by a network of interethnic material and social exchange relations – a network that is essential to the continued existence of each individual group (Fig. 4)

Survival strategy systems of indigenous pastoral and agropastoral groups are largely risk-minimizing systems for coping with the hardships common to African semi-arid and arid environments, such as prolonged drought, disease epidemics, interethnic conflict, changing market conditions, and the effects of government policies. In the face of such hardship conditions, adaptability is key to the pastoralists' cultural and socioeconomic persistence.

The region's vegetation types vary widely in tandem with complex soil deposition patterns, water conditions, and other factors – forming a mosaic-like pattern. Even the subtlest variations are understood and incorporated into pastoral indigenous knowledge systems that have evolved over centuries.

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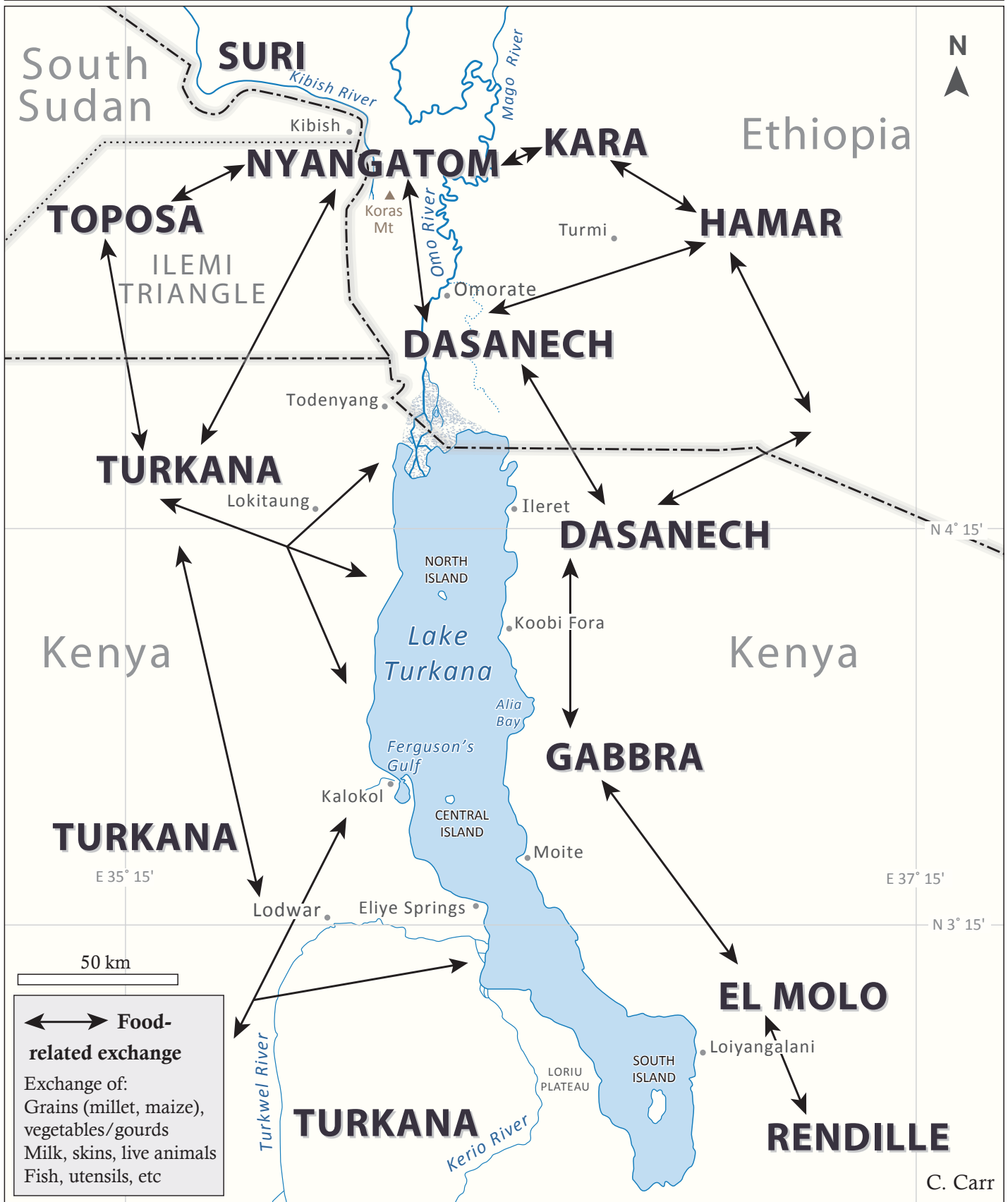
<sup>6</sup> A relatively extensive literature concerning the ethnic groups in the region has been produced over the past four decades. Some of the most notable work for the Lower Basin is that by Turton concerning the the Mursi (in 1977, 1981, 1991, 1995 and numerous recent papers concerning changes in the region); Abbink (2000, 2001, 2003 and 2009) concerning the Suri and pastoral conflict within the region; the author (1976, 1977, 1998, 2009) and Almagor (1978, 1992) with regard to the Dasanech region; Tornay (1979, 1980, 1981, 1997), as well as Mark and Tornay (1992), Savary (2003) and Schroder (2003). While the literature concerning the Turkana is extensive, most of it does not pertain the the Turkana most directly affected by the Gibe III dam – the northern segment. Gulliver's early work (1950, 1955, 1968, 1972) is of great value, and that by Hogg (1982), Lamphear (1992), McCabe (2004), Smucker (2006) and Fieldint (2001) are all provide useful background.

Fig. 3. Ethnic Groups in Tri-Nation Transborder Region

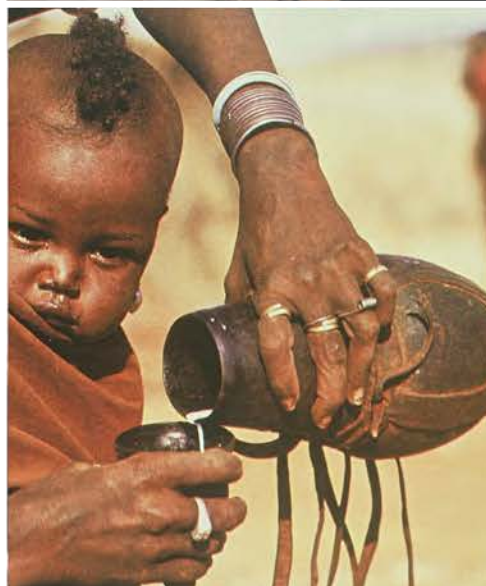


**Fig. 4. Survival Systems: Food Related Exchange**

*Herding ↔ Herding-Fishing ↔ Fishing ↔ Agro-Fishing ↔ Agropastoral*



## Peoples of the Transborder Region



**Photo Page 4. Peoples of the Transborder Region.** Top left: Dasanech man at Dimi ceremony. Top right: Nyangatom man at Omo River. Center right: Dasanech infant and young male herder. Bottom photos: Turkana fishing villagers.

**Strong adaptational capacity is suggested by these components of pastoral and agropastoral survival systems in the transborder region. The past few decades of research in pastoral areas has documented these approaches to risk minimization and recovery:**

- 1. Maximum accumulation of capital.** Both for subsistence and longer-term security, particularly accumulation of livestock (preferable), but increasingly, flood-recession agricultural land, or fishing capability.
- 2. High mobility of livestock herds and village settlement.** Complex and flexible seasonal movements, for example, between upland or plains environments, on the one hand, and riverine or lake zones, on the other, in response to changing conditions of pasturage, water availability, disease and social conflict.
- 3. Economic diversification to alternatives to livestock herding.**
  - \* Flood-recession agriculture – the only type possible in the Lower Omo basin, along riverside flats low enough to receive Omo channel floodwaters with critical new nutrient-rich sediment, and in much of the modern Omo Delta. No lakeshore cultivation is possible due to high salinity, though flood-recession agriculture is practiced along the Turkwel River.
  - \* Fishing along the Omo River, particularly in the delta region and along the northern shoreline of Lake Turkana using minimal boat and gear
    - \* Wild food gathering and bee-keeping
    - \* Household ‘commodity’ production for barter (charcoal, chickens, utensils)
- 4. Diversification within production types.** For example, in herding, moving from cattle to small stock (goats and sheep) and camels; in flood-recession agriculture, to additional crops; in fishing, to additional catch species and habitats for exploitation.
- 5. Decentralized sociopolitical authority relations and dispute settlement.** Adaptive for highly mobile people for problem solving in matters, for example, of pasture and water sharing, in social problem/conflict solving involving, for example, problems of pasture and water access, settlement location, exchange relations, theft, and conflict with neighboring ethnic groups.
- 6. Extensive reciprocity relations for exchange.** Material exchange relations range among gifts, loans and barter, and trade of several types. This includes livestock (including live animals, skins, etc.), food products (milk, grain, other farm products, fish), as well as labor exchange in herding, agriculture, fishing, marketing, and many subsidiary activities. Exchange relations are also important among neighboring ethnic groups.

**Secondary livelihood activities have become increasingly critical to the survival of the region’s pastoralists. In the lower Omo basin, this has been first, flood-recession agriculture followed by fishing by the poorest fraction of villagers.** In the Lake Turkana region, since agricultural efforts have mostly failed, except along the Turkwel River, fishing has been the major alternative to herding. Supplemental food getting in both major regions includes wild food gathering, bee-keeping, boat making (dug-out canoes, rafts, etc.), chicken raising, household tool manufacture, charcoal making, and fish marketing. Most recent among some Turkana communities have been the production and repair of fishing gear (sails, nets, boats, etc.). Despite a radical increase in agropastoralism over pastoralism among the Dasanech. After decades of disenfranchisement, Omo River based communities and those in the upland plains retain multiple dimensions of cooperation (Photos 5 and 6).

## Herds and Herders in Drylands of the Lower Omo Basin



**Photo Page 5. Dasanech Herders and Herds.** Villages in upland plains with highly overgrazed conditions.

Top left: Severely malnourished cattle before slaughter for consumption during major hunger period.

Top right: Dasanech hut of hides and grass mat.

## Life Along the Lower Omo River



**Photo Page 6. Life Along the Lowermost Omo River.** Top right: 'Shoats' (goats, sheep) on water trek to the Omo River. Bottom left: young Dasanech men/boys spear fishing w/ wooden sticks in 'Kolon' catchment stream near the river. Bottom right: Dasanech on Omo river waterside flat with flood agriculture, following crocodile hunt.

➤ **The most common specific coping strategies utilized by transborder pastoralists to recover from livestock losses due to drought, disease, conflict and other hazards have been:**

- Temporary movement of herds into peripheral lands with pasturage and water
- Short-term barter of small stock (goats/sheep) with communities of the same or neighboring ethnic groups order to meet immediate food needs
- Exchange or sale of animals, farm or fishing product to external traders & merchants (Somali, Ethiopian and Kenyan)
- Borrowing or use of other social reciprocity relations (e.g., gifting, labor cooperation) to rebuild livelihood or meet immediate household needs
- Temporary primary reliance on subsidiary types of production, including chicken raising and sale, wild fruit gathering, hunting, bee-keeping, charcoal production, or other household commodity production (boat making, household utensils, etc.
- Engagement in new types of production when opportunities are available – particularly flood-recession agriculture or fishing
- Labor cooperation or raiding relationships with neighboring groups toward the rebuilding of livestock herds or for access to new resource areas

Implementation of these adaptive patterns, however, requires access to sufficient territory and resources - conditions that have changed drastically over the past half-century.

➤ **Survival for individual ethnic groups within the transborder region depends on a broad exchange network with neighboring groups (Fig. 4).** This is particularly true when pressures for herd rebuilding (or other recovery) are intense for one or another group - for example, following extensive losses from livestock disease or raiding, failure of Omo floodwaters to replenish agricultural plots and last resort grazing, decreased fish catch, or failed local markets.

The major food-related exchange relations between just two sets of the region's groups are summarized in Tables 1 and 2. The full set of such relations is exponentially more complex, particularly when the full set of material and social transactions is considered, including marriage-based exchange, labor cooperation, personal gift giving and sharing, and political relations are considered.)

These exchange relations are based in the diversification and settlement/movement patterns of the transborder region's ethnic groups. The following charts present overviews of the extent of food related diversification in the region and food based exchange among three of the region's groups: the Nyangatom, Turkana and Dasanech. The key exchange relations in the region are:

*Small stock ↔ Grain & Small stock ↔ Cattle ,*

*However, as diversification to flood-recession agriculture and fishing have become the primary means of survival for very large numbers of the region's indigenous people in recent years, new forms are preeminent in some areas, especially:*

*Fish ↔ Small stock & Fish ↔ Grain*



<b>Lower Omo Basin &amp; Ilemi Triangle</b>	
Kara	Flood-recession agriculture**/Agropastoral**
Nyangatom	Flood Recession Agriculture**/Agropastoral**, Pastoral*, Fishing**
Dasanech (upland, riverine)	Flood-recession agriculture**/Agropastoral**, Fishing**, Pastoral*
Suri	Agropastoral, Pastoral
Toposa	Pastoral, Agropastoral
Hamer	Pastoral, Agropastoral, Bee-Keeping
<hr/> ** Year round dependence on Omo River or Lake Turkana * Seasonal dependence on Omo River or Lake Turkana	
<b>Lake Turkana Region</b>	
Dasanech (Delta, east shoreline of lake)	Flood-recession agriculture**, Agropastoral**, Fishing**, Pastoral*
Turkana	Pastoral*, Fishing**, Pastoral-Fishing**
Gabbara	Pastoral *
El Molo	Fishing**, Fishing-Pastoral**
Rendille	Pastoral *
Samburu	Pastoral *
<hr/> ** Year round dependence on Omo River or L. Turkana * Seasonal dependence on Omo River or Lake Turkana	
<b>Major Subsidiary Livelihood Activities (groups vary)</b>	
<ul style="list-style-type: none"> <li>• Wild Food Gathering/Harvesting**</li> <li>• Bee-Keeping/Honey Gathering**</li> <li>• Boat making**</li> <li>• Chicken-raising</li> <li>• Utensil and tool making</li> </ul>	<ul style="list-style-type: none"> <li>Utensil manufacture</li> <li>Fishing gear/net manufacture</li> <li>Firewood/charcoal preparation ⊕</li> <li>Fish marketing ⊕ **</li> </ul>
⊕ Recently initiated or increased ** Dependence on Omo River or Lake Turkana	

**Table 1. Diversified Food Production of Transborder Ethnic Groups**

<i>TURKANA-NYANGATOM</i>		<i>DASANECH-TURKANA</i>	
<i>From Turkana:</i>	<i>From Nyangatom</i>	<i>From Dasanech</i>	<i>From Turkana</i>
Animal skins/hides	Sorghum, Peas, Beans,	Sorghum, Peas, Beans,	Animal skins/hides
Live animals (mostly small stock)	Squash, gourds	Squash, gourds	Live cattle, small stock
Cooking pans (Fish)		Small stock	Fishing nets/gear

**Table 2. Food Related Exchange among Immediate Neighbors: Turkana-Nyangatom and Dasanech-Turkana Products Traded**

While survival strategy systems should be defined for particular groups, all ethnic groups within the region are embedded in the region-wide network of exchange relations, shown in Fig. 4. This exchange network is essential to the continued existence of each individual group.

### **Pastoral Dispossession: The Roots of Direct Dependence on the Omo River and Lake Turkana**

- In order to carry out their highly adaptive survival strategies, including their complex system of exchange, the region's traditionally pastoral ethnic groups have depended on access to sufficient territory, specifically, adequate pasture lands and water for their livestock, but also planting locales and in later years, waters for fishing.
- These conditions have been drastically curtailed in recent decades, forcing the pastoralists to depend on Omo River and Lake Turkana resources not only for their livestock, but also for major new flood-recession agriculture and fishing.
- Access to Omo River and Lake Turkana pasturage, planting and fish resources is a matter of life and death for the indigenous people.

- **Since colonial times, a wide range of Ethiopian and Kenyan government policies have caused major territorial and resource access losses among the pastoralists in the Lower Omo basin, the Lake Turkana region, and the Ilemi Triangle.**

These policies have included: national border demarcations; establishment of administrative and police presence, as well as related buffer zone establishment; promotion of territorial expansion, sometimes including agricultural development by neighboring ethnic groups; water development programs eliminating long-standing water source access (for example, damming the Turkwel River in Kenya); taxation of several types - household, head, or stock; development of exclusionary parks and tourism; promotion of commercial ventures, and displacement of neighboring ethnic groups, sparking new encroachment.

### Background to Dispossession in the Border Region

- Dispossession of the region's pastoral groups occurred both directly through their forcible removal by the colonial Kenyan administration, in agreement with the Ethiopian monarchy, and indirectly through neighboring groups who were themselves dispossessed and pushed further into the transborder region.

Those ethnic groups with critical roles in this history of territorial losses included the Pokot, Jie and Karamojong, Toposa and Hamar, all of whom also suffered resource losses from colonial policies (Fig. 3).

- For decades most of the transborder region was considered wasteland by colonial (and post-colonial) administrators charged with managing national boundary issues. Decisions were generally made without regard for the size, resource needs, or sometimes even the identity of the indigenous groups concerned.

- Agreements between the Ethiopian and Kenyan governments regarding the Ilemi Triangle resulted in the exclusion of Dasanech, Nyangatom, Turkana, and Toposa pastoralists from a vast region of the eastern Ilemi Triangle (Fig. 2), even though these groups all had longstanding access to Ilemi lands for their herds. (The Sudan government was not actively involved in the extreme southeastern Ilemi region during that period).

By agreement between Ethiopia and Kenya during the 1960s, the Ilemi was to be a buffer zone where ethnic groups would remain in their respective countries. With no knowledge whatsoever of the population sizes of particular groups, they were assigned to Ethiopia or Kenya. (The author interviewed a colonial officer, Mr. Whitehouse, who was in charge of this border demarcation and ethnic group allocation process). Kenya continued to administer the Ilemi, with police posts at Kibish, and several other locales. Ethiopian border presence remained minimal until the 1980s, when the government began increasing its presence along the Lower Omo River.

*Cont'd*

- A relatively strict exclusionary policy was maintained for the Ilemi lands, with the Kenyan police frequently seizing livestock herds belonging to the poachers, as they were considered, sometimes even shooting the herders. The Dasanech were then effectively confined to a small segment of their traditional lands east of the Kibish River, then later, effectively confined to lands between the Kibish River and the Omo River (they were threatened by the Hamar east of the Omo River). This exclusionary policy effectively split the Nyangatom into two geographic segments: one settled in villages along the Kibish River and the Omo River, and the other settled nearby the Toposa to the northwest of the exclusionary lands.

The Turkana who had been herding in the Ilemi were pushed back to the south and the Turkana were pushed southward into Kenya. In subsequent years (the 1980s), the Kenyan government has permitted and in fact encouraged the re-entry of only the Turkana into the Ilemi lands.\_

- The Ilemi Triangle has been a contested area involving all three nations. The controversy remained largely dormant, however, until the region's oil and gas potential became known in government circles (oil companies had been exploring the region for years). Global extractive industry corporations increased their involvement sharply during the 1980s, and this process has accelerated since. Land grabs and government issuing of leases and concessions is fully underway, a process firmly tied the Gibe III.

➤ **Largely as a consequence of these major territorial losses, along with prolonged droughts livestock and people alike became overcrowded throughout the region.** These conditions led to overgrazing and ecological deterioration throughout much of the dryland plains of the transborder region, except for the restricted Ilemi lands. Livestock mortality increased rapidly to the point that livestock herd sizes plummeted. Prolonged droughts during the 1960 - 1980s period caused further spikes in this degradation process.

**The radical decline of herds has been so severe that the economic recovery strategies of the region's pastoral groups have been ineffective.** Traditional long- term coping means such as increased mobility and dispersal of herd animals, internal sharing relations, and barter with neighboring groups have proven insufficient for household and community survival. Depending on their circumstances, pastoral groups in the region utilized every adaptation available to them in order to survive. New types of economic diversification became a necessity for indigenous household heads and communities, in order to survive. For this part, this led to migration to new locales, often with radical social dislocation (Fig. 5).

**Fig. 5. Indigenous Village Migration to the Omo River and Lake Turkana: 1960 to Present**



- Hundreds of thousands of this population have turned to the only other resource systems available to them, the Omo River and Lake Turkana, where they have taken up, as a last option, flood-recession agriculture or fishing along the Omo River or around Lake Turkana. When possible, they continue to raise whatever livestock remain.
- The general patterns of settlement movement to the Omo River and to Lake Turkana, based on the author's field research in the Lower Omo Basin and SONT research in both the Omo and northern Turkana region, are shown in Fig. 5. These general patterns of settlement migration to the Omo River and to Lake Turkana are based on the author's field research in the Lower Omo Basin and SONT research in both the Omo and northern Turkana region.

### **Rising Interethnic Conflict Over Diminishing Resources**

#### **Localized conflicts in the transborder region are rapidly escalating due to:**

- (1) Worsening resource deterioration and poverty conditions throughout the lower Omo, Lake Turkana, and Ilemi Triangle regions, with continued dispossession fueled by government policies, prolonged drought occurrence, as well as disease outbreaks.
- (2) The Ethiopian government's large-scale forcible eviction of indigenous communities along the Omo River to make way for government and commercial plantation export agricultural schemes and associated irrigation and canal systems, decimating survival efforts along the Lower Omo River and reducing inflow to Lake Turkana,
- (3) The Kenya government's present acceptance, and possibly active partnership, with Ethiopian policies in the region, and
- (4) Rampant arms trafficking in the region closely related to conflicts in South Sudan.

- **Increased competition for dwindling grazing lands and watering points has greatly intensified long established interethnic tension.** Rising tensions over resources have also weakened the extensive regional system of food-related (and other) exchange – a systems important to the survival of all groups (Abbink, 2001, 2009; Teqegn, 2003, Hendrickson et. al. (1998).

Conflict is particularly common between the Dasanech and their Nyangatom, Hamar, and Turkana neighbors, as well as between the Turkana and the Pokot, Nyangatom and Toposa. and they also obtain firearms from Kenyan arms merchants and sources in South Sudan.

These conflicts became especially pronounced in the border areas among multiple ethnic groups. They are presently most frequent in the Ilemi Triangle, along the Kibish River and around Koras Mt., along the Omo River and the Lake Turkana edge of the modern Omo Delta, the waters of northeastern and northwestern Lake Turkana, and along the border between the Lower Omo basin and the Ethiopian highlands to the east. They are summarized in a figure below..

### **Environments in the Transborder Region: From Pristine to Degraded**

- Largely as a result of the territorial constriction of ethnic groups outlined above, most of the transborder region's formerly pristine habitats, excluding the Omo riverine forest until very recently, have already undergone severe degradation, particularly within the past twenty-five years.

Only isolated pockets of natural habitat remain within the broad transborder region, generally in locales where an absence of accessible water for livestock or where the threat of interethnic clashes discourage herdsmen and their flocks. For the most part, the unique biodiversity and pristine character of the region has largely regressed to one of restoration potential.

- If the Gibe III dam is completed, the remaining natural habitats in the region will be decimated by waves of indigenous villagers, who will have been displaced from the Omo River and Lake Turkana and desperately seek the region's last available resources.

This is now a matter of urgent concern if the natural heritage or natural resource capital of the three nations concerned is to be preserved.

- **The transborder zone's ecological communities are highly diverse compared with other semi-arid regions of Sub-Saharan Africa, primarily because of the broad range of habitat conditions corresponding to the complex geomorphic features of the region.** These include: the perennial Omo River and its meandering system with ox-bow features and expansive modern delta; Lake Turkana with its complex lacustrine habitats, numerous large and small ephemeral watercourses (the Turkwel River, Kerio River, Kibish River, and countless smaller ones), relict beach ridges and basin pans, ancient or relict floodplains, scattered volcanic highlands and outcrops, hot springs, and tuffaceous exposures.

This wide variation in of ecological conditions has produced stark contrasts, often with mosaic-like patterns of plant and animal communities. Other than the Omo River, Lake Turkana, and volcanic outcrop environments, different types of grassland (and semi-desert scrub or steppe) dominate the landscape. Moderate to extreme degradation has set in within both the Lower Omo Basin and the northern Turkana regions (Carr, 1977, 1998, Ebei et al (2008), Gil-Romera et. al

(2011) – a discussion of recent landscape change in the lower Omo region).

- **In addition to the specialized environments noted above, biodiversity in the lower Omo basin is enhanced by its position as a zone of convergence of contrasting ecological zones.** Carr (1977, 1978, and 1998) has conducted plant ecological and taxonomic studies of the Lower Omo River region, including riverine and dryland plains areas.<sup>7</sup>
- **Large wildlife populations have been recorded in recent decades throughout the lower Omo Basin, Ilemi Triangle, and northern Turkana regions.** Eland, oryx, topi, Burchell's zebra, hartebeest, lion, leopard, cheetah, elephant, bat-eared foxes, gazelle, and gerenuk have long populated the region's grassland communities. Omo riparian forest and woodland areas support a rich wildlife population including hippo, elephant, crocodile, at least three species of primates, kudu, bushbuck, waterbuck leopard, and a wide variety of bird species including fish eagle, goliath heron, and dwarf bittern. These people have dwindled sharply in recent years, both from habitat destruction resulting from the changes outlined above and from the pervasive trafficking throughout the region.

### **The Lower Omo River Basin and Environs**

**The problem faced by the indigenous peoples along the lower Omo River is too little flooding, not excessive flooding. The same limitation applies to the sustainability of the pristine Omo riverine forest.**

- **The lower Omo River supports the only remaining pristine riparian forest within the drylands of Sub-Saharan Africa. Operation of the proposed Gibe III dam would destroy the riverine forest along the entire Lower Omo River.**

Until now, the only dams constructed have been the relatively small Gibe I and Gibe II. With source waters in the highlands of Ethiopia, the river gradually descends to the lower Omo Basin and through a series of gorges in the northern part of the lower Basin. In the Omo National Park, the river is bordered by a mixture of riparian forest-woodland, mixed with a variety of dry community types. Continuing southward, the Omo opens into a relatively open section of predominantly grassland, where it forms a strongly meandering system, then continues to its terminus at the northern end of Lake Turkana. A series of oxbow channels with seasonal floodwater inundation have developed in the most strongly meandering portions of the river.<sup>8</sup>

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<sup>7</sup> With some notable and important exceptions, the flora and vegetation types in southwestern Ethiopia closely resemble those of the Ilemi region and eastern Africa – a relatively recently determined relationship confirming earlier predictions by the well known British botanist in East Africa, Jan Gillett. Plant taxonomic studies, with collection and ecological characterization of more than two thousand specimens, have been completed by Carr. A full set of plant specimens is deposited both at Kew Gardens Herbarium in London and at the National Museum of Kenya Herbarium in Nairobi. Species identified to date are listed in Appendix \_\_\_\_ of this document.

<sup>8</sup> Arguably one of the least described regions of Eastern Africa, the impressionistic and often subjective accounts by early colonial explorers offer important clues to early subsistence patterns among the area's indigenous groups. These include descriptions by Vannutelli and Citerni 1887; D'Ossat and Millosevich 1900; von Hohnel 1938). Butzer (1971) describes a series of expeditions that passed through the Omo delta during the early twentieth century.



- The author has carried out a detailed study of the riverine forest and its development along the natural levee (Carr 1998). The dominant species of higher altitude zone forests, such as those near the Mago, Mui and Mara tributaries, are different from those in the lower, meandering portion of the river (Fig. 1).
  - The Lower Omo riverine forest's distinctness from the forest of the Omo River upstream, or 'above,' the meandering section of the river, is contrary to the Ethiopian government's assessment, which generalizes about the entire riverine zone from this northern area studied by Ethiopian and foreign botanists.
  - The significance of this misrepresentation is fundamental. While the GOE report clearly implies is that because of a fundamental 'uniformity' of forest species in the upper (gorged) zone and those in the lower, meandering section of the river, there would be less impact on the riverine forest by the Gibe III dam than is in fact the case, the fact remains:
    - Subsurface water inundation of the natural levees during the Omo River's annual flood (generally between August and December) is essential to the survival of the unique riparian forest and woodland zone
- **Over-bank flooding does not occur except in the modern Omo Delta and at the northernmost edge of the delta (Figs. 1 and 2) and there is no general 'excess flooding' in the forest/woodland region, as the GOE and development agency reports maintain.**

Forest and woodland resources grow along the natural levees and the immediate levee backslope along the Omo River from about Omorate and extend northward through the lower basin. This relatively more mesic (wetter) habitat provides critical last resort resources for the survival of the region's indigenous people – namely, vegetation for livestock grazing and browsing and for wild plant gathering (of fruits, shoots, and roots). Most species in the forest and woodland are limited to that environment and are key to the biodiversity (both floral and faunal) of the lower Omo basin.

- **The vast relict, or ancient floodplain in much of the Lower Omo basin does not receive Omo River floodwaters.** Since precipitation is low and erratic, ground water recharge is a critical factor in the maintenance of both riverine zone and floodplain ecosystems. The vegetation in these areas – mostly scrub-like grasses and clustered herbaceous ground vegetation - forms a highly irregular pattern, apparently corresponding to micro-level soil and drainage characteristics (there are large cracking patterns throughout much of this zone, for example) with irregular distribution of rainfall and pooling during the rainy season. Vegetation cover here can retard soil evaporation and large-scale sheet erosion.

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| With the inception of the Omo Expedition in 1967, directed by Clark Howell, Richard Leakey, and Yves Coppens, concrete description of the area was undertaken in a number of scientific dimensions. This effort sponsored a detailed riverine vegetation and land use study by the author and extensive geomorphology, hydrology and soil studies by Butzer, Brown, Cerling and their later associates.

The low-lying waterside flats along the river, primarily silt berms and sand/silt bars, are replenished by the Omo's annual flood, with recession agriculture carried out on virtually all of them by villagers in Dasanech, Nyangatom, and Kara territories.

**The Ethiopian government's misrepresentation of the Omo River's flooding regime in its downstream impact assessment, including the matter of "flooding" the ancient floodplains, is a key component of the invalidity of that assessment.**

- The GOE repeatedly asserts the existence of widespread indigenous agriculture throughout the floodplains, "uncontrolled flooding," and "excessive evaporation" with the repetitive assertion that the proposed Gibe III dam would solve these "problems" or crises. The reality is entirely different:

- There is no "excessive" and "destructive" flooding of these relict floodplains, because floods do not occur here. Overbank flooding occurs within the modern Omo Delta (Fig. 1) and just at its northernmost edge, a fraction of the flooding zone described by the GOE.

- Rainfall in the region is entirely inadequate for rainfed agriculture, despite repetitive GOE assertions that this practice is widespread. Again, the significance of this misrepresentation is critical: indigenous agropastoralists and others do not have an option of rainfed agriculture as an alternative to flood-recession agriculture, and since the latter would be eliminated by the Gibe III dam's reduction of Omo River flow volume and cessation of flooding of flood recession agricultural locales in the delta and along waterside flats, a full-scale crisis of starvation would ensue for the indigenous people.

**This situation is greatly worsened by the government's ongoing program of eviction of indigenous communities from their riverside settlements and flood recession agriculture for commercial agricultural lands.**

### Lake Turkana and Environs

- **Central and northern Turkana upland environments are similar to those of the Lower Omo Basin and those of the Ilemi Triangle/South Sudan (Fig. 3).** The region is semi-arid with a mean annual rainfall of less than 250mm) and extremely unpredictable distribution of rainfall – harsh conditions that Turkana pastoralists have long been adapted to (Photo 7).

## Turkana Pastoralists



**Photo page 7. Turkana pastoralists in upland plains, northwest of Lokitaung.** Center right: women drawing water from 15 ft. deep well dug by women. Bottom right: Shoats (goats & sheep) at hand dug well, southeast of Ilemi Triangle, in Kenya.

A bimodal precipitation pattern is common, however, with a relatively heavier rains between March and May and smaller ones in September and October.<sup>9</sup>

For example, a nearly rainless period extended for three years in both regions during the past seven years, resulting in large-scale deaths of people and their livestock – conditions mirrored during that time throughout much of the Lower Omo Basin

Seasonal changes in rainfall, combined with annual patterns of Omo River flow and lake characteristics, create major shifts in available pasturage and other biological resources, as well as available water for livestock, fishing potential and flood recession agriculture. Consequently, seasonal movements among the indigenous population are pronounced and correlated with Omo River flow patterns and Lake Turkana conditions.

The high mobility of much of the transborder region's indigenous population is summarized from Fig. 6.

- **Lake Turkana is the second largest lake in Kenya and the world's largest desert lake. More than 90 per cent of its waters derive from Omo River inflow.** Any significant change in the Omo's flood impacts lake habitats essential for fish life cycles of the more than 50 species of fish identified. In turn these impact the tens of thousands of Dasanech residing in the Omo Delta and certainly the more than 200,000-300,000 Turkana who have migrated to Lake Turkana and are now dependent on the lake's resources. Photos 8 through 10 are from Turkana fishing communities along the northwestern shores of the lake.

Both the Turkwel River and the Kerio River flow into Lake Turkana, but inflow from the Turkwel has been radically reduced following the construction of a hydroelectric dam at Turkwel Gorge, about 150 kilometers from the lake. Lake Turkana has no outlet since separating from the Nile Basin (Butzer, 1972). Because it is a closed-basin lake, fluctuations in the level of Lake Turkana are determined by inflow from rivers and by the evaporation, which is generally accepted to be 2,330 mm/year.

The Omo River's annual flood between August and December is essential for replenishment of lake waters as well as for the sustainability of the lake's fisheries, and therefore for the subsistence of the indigenous people.

- **The Omo River's annual flood produces an extensive plume of nutrients and sediment-laden fresh water that reaches as far as the central portion of the lake and is key to the replenishment of Lake Turkana's entire ecological system.** This nutrient and fresh water inflow sustains the fish reproductive and feeding habitats in the lake which are most concentrated along the northern shoreline, but also in bays, small inlets and other locales around

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<sup>9</sup> Temperatures likewise are extreme and easily reach 40°C. Temperatures recorded at Lodwar reveal a seasonal pattern with the lowest temperatures generally in July and August, but with an annual mean temperature of 29.2°C.

**Fig. 6. Seasonal Dependence on Omo River and Lake Turkana Resources by Pastoral, Agropastoral and Fishing Villages**



## Livestock Dependence on Lake Turkana



**Photo Page 8. Livestock Dependence on Lake Turkana.** Top left: Shoats begin long trek back to browsing territory from watering. Top right: Goat in last phase of malnutrition from lack of browse, near lake. Bottom left: Baby shoats dead from lack of browse and water – in trek to Lake Turkana. Bottom right: Thousands of shoats make trek to the lake for watering.

## Fishing Livelihood Along Northern Lake Turkana



**Photo Page 9. Turkana Fishing Livelihood Along Northwestern Shore of Lake Turkana.** Top left: Group of Turkana sail boats leaving for trip to eastern portion of Lake Turkana. Top right: Turkana fishers making sail from plastic food aid bags. Bottom right: Preparing nets for fishing expedition.

## Turkana Lakeside Fishing Villages



Photo Page 10. Turkana Fishing Villagers Residing at Northwest Extreme of Lake Turkana. Right: Fish salted and drying in village. Bottom left: Dried fish pallets along road await pickup by merchants.



the lake's shore, particularly Ferguson's Gulf and Alia Bay. These habitats and the fish they support are fundamental to the survival of the Dasanech living in the Omo Delta, as well as the Turkana and other ethnic groups, including the El Molo living around the lake.

**Lake Turkana is one of the most saline lakes in the Great Rift Valley and the second most saline in Africa.** According to Yuretich and Cerling (1983) its salinity is already at a level critical for various fauna and at the extinction limit for molluscs. It is the most saline lake in East Africa containing a normal fish fauna. Citing Beadle (1974) the authors also note that at a higher salinity, dwarfism of fish occurs.

The lake is only borderline potable for humans, livestock, and many wildlife species. Wood and Talling (1988), building on studies by Hopson (1972), recorded a dissolved salt content of 2,440 ppm. This value is already almost double the level regarded as safe in Kenya's "Guide Value." Although technically reasonably safe for livestock watering, it is common for the animals of herders to refuse watering at the lake. Turkana villagers report numerous health problems associated with high salinity.

- **Seasonality of the lake is a key variable in the survival efforts of the region's indigenous people.** The annual flood pulse from the Omo River, combined with the prevailing winds and currents in the lake, combine to establish several major seasonal differences. The lake is exposed to strong winds during certain months, with the prevailing winds from the southeast being a critical factor in the mixing of lake waters and nutrients.

**Local fishers define seasons in terms of the combination of changes in winds, lake level, nutrients, and fishing conditions.** The seasons of Lake Turkana as defined by the dominant group depending on the lake's resources, the Turkana fishers. All of the factors in that create fishing conditions in the lake would be drastically altered by even short-term cessation of the Omo River inflow, including the river's annual pulse of water, sediment, and nutrients entering the lake. The "controlled flood" proposed by the GOE and essentially accepted by development agencies would result in the drying out of the modern delta and southward retreat of the entire northern pulse zone where fish reproductive habitat is particularly extensive. This planned longer-term reduction of total flow could be expected to have an even more devastating effect on this resource.

The interplay of these different factors in creating fishing conditions would be drastically altered by even short-term cessation of the Omo River inflow, including the river's annual pulse of water, sediment, and nutrients entering the lake, let alone longer-term reduction of total flow.

- **Although low in fish species diversity, Lake Turkana has about 50 species, 13 or so that are critical resources for the indigenous people.** These are variously pelagic and demersal, and their distribution largely conforms to the habitat factors noted above. While *Tilapia spp.* and Nile perch are particularly important to Turkana fishing communities, for example, the survival of even these species depends on the health of the lake's ecosystem more generally. They would be fundamentally impacted if not eliminated without the sustainment of the major reproductive – and feeding habitat (in the case of Nile perch) in the northernmost lake/ Omo delta area. Fish species and Lake Turkana habitats critical to the survival of the indigenous people are identified

in the section below concerning Turkana livelihood.

- **A 60 to 70 per cent reduction in the Omo River's flow volume is predicted by the GOE if the Gibe III dam is completed.** (This estimate does not include abstraction for irrigation).
  - According to the GOE and dam proponents, this radical decrease in inflow to Lake Turkana would produce a minimum 2-meter drop in immediate terms which would occur for one to two years during reservoir filling, followed by controlled flooding.
  - The AFDB and its consultants do not question this assumption. However, geologists working in the dam region for decades point out that reservoir filling is likely to extend over many years due to heavily fractured volcanic rocks throughout the Gibe III dam site.
  - The Ethiopian government's program of state/private corporation plantation style irrigation agricultural schemes along the Omo River is already underway and involves large-scale river water abstraction (diversion) for the thousands of hectares planned for this purpose. Such abstraction undoubtedly produces an additional drastic loss of inflow to Lake Turkana.
  - This major impact fundamentally compounds the already devastating effects of the proposed Gibe III dam on the indigenous communities and environmental systems. This program was completely omitted from the GOE's impact assessments, as well as development bank assessments.
- **Even a lake level drop of 2 to 5 meters would desiccate most of the shallow shoreline environments as well as the entire modern Omo Delta and cause a northern shoreline retreat of at least 10 kilometers, as Fig. 7 indicates.** The maximum depth of the lake is 109 meters, with a mean depth of 30 meters. Its shoreline zone is markedly shallow in most of its central and northern zones.

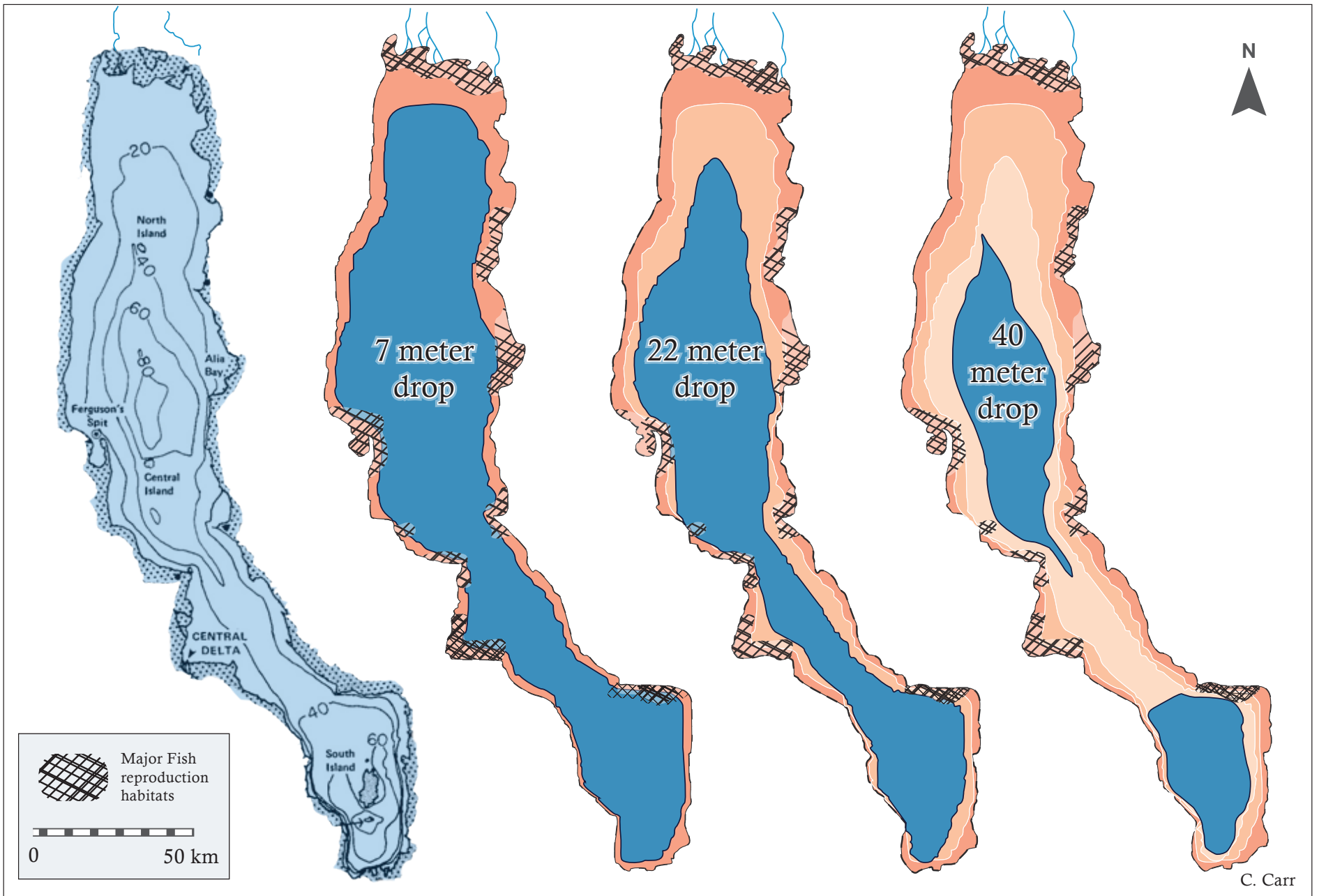
Any decrease in the level of Lake Turkana caused by the 60-70 per cent Omo River flow volume loss due to the Gibe III dam would be in addition to the natural, or annual fluctuation of the lake notated by the AFDB and the GOE.

- **Fluctuation of the lake.** The lake's annual fluctuations are about 1-1.5 meters, but the lake level dropped 10 meters between 1975 and 1994.

**The drop in lake level drop should be predicted to extend substantially below 5 meters within even a few years, given the following conditions, all of which would apply:**

- \* Seepage from the reservoir with a drawn-out if not indefinite filling period,
- \* Failure to implement artificial flooding because of reservoir fill delay and GOE priority for hydroelectricity generation over downstream flood release of waters, and
- \* Major GOE and commercial irrigation/large-scale agriculture schemes along the lower Omo River.

**Fig. 7. Lake Turkana: Effect of the Gibe III Dam  
Progressive Lake Retreat**



- **The ' flood' (also termed flood simulation) proposed by the GOE and basically adopted by controlled development agencies would not be even minimally sufficient to reverse the levels of biological and human destruction created by radical reduction of Omo River flow.**

This destruction includes:

- The desiccation of the modern delta and waterside flats where livestock grazing, agriculture and fishing are essential to the survival of tens of thousands of indigenous people,
- The destruction of the Omo riverine forest, its fauna, and all subsistence activities of indigenous communities there.
- The southward retreat of the lake's northern shoreline by a minimum of 10 km, with desiccation of the entire Omo Delta. the northern end of the lake -where fish reproductive habitat is critical for the entire lake system, and the lake's shoreline areas, the lake's western and eastern shorelines,
- The cessation of the Omo's seasonal pulse of fresh water and nutrients essential to the fisheries, which provide sustenance for the indigenous people.

For Lake Turkana, destruction of its fisheries and associated biological systems would be greatly compounded by salinity increase. Barely potable at present, an increase in salinity would have further destructive effects on the health of the fishing communities, who depend on lake waters for drinking and household use. The negative effects of salinity diseases for both humans and livestock have been documented for the shoreline area between Ferguson's Gulf and the northern end of the lake.

Such retreat of Lake Turkana from the Gibe III dam would result in immediate and devastating hunger throughout the region and radically escalate transborder conflict (Fig. 8).

- **The AFDB report on the proposed Gibe III dam's alleged hydrologic effects of the proposed dam on Lake Turkana consistently accepts two major GOE premises – neither of which is supportable.**

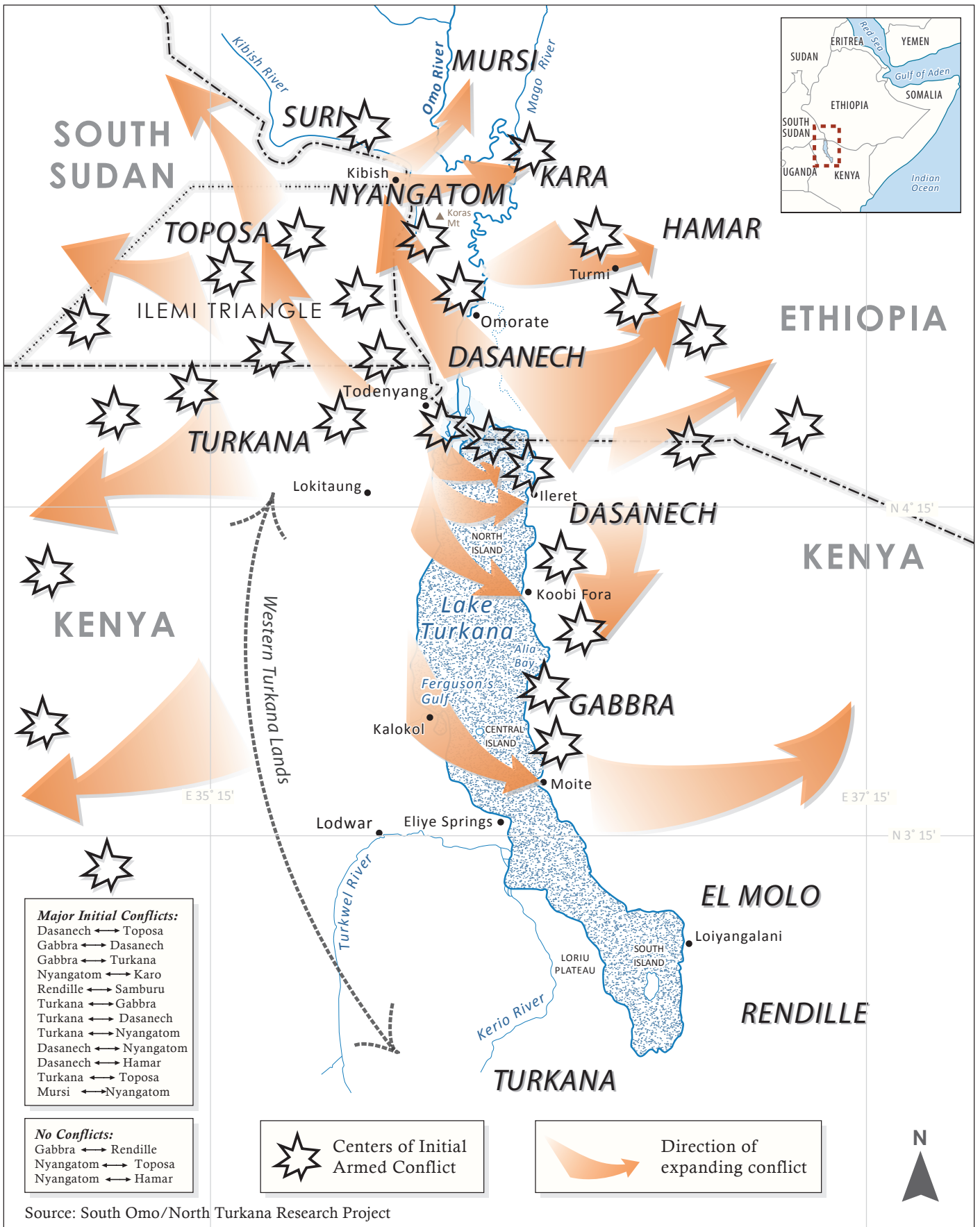
First, that the reservoir will be filled in 1 to 2 years, when in fact the extensive fracturing of volcanic rocks bordering the reservoir promises to thwart the filling process for many years, if not indefinitely - a reality compounded by the clear possibility of additional fracture development from seismic activity.

Second, that an adequate flood substitute will be initiated with a GOE-managed annual controlled flood.

To the contrary:

- (i) Delayed reservoir filling is likely, due to seepage through fissuring (personal communication with ARWG geologist associates).
- (ii) The low likelihood of such a program being implemented due to the GOE's priority of electricity generation for export revenue, and
- (iii) The fundamental inadequacy of the planned flood regime in any case - fundamental problem addressed by the EIB's impact assessment, all point to a sustained radical reduction of Omo River inflow and a continued drop in lake level, with devastating environmental and human impacts.

**Fig. 8. Expanding Armed Conflict From Proposed Gibe III Dam**



- **The destruction of wildlife is already at a crisis level in much of the Lake Turkana region and it is likely to become irreversible in even the first phase of impacts of the Gibe III dam, if it is completed.** Wildlife in and around the lake has been abundant, with unique parks known for their richness and uniqueness. These include the UNESCO World Heritage site, Lake Turkana National Park (on the western shore), Sibilo National Park (on the eastern shore), and island parks (both Central Island National Park and South Island Park). The lake is home to Nile crocodile, bird species numbering in the hundreds – including flamingos, cormorants, ibises, skimmers, and sandpipers - hippos, and turtles. Wildlife literature for the Lake Turkana region and the lower portion of the Omo Basin is not particularly abundant, and it is even poorer for the Ilemi Triangle region.

In recent times, much wildlife has been decimated throughout much of the entire region, both because of overcrowding of people and wildlife, with inevitable habitat destruction resulting, and abundant firearms since the Turkana and all ethnic groups in the region obtain arms from traffickers between Kenya and South Sudan, from Ethiopia and elsewhere. Wildlife in the lake's island habitats - including the highly threatened) turtle, Nile crocodile, and hippo populations - remains essentially unprotected.

## **V. COMPONENTS OF CATASTROPHE: SOCIAL AND ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED DAM**

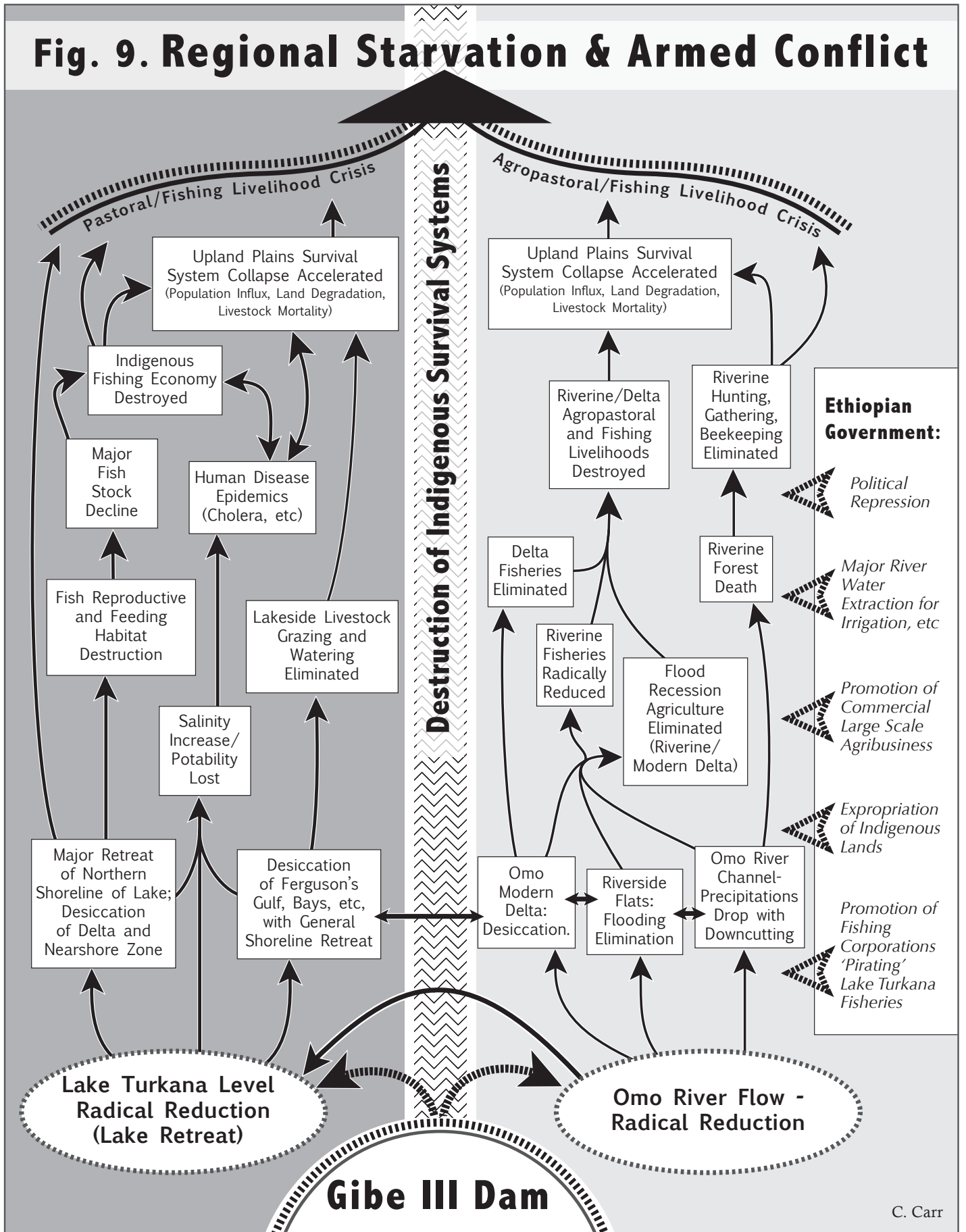
The following outcomes are the specific components of catastrophe that would unfold for at least 200,000 indigenous people in the Lower Omo River Basin, 300,000 indigenous people in the Lake Turkana area (including fishing and pastoral/fishing communities) if the Gibe III dam is built and operated, and thousand of other indigenous people who would be swept up in conflicts resulting from the desperate struggle for survival throughout the transborder region.

Fig. 9 presents a summary of the outcomes of Gibe III completion and operation, for the Lower Omo River Basin, the Lake Turkana region and the Ilemi Triangle.

### **Consequences for the Lower Omo River Basin**

1. **At least a 60-70 per cent reduction of Omo River flow volume**, with a corresponding drop in inflow to Lake Turkana. The estimate does not take account of the large-scale irrigation (on expropriated indigenous lands) along the river that has already been initiated and is being rapidly escalated by the Ethiopian government.
2. **Elimination of Omo River flooding in the modern (present day) delta** (about 500 square kilometers) and southward migration of Lake Turkana's northern shoreline by **at least 10 kilometers** (Fig.7). Desiccation of the entire modern Omo Delta and northernmost waters of Lake Turkana.
3. **Cessation of flooding of waterside point bars** (and sand/silt spits) along the entire lower Omo River with elimination of mesophytic (water-loving) vegetation in these locales.

# Fig. 9. Regional Starvation & Armed Conflict



4. **Further down cutting of the Omo River channel in adjustment to the new (lower) base level of the lake**, accompanied by channel scouring, river bank erosion, and resulting silt, causing fundamental disruption of oxygen and nutrient levels in the river, with major changes in water quality reaching the lake.
5. **Destruction of all recession agriculture throughout the modern Omo Delta** - both its Ethiopian and Kenyan portions - and on waterside flats along the river. Destruction of the agricultural livelihood of at least 80,000 indigenous peoples (primarily Dasanech and Nyangatom) settled along the Lower Omo River and in the modern Omo Delta area, with tens of thousands more indigenous peoples of the lower Omo Basin devastated by their loss of access to grain and other agricultural products, through trade.
6. **Elimination of fish reproductive (hatchery, nursery, and feeding) habitat** throughout the modern Omo Delta and northern Lake Turkana waters, as well as in Omo riverine environments impacted by major disruption of nutrient, sediment and oxygen content.
7. **Destruction of Dasanech and Nyangatom (Fig. 2) artisanal fisheries** – the major livelihood for the poorest among Dasanech and Nyangatom communities - in the modern delta and northernmost Lake Turkana waters and in the Lower Omo River.
8. **Desiccation of last-resort (drought period) grazing for livestock within the modern delta**, along the entire northern Lake Turkana shoreline, and in the upstream riverine zone, causing further radical livestock mortality and dependence on cultivation just when cultivation in the riverine zone and modern delta is eliminated.
9. **Elimination of riverine (mesophytic, or water-loving) vegetation** - grasses, other herbaceous and woody plants - along riverbanks and natural levee back slope environments upstream from the modern delta. Destruction of last-resort grazing and browsing habitat for indigenous livestock – particularly critical during prolonged drought and other major hardship periods.
10. **Radical decrease in floodwater quantity and residence time (that is, the period of water retention in soil) in Omo River natural levee soils**, causing death of the riverine forest – the last pristine such forest in semi-arid Africa.
11. **Destruction of riverine forest/woodland-based subsidiary food production**, including gathering of wild fruits and other plant parts, bee-keeping, and hunting, all key survival activities for the most impoverished communities of the lower Omo's indigenous groups.
12. **Lowering of the current limited but critical ground water recharge** in the dryland plains lateral to the lower Omo River channel, causing an acceleration of grassland deterioration, susceptibility to overgrazing, and desertification.
13. **Collapse of agropastoral, pastoral and fishing livelihood within the riverine zone** throughout the lower basin, with outmigration of tens of thousands of households newly



impacting the surrounding plains and thousands of pastoralists clinging to their way of life there, despite radical declines in livestock herds as overgrazing progresses.

14. **Major escalation of existing malnutrition levels** (already at least at about 40 per cent, by general estimates from aid organizations periodically present in the area among the indigenous people, with starvation conditions taking hold throughout the region - both riverine and nearby plains.
15. **Major spike in disease susceptibility**, with conditions (such as stagnant water bodies) promoting major increases in malaria and schistosomiasis, cholera, and other diseases known to the region but heretofore held at bay.
16. **Major escalation and initiation of armed conflict between ethnic groups**, particularly among the Dasanech, Nyangatom, and Turkana, but also the Hamar, Toposa, and others, as desperate survivors from the riverine zone push into surrounding regions (Fig. 8). Arms availability is such that these conflicts have an acceleration potential previously altogether unknown to the region.

### **Consequences for the Lake Turkana Region**

The following outcomes can be expected to affect the population of approximately 300,000 indigenous people dependent on Lake Turkana's water and fisheries resources and are also pertinent to the survival and well being of a far larger population through essential trading relations and conflict issues.

1. **Initial lake level drop of approximately 2 meters during early reservoir filling effort, with continuing lake retreat resulting from three circumstances already existing or highly probable.** These are:
  - (i) an indefinite reservoir filling period due to seepage from the reservoir through volcanic rocks,
  - (ii) inadequacy of the GOE's planned artificial flood and the low likelihood of its implementation at all, and
  - (iii) reduced inflow from Ethiopia's major diversion of the Omo River for irrigation agriculture.
2. **Southward migration of the northern shoreline of Lake Turkana by at least 10-12 kilometers** further into Kenya in early phase of the reservoir fill period, with continued shoreline regression likely under these reduced flow conditions.
3. **Desiccation of the modern Omo River Delta** at the northern end of the lake as well as the entire northern shoreline zone and all shallow areas along the western and eastern shorelines, including Ferguson's Bay, Alia Bay, and other bays and inlets around the lake.

4. **Destruction of all fish reproductive habitat in lake regression areas**, with the first major impacts in the lake's primary fish hatchery/nursery habitat – the northern shoreline region near the Omo River's terminus and Ferguson's Gulf (Fig. 9).
5. **Salinity increase in what is already the most saline of large lakes in Africa**, worsening the borderline potability of its waters for humans, livestock, and wildlife.
6. **Collapse of fish stocks most critical for indigenous fishing communities** from the combination of lake withdrawal with destruction of reproductive and feeding habitats, loss of nutrients swept into the lake by floods and rise in salinity.
7. **Destruction, with likely elimination, of the Turkana artisanal fishing economy** – the last resort livelihood of the indigenous people.
8. **Collapse of the exchange system between fishing and pastoral, and fishing and agricultural (flood recession) communities**, and therefore, destruction of food-related reciprocity relations in the region more generally.
9. **Destruction of shoreline and near-lake vegetation**, eliminating last resort grazing (and browsing) resources for livestock.
10. **Increased mortality of livestock**, major decrease in stock vigor, with starvation and death from thirst and disease, further destroying the herding economy and causing continual migration by Turkana to the lake in order to take up fishing.
11. **Decreased [lowered?] water table in dryland plains adjacent to Lake Turkana**, with loss of remaining grassland vegetation and increased (often irreversible) establishment of unpalatable invasive species. (These species include *Prosopis juliflora* and other species toxic to livestock).
12. **Epidemic-level disease outbreaks**, including cholera, at Lake Turkana (including Kalokol/Ferguson's Gulf where cholera outbreaks have previously occurred). Major disease susceptibility increases with the drying out of major shoreline habitats, leaving standing pools of water, combined with human waste accumulation and major malnutrition conditions.
13. **Region-wide hunger and starvation** among Turkana, with desperate efforts to migrate to towns or to possible internally displaced persons camps with few if any 'exit options' available.
14. **Major inter-ethnic armed conflict** emerging from the simultaneous collapse of indigenous survival systems in the Lake Turkana region and the Lower Omo Basin exacerbated by the widespread availability of arms.

## Consequences for the Ilemi Triangle and the Broader Region

1. **Major spike in overgrazing and ecological degradation throughout the dryland plains** of the Ilemi Triangle caused by a large influx of pastoral and other peoples from Kenya and Ethiopia as environmental or economic refugees.
2. **Escalation of local skirmishes and multi-ethnic conflict** as overcrowding by ethnic groups (mostly Turkana, Nyangatom and Dasanech) intensifies and competition over disappearing pasturage and water sparks increased hostilities.
3. **Expanding armed conflict in the region**, facilitated by heightened arms availability from trafficking between Kenya and South Sudan and from national governments utilizing their respective ethnic groups as proxy forces in the tri-nation struggle over the oil- and gas-rich but contested Ilemi lands (Fig. 8).
4. **Spiraling militarization of the region**, as governments react to their own indigenous people's strife and inter-ethnic conflict engulfs the region. Increasingly repressive government policies with desperate actions by indigenous people can be expected to produce regional destabilization.

The Ethiopian government is already highly repressive in the Lower Omo Basin, with indigenous communities reporting beating and arrest of villagers protesting or resisting eviction from their Omo riverine lands. Both the Kenyan and Ethiopian governments have greatly increased their police and military presence in the region as they begin implementing plans for further expropriation of indigenous lands for major infrastructure construction, increasing diversion of Omo River waters, and commercial agribusiness.



**Ilemi Triangle (left) border with heavily grazed area**

## **VI. THE INVALIDITY OF IMPACT ASSESSMENTS BY THE ETHIOPIAN GOVERNMENT AND DEVELOPMENT BANKS**

**No impact assessment has been done for the actual impact zone of the proposed Gibe III dam. This zone encompasses the transborder region of Ethiopia - including terminus of the Omo River in Kenya, the Lake Turkana region of Kenya, and contested Ilemi Triangle/southeastern South Sudan lands**

- **The Ethiopian government (GOE) has failed to produce such an assessment, despite its multiple requests for international funding. The development banks either funding or considering underwriting the Gibe III project have also failed to produce such an assessment, thereby violating their own procedural stipulations.**
- **The GOE's impact assessment, produced only for the Ethiopian portion of the Omo River Basin downstream from the dam site, is based on such major and pervasive omissions, misrepresentations of, and fabrications about the socioeconomic and environmental conditions in the region as render it wholly invalid.**
- **In addition to addressing only fragments of the actual impact area and the dimensions of social and environmental effects of the proposed dam, development bank investigations have failed to question major omissions, misrepresentations and fabrications in the Ethiopian government assessment so that their own assessments are unacceptable.**

### **Systematic Bias and Invalidity in Impact Assessments**

- **The Ethiopian government's downstream impact assessment does not meet even the most minimal scientific standards in terms of environmental and socioeconomic observation and interpretation. A number of its key false assertions are adopted in the development banks' impact reviews, however.** The dimensions of invalidity of the GOE assessment of the Gibe III project, as well as selected strengths and problems with international development bank reviews of the project, are summarized in Fig. 10.

The GOE's failure to produce a valid impact assessment stems in no small part from its virtual exclusion from consideration of transborder impacts of the proposed dam, for example, on large swaths of indigenous peoples whose survival depends on Kenya's Lake Turkana, and the peoples and environments of the Ilemi Triangle and the extreme southeastern portion of South Sudan. The few transborder effects mentioned in the assessment are either asserted to be either benefit for the region or of insignificant consequence.

- **The GOE's failure to establish fundamental baseline environmental and socioeconomic information in its assessment underlies much of its invalidity.** River flow volume in the zone downstream from the Gibe III dam site, along with Omo River inflow to Lake Turkana, were not recorded. Instead, projections were made from flow volume figures near the Gibe III dam site – a fundamental shortcoming pointed out in the European Investment Bank review (but avoided in the AFDB review) from faulty premises, are presented and used as a basis for a multiplicity of assertions. Other major environmental failings by the GOE's assessment include the fabrication of broad-scale excessive flooding and evaporation in the lower basin, faulty observation and interpretation of Omo tributaries and secondary watercourses in particular, with wrong interpretation of input to Lake Turkana other than the Omo River.

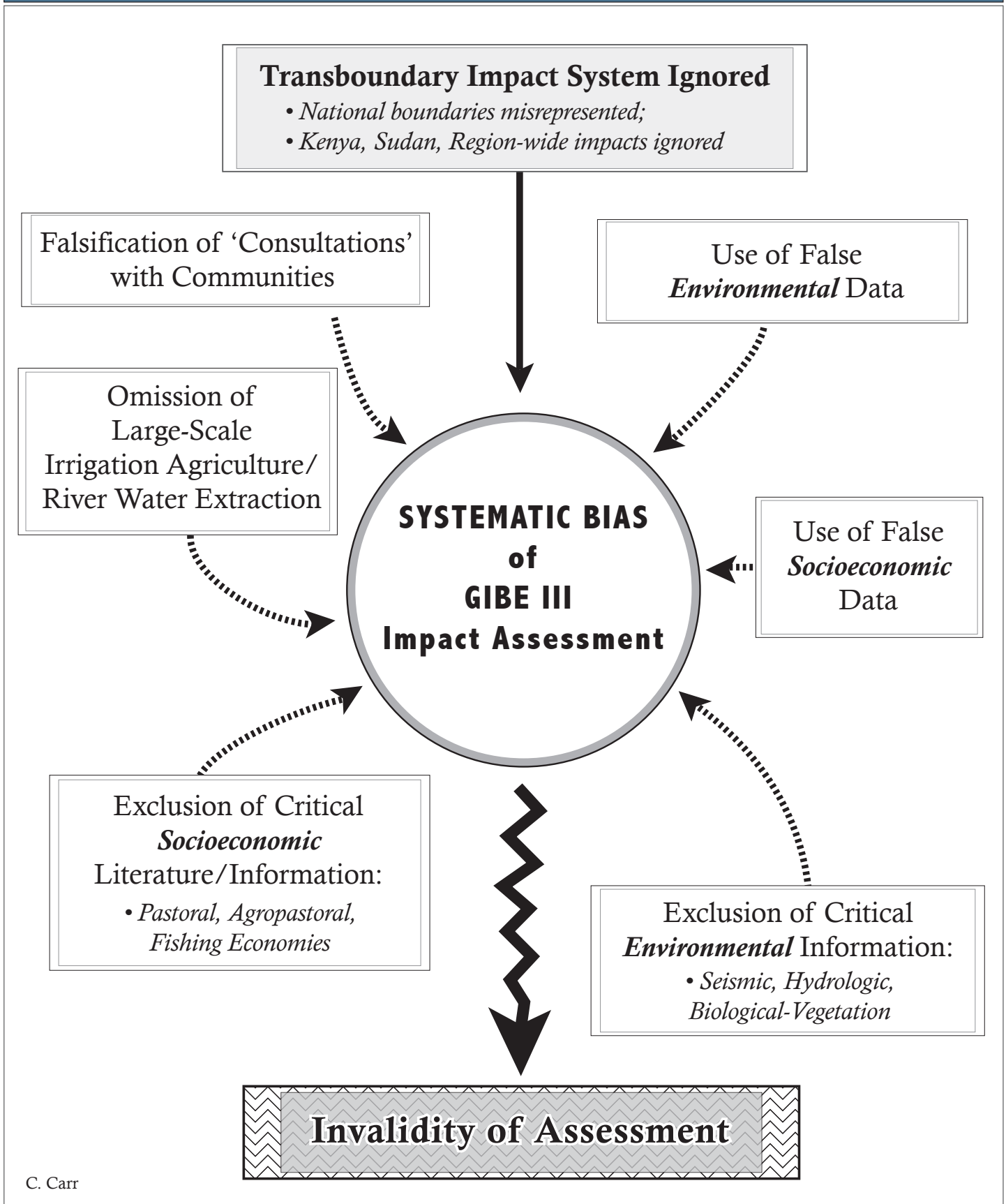
The failings of the GOE's downstream assessment – extending across major assumptions and generalizations to the specific empirical details – are so extreme that at least five ARWG professionals consider it to be the worst EIA/SIA encountered in several decades. The GOE assessment's omission and misrepresentation of even the social conditions in the Lower Omo Basin is so extensive that it provoked one ARWG physical scientist with decades of field research in the lower Omo region to inquire, upon reading the document, “Have they ever *been* there?”

- **The invalidity of the GOE's human ecological and socioeconomic assessment of the lower basin is no less glaring.** Land use patterns and related ecological *status* (both of dryland, or upland plains environments, and the Omo riverine forest) are either omitted or misrepresented. Quite apart from the GOE's disregard for the vast majority of the transborder region's indigenous people, its representation of even those indigenous groups in the lower region within Ethiopia itself is entirely unacceptable. The failings of the GOE's socioeconomic treatment of the region are not merely 'shortcomings' of assessment: they are of life and death importance for at least a half million indigenous peoples in the region.

The systematic nature of GOE omissions, misrepresentations, and fabrication of information in its downstream impact assessment is evident for the Lower Omo basin's indigenous groups. The GOE's statement, “Any environmental consequence has to be recognized early and taken into account in project design” (p. 24) is entirely at odds with the fact that the GOE produced no downstream assessment until more than two years after construction of the Gibe III dam was begun. Such inconsistency suggests the likelihood of a predetermined conclusion that any assessment would be a positive one in which the net benefit to the local people would far outweigh any problems created, and that any problems emerging could be mitigated.

Nothing could be further from the reality of the dam and its predictable impacts, should it be completed and operative.

**Fig. 10. Invalidity of Ethiopia's GIBE III Impact Assessment:  
Dimensions of Systematic Bias**



- **The African Development Bank (AFDB) and the European Investment Bank (EIB) assessments, despite their significant differences are compromised by their failure to:**
- (i) Consider the transborder character of the Gibe III impact system,
  - (ii) Challenge major dimensions of false information from the Ethiopian government - indeed their adoption of such misinformation as key components in their own review, and
  - (iii) Make key dimensions of field observation, including clear, flagrant omission of large-scale irrigation and water development throughout much of the Lower Basin (including in lands contiguous with Lake Turkana (and major eviction of indigenous people).

Reliance on GOE unreliable or false data, including its faulty projections of river flow volume, inflow to Lake Turkana, geomorphic conditions of flooding and evaporation, and unreliable plans for artificial flooding, as well as misrepresentations of livelihood systems and resource status, further contribute to the invalidity of these reviews.

No impact assessment by the World Bank in support of its potential funding of the project has been available to the author or ARWG contributors – or apparently, in the public record.

Consultants for the AFDB (Sean Avery)<sup>10</sup> and the EIB (Sogreah) *have* predicted some particular impact concerns that would actually be catastrophic for the region's indigenous people - although each report declines to identify them as such, and neither of them include these matters in their Executive Summary or Conclusions.

The EIB report, for example, notes the following:

- The GOE's projections do not suffice as a substitute for Omo River downstream flow volume and river inflow to Lake Turkana.
- Even the initial period of reservoir impoundment (filling) would cause the desiccation of the Omo's modern delta, the effective cessation of flood recession agriculture, and the retreat of Lake Turkana's northern shore by at least 10 kilometers.

The implications of these radical changes for the tens of thousands of indigenous people dependent on these resources for their survival is not mentioned in the EIB review, despite the fact that plans for and initiation of large scale irrigation agriculture was underway in the downstream zone of the Lower Omo River Basin during the EIB field reconnaissance period.

**The lower section of the basin, where major expropriation and irrigation schemes are underway, is not mentioned.. The EIB is also silent on the impact of major water abstraction from the Omo River for these irrigation schemes.**

The EIB has declined to fund the project, but its review of the GOE's assessment is only secondarily critical of the project plan. [What do you mean by secondarily?]

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<sup>10</sup> As noted earlier, unless otherwise specified as the *AFDB Socioeconomic* impact assessment, comments regarding the AFDB's review process refer to the 2010 AFDB assessment.

➤ **The AFDB review of potential impacts of the Gibe III dam on Lake Turkana's hydrology also offers some noteworthy cautions** although they are obscured within various sections of its text. The following examples are of particularly critical importance:

(i) If a significant irrigation program were to be initiated by the Ethiopian government, an entirely new impact assessment would be required.

The review does not challenge GOE data projections for lake inflow, and despite the consultants' multiple visits to the lake (presumably this included the modern Omo Delta, where 90 per cent of the inflow occurs), irrigated agricultural development in the contiguous area of the Omo River were apparently ignored.

(ii) A Gibe III dam collapse would add 2 meters to the level of Lake Turkana and a study of potential damage from dam failure should be done.

No mention is made of the inevitably violent nature of any such addition of water and debris from a collapse of the Gibe III dam, which would have such force as to destroy everything in its pathway to Lake Turkana.

➤ **For its part, the African Development Bank indicated strong interest in the project by 2008-2009**, as evidenced by its hiring of consultants to travel to Kenya's northwest to assess socioeconomic conditions there along with the likely impacts of the proposed dam on the region's indigenous people. In fact, however, the consultants themselves revealed that they were instructed to inform the indigenous communities about the major benefits that would come to them from the building of the Gibe III. When the communities raised strong objection to the project and its impact on their livelihoods that depend on Lake Turkana resources, their opinions were simply ignored and the matter was apparently set aside by the AFDB.

The research effort conducted by the socioeconomic consultants was the worst such effort encountered by Africa Resources Working Group social scientists, including the author, in decades. It by no means provides even the most minimally accurate characterization of the region's indigenous people and its economy, and certainly offers no credible basis for evaluating the proposed dam's impacts on the region.

**The AFDB's late 2010 major hydrological review of impacts of the Gibe III dam on Kenya's Lake Turkana** excluded any consideration of the dependence of the region's indigenous people on the lake's resources, and thus the planned dam's impact on their subsistence economies. This failure stemmed from the narrowly defined Terms of Reference for the consultant, but the omission is fundamental. Even the minimal hydrological changes predicted in that report would have major implications for the region's peoples. In turn, the indigenous fishing and grazing systems around the lake are intricately related to the quality of water and fish stocks.

➤ Table 3 outlines the major failures of the GOE downstream impact assessment and notes AFDB and EIB handling of individual issues.



**TABLE 3**

**KEY COMPONENTS OF INVALID ASSESSMENT OF GIBE III IMPACTS ON TRANSBORDER ENVIRONMENTS AND INDIGENOUS PEOPLES**

	<b>ESSENTIAL IMPACT ASSESSMENT COMPONENT</b>	<b>MAJOR ETHIOPIAN GOVERNMENT (GOE) ASSESSMENT FAILURES: (Omission, Misrepresentation, Fabrication)</b>	<b>AFRICAN DEVELOPMENT BANK (AFDB)<sup>11</sup> EUROPEAN INVESTMENT BANK (EIB)</b>
1	<b>Transborder impact system assessment: (Ethiopia, Kenya, Ilemi Triangle/ South Sudan)</b>	<p><i>Omission, Misrepresentation</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Failure to consider transborder impacts in nearly <u>all</u> dimensions. <ul style="list-style-type: none"> <li>● Omission of impacts on Kenya's Lake Turkana and the more than 300,000 indigenous people whose survival depends on Lake Turkana resources. The few considerations given are primarily misrepresentations.</li> <li>● Disregard for Kenyan sovereignty over Lake Turkana's northern shoreline zone and a significant portion of the Omo Delta (the expansion of the Delta in recent decades bringing much of the Omo River's active delta and river terminus within Kenyan borders).</li> <li>● Omission of Gibe III impacts on the lands and peoples of northern Kenyan and the Ilemi Triangle/South Sudan, due to radically reduced resources in the Omo riverine and Delta regions.</li> <li>● Omission of Gibe III impacts on the increasing conflict within the tri-nation border region among pastoralists, agropastoralists and fishers from multiple ethnic groups</li> <li>● Omission of GOE's large-scale irrigation/commercial agriculture impacts on the hydrology &amp; biological systems/fisheries of Lake Turkana -and indigenous economies.</li> </ul> </li> </ul>	<p><b>AFDB:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Largely uncritical of the GOE assessment's failure to consider transborder impacts of the Gibe III dam -on Lake Turkana's hydrology, fisheries and resource use system.</li> <li><input type="checkbox"/> Omission of major impact of major southward retreat of Lake Turkana's northern shoreline (&amp; desiccation of most of the modern Omo Delta) on key fish reproductive habitat and the future of the lake (an effect even under the most optimistic scenario of reservoir filling).</li> <li><input type="checkbox"/> Failure to identify major GOE commercial agriculture and irrigation/canal works with Omo River diversion, and its predictable impacts on Lake Turkana (despite the AFDB's own statement that such development would necessitate a 'new' environmental impact assessment - a statement embedded in the report text but omitted from all Summary and Conclusion discussion).</li> </ul> <p><b>EIB:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Brief mention in the general text, but omission from report summary and conclusions, of key transborder impacts of the Gibe III. including: the inevitable southward retreat of Lake Turkana's northern shoreline, loss of flood recession agriculture, destruction of lake fisheries habitat, and regional conflict)</li> <li><input type="checkbox"/> Omission of dam impacts on lands/peoples in the Ilemi region.</li> </ul>

<sup>11</sup> \*Refers to AFDB [2010](#) review of Gibe III impacts on Lake Turkana (AFDB 2010), unless otherwise specified.

2	<b>Seismic Risk</b>	<p><b><i>Omission, Misrepresentation</i></b></p> <p><input type="checkbox"/> Misrepresentation of appropriate geographic unit for seismic analysis (identified by U.N., USGS seismic offices). Consequentially, omission of available data pointing to a 20% probability of a 7 or 8 (Mercali) intensity earthquake within next 50 years in the Gibe III dam region.</p> <p><input type="checkbox"/> Omission of available data concerning <u>proximal</u> seismic activity.</p>	<p><b><u>AFDB:</u></b></p> <p><input type="checkbox"/> No substantive treatment, although brief mention of need for study of seismic hazard/possible dam collapse embedded in general text, but omitted from report Summary/Conclusions), despite potential cataclysmic effect of a major seismic event on Lake Turkana.</p> <p><b><u>EIB:</u></b></p> <p><input type="checkbox"/> Basic complicity with GOE misrepresentation of seismic issues, including the appropriate geographic unit for seismic analysis. States 'Risk of seismic activity cannot be avoided' and 'no evidence seems to exist of present seismic activity in the project area.'</p>
3	<b>Dam collapse - sediment buildup &amp; landslide related at reservoir</b>	<p><b><i>Omission, Misrepresentation</i></b></p> <p><input type="checkbox"/> Asserts that sediment buildup at the reservoir would be minimal - "not affecting the life capacity of the reservoir before 130 years, far beyond the life duration of the project." Landslide danger also dismissed.</p> <p>vs. ARWG scientists' estimate of significant landslide potential and calculation that the sediment accumulation capacity of the reservoir may be reached within a few years after reservoir impoundment, with plausible dam failure from seismic activity, landslide/sediment buildup.</p>	<p><b><u>AFDB:</u></b></p> <p><input type="checkbox"/> As noted above, brief mention of need for study of potential dam collapse impacts: projects 2 meter rise in lake level from dam failure. No mention in summary or conclusions.</p> <p><b><u>EIB:</u></b></p> <p><input type="checkbox"/> Dismissal of landslide and sediment buildup issues raised (by ARWG, other critics); acceptance of GOE/Salini construction firm's general assurance that concerns are 'unwarranted'.</p>
4	<b>Baseline data for (A) Omo River downstream flow volume &amp; (B) Omo River inflow to the lake</b>	<p><b><i>Omission, Misrepresentation, Fabrication</i></b></p> <p><input type="checkbox"/> Failure to collect data for both dimensions though acknowledges 65-70% reduction of river flow volume 'during reservoir filling'.</p> <p><input type="checkbox"/> Invalid projections of river flow volume for both downstream and lake inflow, based on inapplicable data from the Gibe III dam locale and false representation of hydrologic/geomorphic characteristics of Lower Omo Basin, including:</p> <ul style="list-style-type: none"> <li>● Wrong precipitation regime for rainfall projections,</li> </ul>	<p><b><u>AFDB:</u></b></p> <p><input type="checkbox"/> Cites GOE's absence of data for Omo River downstream flow volume and lake inflow. Substitutes 'new' flow data projections, but with some use of GOE misrepresentations of hydrologic dynamics in the Lower Basin.</p> <p><input type="checkbox"/> Largely uncritical use of GOE information &amp; perspective, with even minor 'challenges' omitted from report conclusions.</p> <p><b><u>EIB:</u></b></p> <p><input type="checkbox"/> Repeated mention of GOE's lack of baseline data - both for downstream river flow volume and inflow to Lake Turkana,</p>

		<ul style="list-style-type: none"> <li>• False attribution of Omo tributary contribution to Lake Turkana as 'alternative' source of water from main Omo channel,</li> <li>• Misrepresentation of substantial ephemeral channel (e.g., Kibish River) as flowing into Lake Turkana</li> <li>• Fabrication of Omo flood occurring throughout what are in fact relict/ancient floodplains, with 'excessive evaporation' and vast floodwaters to be 'recovery' by river regulation (the Gibe III dam).</li> </ul>	<p>along with GOE's insufficient basis for projections of 'planned' mitigation measures (annual controlled flood, etc.).</p> <p><input type="checkbox"/> No challenge to other GOE information invalidities, with apparent full complicity with GOE falsification of extensive flooding throughout what are relict floodplains, excessive evaporation and potential 'recovery' for lake inflow, etc.</p>
5	<p><b>Inflow from Omo River to Lake Turkana: reduction from Gibe III</b></p>	<p><b><i>Omission, Misrepresentation</i></b>  Misrepresentation of major components of Omo River inflow to Lake Turkana:</p> <ul style="list-style-type: none"> <li>• Failure to establish baseline data/measurements for Omo River downstream flow volume. Fallacious projections from upriver (Gibe dam region) data, including for precipitation (the dam region is a different precipitation regime than the Lower Basin) and 'mean flow' are used, instead of direct measurement of river flow in the lowermost river and at the river's terminus with inflow to the lake.</li> <li>• Fabrication of vast 'lost waters' in extensive 'floodplains' lateral to much of the lower Omo - lands which are in fact ancient floodplains - the significance being that there will be no 'recovery' of such floodwaters. This false premise is used for the GOE assertion that the 'elimination of excessive evaporation' through Omo River regulation will be a significant factor in maintaining the level of Lake Turkana.</li> </ul>	<p><b>AFDB:</b></p> <p><input type="checkbox"/> Speculative AFDB projection of Omo flow volume effect of the Gibe III, despite the AFDB consultant's assertion of a 'new approach' to calculating river flow volume in the absence of measurement taken (e.g., involving satellite imagery). The allegedly improved AFDB projection relies on several types of invalid data derived from the GOE report(s). These include:</p> <ul style="list-style-type: none"> <li>• Precipitation data inapplicable to the Lower Omo River Basin;</li> <li>(ii) Alleged contribution to Lake Turkana waters from Omo tributaries that does not transpire; and (iii) 'Recovery' of vast floodwaters (with 'excessive evaporation') for return to Lake Turkana, with river regulation (dam construction), whereas such flooding does not occur since the lands referred to are ancient floodplains, not active ones (active floods occur only in the modern Omo Delta.</li> <li>• Detailed and partially accurate description of seasonal Omo River inflow (seasonal 'pulse' of fresh water waters, nutrients, etc.) to Lake Turkana, but with major underestimation of reduced river inflow and lake impact. due to uncritical adoption of GOE assertions including: <ol style="list-style-type: none"> <li>(1) Its predicted 'recovered' waters from excessive flooding,</li> <li>(2) Its false characterization of Omo River tributaries and the Kibish River (Fig. 1) as significant alternative sources of inflow to Lake Turkana, and</li> <li>(3) Its assurances of sustained inflow through an adequate' GOE program of artificial flooding. All of these assertions are unsupported.</li> </ol> </li> </ul>

			<p><b>EIB:</b> Despite explicit recognition of desiccation of modern delta from Gibe III dam, with the immediate southward movement of lake's northern shoreline by at least 10 kilometers, exclusion of this key impact from conclusions and summary.</p>
6	<p><b>'Floodplain' status (relict vs. active) and Omo River floods as repetitively destructive of human life and livestock.</b></p>	<p><b>Misrepresentation, Fabrication [expanded from above]</b></p> <p><input type="checkbox"/> Fabrication or faulty field investigation of flood occurrence in what are <b>relict/ancient</b>, rather than active, floodplains. More than 150 references to uncontrolled and destructive flooding in these lands, along with 'excessive evaporation' -- both utilized as further 'rationales' for the Gibe III.</p> <p><input type="checkbox"/> Fabrication of frequent 'uncontrolled' floods – according to the GOE, floods 'highly destructive of human life and livestock.</p> <ul style="list-style-type: none"> <li>• No such field evidence (for excessive flooding) exists. Moreover, indigenous elders and other residents in the Omo Delta and northern Lake Turkana shoreline region universally cite <i>too little</i> flooding, <i>not</i> excessive flooding. The briefest conversations with elders point to this reality.</li> <li>• <b>Local residents universally report very little loss of human life through drowning (fewer than 10 people) and livestock (50-100) during the 2006 flood, rather than the drowning of 360 to 900 people and more than 3000 livestock described by the GOE.</b></li> </ul>	<p><b>AFDB:</b></p> <p><input type="checkbox"/> Uncritical of the GOE version of floodplains and flood regimes (including its misrepresentation of floodplains, its assertion of massive scale evaporation' and 'recovery potential', and the need to regulate the river in order to eliminate 'major destruction' by flooding.</p> <ul style="list-style-type: none"> <li>• Does question the efficacy of the ten-day flood pulse proposed in the GOE assessment and other planning documents, however.</li> </ul> <p><b>EIB:</b></p> <p><input type="checkbox"/> Same as above (although purports to have performed at least 10 days of field investigation (presumably from the Gibe III dam site to Lake Turkana).</p>
7	<p><b>Reservoir water seepage with delayed filling, with radical reduction of Omo River flow volume &amp; inflow to Lake Turkana</b></p>	<p><b>Omission, Misrepresentation</b></p> <p><input type="checkbox"/> GOE exclusion of readily available geological literature and field-based information indicating fractured volcanic rocks at the Gibe III dam/reservoir site, indicating high probability of major water seepage from reservoir into fractured system. Cherry picked geological description for apparent predetermined conclusion of no seepage problem.</p>	<p><b>AFDB:</b></p> <p><input type="checkbox"/> Apparent acceptance of the GOE view of geological character of Gibe III dam site, despite potential significance for Lake Turkana hydrologic conditions (AFDB consultant's Terms of Reference). Dismisses ARWG geologists' warning of highly fissured volcanic rocks at the dam site.</p> <p><input type="checkbox"/> Acceptance of 'assurances' by Gibe dam construction firm,</p>

		<ul style="list-style-type: none"> <li>• Misrepresentation of water movement in the region - re: seepage water 'returning' to Lake Turkana <i>anyway</i>. Migration of seepage waters from the reservoir to the lake would require at multiple decades, if not a century or more (ARWG).</li> <li>• Dismissal is landslide danger, including potential danger of threat to the dam's integrity. ARWG geologists point to the steep rock faces of the reservoir walls in the gorge, additional landslide potential from saturation of the volcanic rocks, and seismically induced instability.</li> </ul>	<p>Salini, that seepage concerns are unfounded and that any water lost would be 'returned' to Lake Turkana.<sup>12</sup></p> <p><b>EIB:</b></p> <p><input type="checkbox"/> Apparent acceptance of GOE/Salini assurances of geological integrity/ absence of major volcanic rock fracturing.</p> <ul style="list-style-type: none"> <li>• Largely deflects ARWG geologists' prediction of seepage through fractures to minor infiltration of 'rock face' (a 11% infiltration for first year of filling - a phenomenon unrelated to the problem of fissures).</li> </ul>
8	<p><b>Baseline data for indigenous livelihood systems (pastoral, agro-pastoral and fishing)</b></p>	<p><b><i>Omission, Misrepresentation, Fabrication</i></b></p> <p><b>Four major dimensions of invalidity are identified here.</b></p> <p><input type="checkbox"/> <b>Failure to characterize the following major characteristics of indigenous economies in the Lower Omo Basin.<sup>13</sup> Total omission of all indigenous economies impacted around Kenya's Lake Turkana (a population of about 300,000).</b></p> <ul style="list-style-type: none"> <li>• The dynamics of pastoral, agropastoral and fishing livelihood systems,</li> <li>• The natural resource dependencies (especially on Omo River and Lake Turkana water, vegetation and fisheries) of these economies,</li> <li>• Recent changes in these indigenous economies and their current status (including malnutrition and disease incidence),</li> <li>• The resultant vulnerability of these economies, including regional exchange patterns, to the major environmental changes predictable from the planned Gibe III</li> </ul>	<p><b>AFDB:</b></p> <p><input type="checkbox"/> Not fully applicable, since indigenous livelihood was apparently omitted from the consultant's Terms of Reference. No criticism or comment made regarding the GOE's failure to recognize or consider the hundreds of thousands of Turkana people (and others) relying on Lake Turkana waters and fisheries for their livelihood. No significant comment on the significance of hydrological alterations of the lake, if the Gibe III is completed, for indigenous utilization of the lake's resources (e.g., the impact of shoreline retreat on fish reproductive habitat, on livestock grazing/watering and on human consumption). Brief treatment is given to the importance of shoreline retreat for littoral zone vegetation, however.</p> <p><b>EIB:</b></p> <p><input type="checkbox"/> Clear notation of GOE's failure to generate baseline socioeconomic data, but utilization of GOE's information (and reportedly, 'assistance' by local government offices. (The EIB</p>

<sup>12</sup> The AFDB environmental consultant's statement about having contacted the ARWG for information regarding reservoir seepage but not having received a response is incorrect. No communication was received by the author at the ARWG.

<sup>13</sup> Villagers (Dasanech) in multiple localities along the Lower Omo River were questioned by SONT researchers and consistently reported that no individuals have inquired about their numbers, settlement movement, herding of livestock or livestock numbers; nor were they asked about their food production practices or resource needs. Respondents described only police and government personnel taking action to move them or evict them altogether (with 'employment' of only a few individuals), or government/'outsider' presence to investigate an instance of armed conflict, most frequently with the Turkana (or Nyangatom).

		<p>dam, and</p> <ul style="list-style-type: none"> <li>● The impact of GOE's unreported, yet accelerating program of <u>commercial agriculture plantation and associated irrigation/canal system</u> construction - with eviction of riverside indigenous communities, on the region's indigenous survival systems.</li> </ul> <p><b>All of the above are essential components for a satisfactory impact assessment for the proposed Gibe III dam.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Systematic exclusion of the <u>content</u> of available literature concerning the ethnic groups and economies within the Lower Omo Basin - by geographers, anthropologists and ecologists including Turton, Carr, Almagor, Tornay and Abbink, among others. Some of this literature is referenced in the GOE's bibliography but is entirely excluded from consideration.</li> <li>● Exclusion of all literature pertinent to the Lake Turkana region, despite its availability.</li> <li><input type="checkbox"/> Utilization of unreliable, sometimes clearly fabricated Ethiopian government 'data' (demographic, economic, etc.): information often generated from remote police or agricultural and other offices uninformed about conditions in the Lower Basin or subject to conformity with the government's perspective.</li> <li><input type="checkbox"/> Fabrication of quantitative data for ethnic groups (demographic, livestock populations, other livelihood particulars). Quantitative projections from Landsat/satellite materials that are inaccurate and misleading - having little if any bearing on actual conditions in the Lower Basin.</li> </ul>	<p>report describes a team of six individuals in the field for a total of 10 days for the entire Lower Basin study).</p> <ul style="list-style-type: none"> <li>● Near total exclusion of critical remarks concerning GOE socioeconomic studies and information from the EIB report's Summary &amp; Conclusions.</li> </ul> <p>Prediction of cessation of flood recession agriculture, riverine grazing &amp; much fishing: however, this major criticism of the dam's effects is presented only inconspicuously in the main text of the report, while excluded from the report's Summary and Conclusion.</p>
9	<p><b>Flood recession agriculture: impact from radical river flow reduction</b></p>	<p><b><i>Omission, Misrepresentation</i></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Omission of all information regarding the direct dependence of Lower Omo Basin indigenous communities on flood recession agriculture</b> (and dependence of tens of thousands of other indigenous peoples through exchange relations for agricultural product), as increasing dependence as the pastoral sector precipitously deteriorates.</li> </ul>	<p><b><u>AFDB:</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No significant challenge, despite major relevance to Lake Turkana hydrologic and resource use conditions. (Presumably, not included in AFDB Terms of Reference)</li> </ul> <p><b><u>EIB:</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Little mention of GOE lack of 'data', but substantial field</li> </ul>

		<ul style="list-style-type: none"> <li>● Failure to describe accurately the locations, cropping patterns, water requirements and other specifics of flood recession agricultural production, both along the Omo River's waterside flats and throughout much of the active (not relict) Omo Delta. <ul style="list-style-type: none"> <li>● <i>As a consequence of the above failures, inability to establish a basis for assessing the impacts of radical reduction of Omo River flow from the Gibe III dam on this mainstay local food source. Omission of consideration of flow reduction, northern shoreline retreat of Lake Turkana into Kenya and desiccation of the lowermost Omo flats and modern (active) Delta, eliminating flood recession agriculture (and last resort grazing for livestock) throughout the Lower Basin.</i></li> <li>● Fabrication of the practice of rainfed agriculture occurrence in the Lower Basin (this practice is not possible to have observed because it does not occur, due to limited rainfall).</li> </ul> </li> </ul>	<p>data collected re: cropping patterns, some water requirements, etc.</p> <ul style="list-style-type: none"> <li>● Clear prediction of the destruction of flood recession agriculture in the Lower Basin due to the radical flow reduction by the planned Gibe III dam, with cessation of flooding on riverside flats and delta locales. However, these notations are inconspicuously placed in the report text, without mention in the document's Summary or Conclusions.</li> </ul>
10	<p><b>Artisanal fishing in River and delta: impacts of Omo River flow volume reduction</b></p>	<p><b><i>Omission, Misrepresentation</i></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Failure to detail and evaluate the importance of fishing - the last resort food source for tens of thousands of indigenous people in the Lower Omo Basin -primarily (but not only) among the Dasanech.</b> Consequently, failure to establish a baseline for considering the impacts of the Gibe III on this pervasive and increasing form of livelihood. <ul style="list-style-type: none"> <li>● Exclusion of bathymetric and other data (generally available, but shown by ARWG, the EIB and others to indicate that the Gibe III would cause southward migration of Lake Turkana's northern shoreline (at least 10 kilometers -</li> </ul> </li> </ul>	<p><b><u>AFDB:</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No explicit consideration of Gibe III caused retreat of Lake Turkana northern shoreline retreat and drying out of the Omo delta, for lake fisheries (and the large indigenous fishing population dependent on them). <ul style="list-style-type: none"> <li>● Some discussion of adverse effect of loss of flood pulse on fish stocks noted, including loss of nutrients, valuable sediment and fresh water.</li> <li>● Failure to consider 'overfishing' as a consequence of commercial fishing, rather than assuming the overfishing threat</li> </ul> </li> </ul>

		<p>and likely, substantially more due to major Omo water diversion for the GOE promoted commercial agriculture irrigation systems - destroying critical fish reproductive habitat in northern lake and Delta locales and eliminating fishing as a means of survival in the Lower Omo Basin.</p> <ul style="list-style-type: none"> <li>● Omission of Ethiopia subsidized fishing corporations 'piracy' of Kenyan (and indigenous peoples') Lake Turkana waters as fishing areas.</li> <li>□ Full disregard for artisanal fishing in Lake Turkana - the mainstay of survival for upwards of 200,000 indigenous Kenyans settled around Kenya's lake, as well as those depending on exchange with them (at least an additional 100,000 people).</li> </ul>	<p>stems from the number of indigenous fishers.<sup>14</sup> No mention of the major catches taken by Ethiopia based ('pirate') fishing companies from Ethiopia - companies that operate as far into Kenya's Lake Turkana as North Island.</p> <p><b>EIB:</b></p> <ul style="list-style-type: none"> <li>□ Loss of sediment, nutrients, oxygen and fresh water infusion noted, along with decreases in fish population, but fundamental inconsistency with statements elsewhere in the report noting 'benefit' from the Gibe III for Lake Turkana fisheries.</li> </ul>
11	<b>Riverine forest &amp; forest-based survival activities</b>	<p><b><i>Omission, Misrepresentation, Fabrication</i></b></p> <ul style="list-style-type: none"> <li>□ Omission of available data regarding Omo riverine/forest ecology<sup>15</sup> (e.g., Carr 1998) and comparative riverine environments where forest destruction has followed large hydrodam construction.</li> <li>● No apparent field-based investigation of Lower Omo Basin riverine forests. Invalid description (floristic &amp; other) of lowermost basin's riverine forest presented, using information from from (higher altitude) forests of</li> <li>● Disregard for the need to consider the Omo riverine forest structure and dependence on the river's flood regime - thus its vulnerability to destruction from Gibe III development, as has occurred in all other Sub-Saharan Africa semi-arid environments with riverine forest development.</li> </ul>	<p><b>AFDB:</b></p> <ul style="list-style-type: none"> <li>□ No treatment of Gibe III impacts on riverine forest and possible effects on pulse/inflow of water, sediments and nutrients to Lake Turkana.</li> </ul> <p><b>EIB:</b></p> <ul style="list-style-type: none"> <li>□ Uncritical adoption of invalid GOE description and treatment of the riverine forest. Elaborates with fully unsupportable claim that the downstream riverine forest should 'benefit' from the higher and more stable alluvial aquifer level.</li> <li>● Brief acknowledgments of riverine economy of indigenous communities, particularly with regard to flood recession agriculture - yet exclusion of broader consideration, including the 'last resort' survival nature of riverine economy for the</li> </ul>

<sup>14</sup> The AFDB report states: 'It has been reported that between 2006 and 2007, the number of fishing craft increased from 650 to 6,900, and the number of fishermen increased from 2,600 to 8,160 (Mbogo, 2010, citing Ojwang et al, 2007).' The same report expresses 'rising concern' and states that there is 'inadequate information on the potential of the lake's fishery' and that 'it is difficult to establish whether current catch efforts are sustainable' (*ibid*). The commercial fishing sector has always been hampered by poor infrastructure to store and transport fish to market outlets, and by 'a lack of comprehensive fisheries management strategy' (*ibid*).

<sup>15</sup> For details of the Lower Omo basin riverine forest/woodland floristics and vegetation see Carr (1998); some summary characteristics are presented below.



		<ul style="list-style-type: none"> <li>● Fabrication of overbank floods in riverine forests. There is no field evidence for such, so fabrication is clear. In order to be sustained, riverine forests require particular 'residence times' of subsurface inundation (critical levels of moisture retention in soils for minimal periods of time).</li> <li><input type="checkbox"/> <b>No account of livelihood activities in riverine forest (food gathering, hunting and bee-keeping) critical to the survival of the most impoverished indigenous communities (Nyangatom, Dasanech and Kara) and tens of thousands of additional pastoralists who depend on riverine environments for their own and their herds' survival during prolonged drought.</b> All would be eliminated by radical river flow volume reduction from the Gibe III dam.</li> <li><input type="checkbox"/> <b>Omission of the GOE's major eviction of indigenous communities along the Omo River for clearing of the forest, construction of canal and irrigation systems and establishment of large-scale commercial irrigation farms.</b></li> </ul>	<p>region's pastoralists.</p>
12	<p><b>Artificial flood: efficacy of GOE 'assurances' to sustain downstream ecological and indigenous economic systems</b></p>	<p><b><i>Omission, Misrepresentation</i></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Misrepresentation of GOE's 'planned' artificial flood program as calculated from adequate measures of downstream river flow volume and lake inflow, when no such measurements have been taken.</li> <li><input type="checkbox"/> Misrepresentation of 'planned' artificial flood as 'sufficient' for sustaining downstream ecology, as well as mitigation of any problems for indigenous economies caused by sharp reduction of river flow volume. (These calculations are shown to be false, by the EIB, the ARWG and other critics.)</li> <li><input type="checkbox"/> Omission of Gibe III objectives of hydroelectric power generation for export - now known to be a major proportion of the energy produced - as in conflict with release of water for downstream indigenous economies and ecological systems.</li> <li><input type="checkbox"/> Fabrication of a GOE plan to undertake controlled flooding in tandem with agricultural development <i>for the</i></li> </ul>	<p><b><u>AFDB:</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Basically accepts GOE misrepresentation of Omo basin flood patterns - thus, the rationale for regulation by the Gibe III dam.</li> <li><input type="checkbox"/> Questions the effectiveness of the proposed 10-day flood pulse/artificial flood release, but does not consider the problems associated with such programs in general (for example, the failure to implement such a program in any large dam developments within Sub-Saharan Africa). (See comments in # 13 below).</li> </ul> <p><b><u>EIB:</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Issues little if any challenge to the GOE's invalid characterization of flood patterns (including the need for regulation in the first place) within the Lower Basin, its 'planned' artificial flood program or its omission of information regarding problems created by the proposed dam. (While the EIB report notes ARWG's statement of no successful artificial</li> </ul>

		<i>benefit of indigenous communities</i> , when the GOE is engaged in major eviction of indigenous communities as part of its privatisation and extensive commercial irrigation agriculture development scenario - one well underway, and accelerating.	programs having occurred in Africa, it does not comment on it). Only 'suggestion' made is a program with a higher flow volume & extended release period. <input type="checkbox"/> Suggests even increased water development infrastructure (barrage, or weir construction, etc.) - developments actually oriented to commercial /state agribusiness, with no apparent cognizance of the implications of such development for eviction of indigenous communities and the destruction of environments they depend on for their subsistence.
13	<b>GOE development of large-scale irrigation and commercial agriculture with eviction of indigenous communities</b>	<b><i>Omission, Misrepresentation, Fabrication</i></b> <input type="checkbox"/> <b>Omission of the GOE's ongoing major privatisation program in the region, with construction of large-scale irrigation/canal systems and promotion of commercial agricultural schemes - developments already underway and and generally preceded by eviction of indigeoous communities along the Omo River.</b> <ul style="list-style-type: none"><li>● <b>Exclusion of clear evidence for a large decrease in Omo River water inflow to Lake Turkana, due to diversion for GOE/commercial irrigation schemes.</b></li></ul> <input type="checkbox"/> <b>Fabrication of 'planned' agricultural and social development 'for' indigenous communities, when in fact they are being evicted by the thousands from riverine lands</b>	<b><u>AFDB:</u></b> <input type="checkbox"/> Clear statement of the necessity for a new environmental (and presumably, socioeconomic impact assessment if irrigation agriculture is developed along Ethiopia's Omo River; this statement excluded from Executive Summary. <input type="checkbox"/> No comment on Ethiopia's policies toward the indigenous people, including the people residing within Kenya along the lake's edge of the Omo delta. <b><u>EIB:</u></b> <input type="checkbox"/> Although strong criticisms made of GOE artificial floodplan, recommendations for increased water works (barrages, etc.) development, in full contradiction with EIB's own conclusion that the Gibe III would eliminate indigenous flood recession agriculture. <input type="checkbox"/> No apparent questioning of irrigation agricultural development, e.g., the fact that <u>no impact assessment was done.</u>
14	<b>L. Turkana shoreline &amp; littoral/near shore zone impacts (physical, biological) of the proposed Gibe III dam</b>	<b><i>Omission, Misrepresentation</i></b> Omitted from any impact consideration, since GOE denies any significant impact will occur for the level of Lake Turkana from the Gibe III dam.	<b><u>AFDB:</u></b> <input type="checkbox"/> Detailed description of lake's zonation, fish habitat description, fish species composition, with reliance on Kenyan fisheries department information to exclusion of indigenous knowledge or practice: discrepancies between the two there not addressed (e.g., patterns & significance of near shore artisanal fishing). <input type="checkbox"/> Cognizance of EIB assertion of 10 Km or more southward retreat of the lake's northern shoreline, yet this major change, yet essentially ignores the major impact pf this retreat on the lake's fishery and livelihoods of indigenous peoples.

			<p><input type="checkbox"/> Explicit statement of the importance of irrigation agriculture along the Omo River. with the statement that such development 'would' require a new environmental impact statement, due to its major effect on Lake Turkana through river water diversion that reduces inflow. This AFDB 'caution' is contradicted by the AFDB's omission in the assessment of large-scale irrigation works already underway during the AFDB consultant's investigation/report preparation period.</p> <p><b>EIB:</b> Cursory reference to physical characteristics of the lake, particularly its northernmost portion where the report posits a radical southern movement of the shoreline (at least 10 kilometers). However, little comment on the lake and full omission of consideration of indigenous people as well as from the Executive Summary.</p>
15	<p><b>Baseline data concerning the growing dependence of the large indigenous population around Lake Turkana on the lake's resources.</b></p>	<p><b>Omission</b> Omission of all ethnic and livelihood information from the lake Turkana region, along with their vulnerability to impacts from the Gibe III dam.- despite ample available information regarding the highly stressed indigenous population of northernmost Turkana lands and their of the dependence on the lake's waters and fisheries.</p>	<p><b>AFDB:</b> <input type="checkbox"/> Limited mention, despite the critical influence of the lake's hydrologic conditions on the survival systems of a large and growing indigenous population – including through fishing, livestock raising, and household water consumption. This issue was omitted from the consultant's Terms of Reference with the AFDB, however.</p> <p><input type="checkbox"/> <b>The AFDB's 'Socio – Economic Analysis and Public Consultation of Lake Turkana Communities In Northern Kenya' report in 2009 lacks even minimally competent livelihood description and analysis. Aspects of the report are dealt with in the Turkana discussion of this report.</b></p> <p><b>EIB:</b> Omitted entirely, except for minor remark on possible conflict between Omo Basin and NW Kenyan pastoralists as a consequence of the Gibe III dam's effects (including the elimination of flood recession agriculture along the lower Omo River, and throughout the Omo Delta.</p>
17	<p><b>Increasing armed conflict and crisis in the transborder region</b></p>	<p><b>Omission</b> While the GOE is fully engaged in trying to quell small scale but mounting armed conflict among ethnic groups in the broader region, and either supports or permits various peace</p>	<p><b>AFDB:</b> No reference - direct or indirect</p> <p><b>EIB:</b></p>

	<p>initiatives in the region, the GOE assessment indicates no cognizance whatsoever of the rising armed conflict in the region - conflict that would move to explosive proportions in a far boader region if the Gibe III is completed, since hundreds of thousands of indigenous people would be facing the devastation of their communities from the loss of Omo River and Lake Turkana Resources.</p> <p><b>Dasanech and Turkana villagers universally state that when they are losing women, children and youngsters to hunger and diseas, they will fight for their survival.</b></p> <p><b>All of these issues are ignored in the GOE's impact assessment, as well as in other GOE planning documents.</b></p>	<p>A number of minor references toi scarce resources leading to regionsl skirmishes.</p>
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## The Myth of Disastrous Omo River Floods as ‘Rationale’ for the Gibe III

*The crisis confronting hundreds of thousands of indigenous peoples struggling to survive along the Omo River and the shorelines of Lake Turkana is too little flooding not excessive flooding.*

- The rush to rationalize the proposed Gibe III dam was starkly evident in the Ethiopian government’s reports of ‘catastrophic losses of human life and property (livestock, particularly) from a ‘disastrous’ Omo River flood in August of 2006.

The GOE’s numerous reports, along with its request for international financial and materials aid ‘for relief efforts’, repeatedly declared that at least 350 to 1,000 people had drowned (depending on the specific report) and at least 3,000 to 4,000 livestock had been swept away.

- The GOE has consistently declared, moreover, that the ‘catastrophic losses’ of 2006 were just the most recent chapter in the Omo River’s longstanding pattern of excessive and destructive flooding with repeated major loss of human life. Based on this wrong assumption and the complicity of international development agencies and investing corporations, the GOE proceeded with the clear assumption that the Omo River must be regulated, and that this would occur through Africa’s largest hydrodam, the Gibe III. (As detailed earlier, construction of Gibe III infrastructure was already underway in 2006, without any environmental or socioeconomic baseline studies or impact assessments).

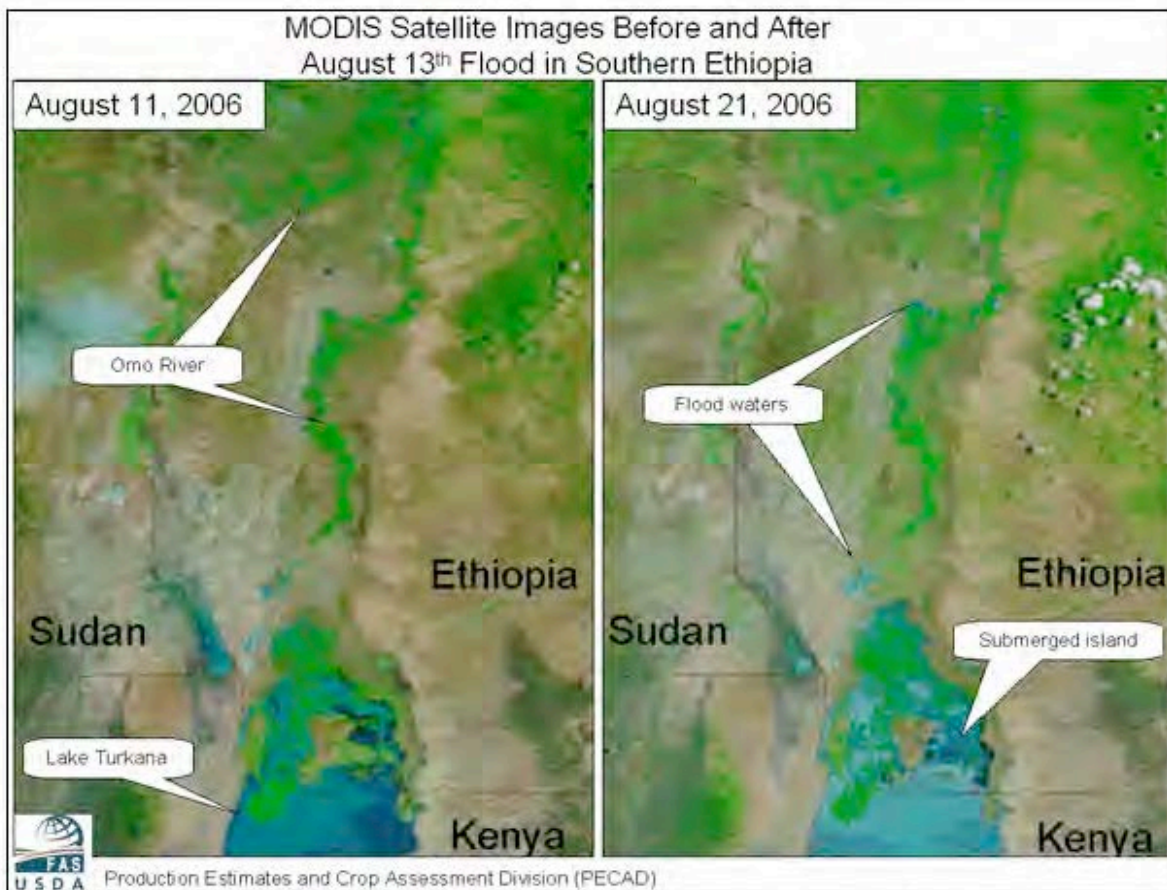
- The Ethiopian government’s reports of major human and livestock destruction 2006 Omo River flood and alleged prior years are shown to be false to satellite data and its assertions of repetitive destructive flooding by the river are directly contradicted by all indigenous accounts in the Omo Delta and northern Lake Turkana shoreline region.

➤ **The GOE maintained strict control over the reporting of the alleged flood disaster, with hundreds of media reports repeating its ‘news’ releases. Dissenting views were not tolerated by the GOE (in fact an Ethiopian NGO publicly stating the lack of human life loss was removed altogether from its operations in the area).**

- Representatives from a host of national governments, international relief and development agencies, and private foundations visited the region were invited to Omorate (where the police station and some other structures in the 20 year old frontier town, were flooded) - tens of kilometers upstream from the alleged devastation. For some, fly-overs were arranged for an

aerial view of what were in fact swollen waters in the active Omo Delta region and the Omo River's terminus at Lake Turkana.<sup>16</sup>

- Inquiring visitors were told that the absence of visible dead bodies could be explained by the 'fact' that deceased people and livestock were floating down the river into Kenya's Lake Turkana. No explanation was offered for the absence of reports of such dead bodies or carcasses around Lake Turkana.
- **There is no evidence for the 2006 flood spreading significantly beyond what was already the active Omo Delta: it extended only into the northern edges of the active Delta and the lowland basin-like and generally desiccated area known as Sanderson's Gulf (shown in Figures 1 and 2).** These U.S. Department Agriculture satellite photos underscore this reality, as do NASA photos from the same time period.



**Figure 1. Two MODIS satellite images show numerous flooded regions on August 21st near the Omo River and Lake Turkana.**

<sup>16</sup> The Ethiopian head of state, the late Meles Zenawi, made a high profile 'stop-over' in the Delta region, underscoring the GOE's reports of 'calamity' in the region.

- The Omo Delta clearly did not undergo the destruction claimed by the GOE. Large portions of the Omo Delta were in fact recorded to have emergent vegetation, which also appears in satellite photos during the highest portion of the flood. The ‘submerged island’ described in multiple Ethiopian press releases is actually an area that was only emergent in recent years, as the delta has expanded into Kenya’s Lake Turkana: its elevation is about 363 m, so it would normally be flooded when the lake reaches that elevation. Finally, the ‘raging waters’ described by the GOE to the media are fully contradicted by both Turkana and Dasanech fishers, who describe remaining squarely in the main channel region, along with personnel from the Ethio-Fisheries company, without interruption of their fishing effort or destruction of their fishing gear.

Omo River natural levee remained dry: it was not overtopped with flood extending over the ‘vast floodplains’, as the GOE claimed. The extensive mudflats on either side of the Omo River, upstream from the active Omo Delta’ (indicated in Figures 1 and subsequent graphics in this report) are in fact ancient, or relict floodplains and have not been flooded in the memory of indigenous elders. Small isolated pockets of standing water are likely even from other sources rather than the Omo waters directly.

The flooding apparent in Sanderson's Gulf in the USDA (and NASA) satellite photos is most likely from an ephemeral watercourse (very likely, the Kibish River), or it could possibly have backed up from the lake/river terminus because of its low elevation. Sanderson’s Gulf (‘*berar*’ to the local population) is not inhabited.

➤ **Omo River overbank flooding occurs only within the modern Omo delta and along its northernmost limit. Flooding does not occur in what are in fact relict, or ancient, floodplains in lateral to the river upstream from the modern Omo Delta.**

**Flood occurs only within the modern delta and along its northern margin. There is no ‘excessive flooding’ or ‘excessive evaporation’, despite GOE assertions to the contrary.**

The GOE’s misrepresentation of the Omo’s annual flood rests and its false assertion of flood waters spreading throughout the vast plains extending east and west from the river – and upriver from the modern Omo delta (Figures 2 and 3) is used for repeated statements that there will be ‘recovery’ of water that will augment inflow to Lake Turkana – as ‘compensation’ for flow volume decrease from the Gibe III dam.

To the contrary, since there is no ‘excessive flooding’ or ‘excessive evaporation’ in these plains, the Gibe III dam would have no potential for such recovery of waters.

The GOE’s Gibe III impact assessment falsely asserts the opposite of these realities. Even the briefest field observations, as well as conversations with elders from communities throughout the region (those not under government scrutiny) confirm this reality. The AFDB and EIB assessments do not challenge these GOE assertions.

As

universally detailed by Dasanech and Turkana residents, agropastoralists and fishers in the region are accustomed to wide variations in water conditions and were moving to higher ground, when many of them were ordered by the Ethiopian government into particular locales – some of which were designated for new commercial development.

➤ **All local residents interviewed (those not directly intimidated by the GOE security apparatus) gave accounts contrary to those of the GOE.** SONT researchers (including the author) spoke with Dasanech and Turkana elders, all of whom categorically denied the GOE's description of a 'disaster'.

- SONT interviewed community members from a multiplicity of locales in the 'flood impact' zone, including (A) the interior of the Omo Delta, (B) the west bank of the lowermost Omo River, (C) Todenyang/Lowarengak villages at the extreme northwestern Lake Turkana shoreline, (D) the Ileret region at the northeastern extreme of the lake, and (E) Ferguson's Gulf (Fig. 2). These Turkana and Dasanech consistently described annual Omo floods, and the 2006 flood in particular, in the following terms.

1. **The crisis all riverside and northern lakeshore communities face is too little Omo flood, not excessive flood.** Both ethnic groups have had to make to undertake major migration to the Omo River and Lake Turkana, where they now have a desperate dependence on the annual flood. They have been forced by their radically declining livelihoods to move to the Omo River and Lake Turkana in recent years, they now have a desperate dependence on the annual Omo River flood – for with its inflow of fresh water that sustains Lake Turkana and its fishery upon which they depend for their survival. The term Dasanech term, '*war gudo'ha*' is an entirely positive term.
2. **The August 2006 Omo River flood was extraordinarily large, but not destructive of human life and livestock as the GOE portrayed it.** The impacts described by Omo Delta and northern Lake Turkana indigenous residents – not those in the service of the government<sup>17</sup> (The flood was not given a special name by the Dasanech or the Turkana: a clear indication that they did not regard the flood as a crisis.

***The Dasanech regard the Ethiopian government as bringing crisis to their land, not the Omo River.***

3. **Estimates of 'lost human lives' from the flood ranged from zero to four, with specifics provided in the cases where individuals were drowned. Estimates of cattle lost ranged from two to 90, depending on the area.** Descriptions of how the cattle were lost were consistently that they were 'stuck in the mud' where they would generally have been able to swim. When told of the GOE's figures for loss of life and livestock, all informants were either angry or simply laughed at such assertions.

One common account among residents was that of a Dasanech man (Walaye) taking Dasanech and Turkana individuals from an area in the delta where there were 'two dead cows – one black adult cow and one calf'. The health clinics at Loyere and Toltale along the Omo took on

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<sup>17</sup> These individuals include the church missionaries (both Hiwot Church in Ethiopia and Catholic at Todenyang), since they are 'partnered' with the GOE in promoting the eviction of indigenous peoples and establishment of irrigation agriculture along the Omo River and at the international border.



water and some boxes of medicines, biscuits and the like were carried away. ‘That is all’, all elders’ stated at the end of their accounts of the event.

4. **The flood waters were not even strong enough at the mouth of the Omo River to cause many fishers to cease fishing or even to suffer damage to their nets and other equipment during the approximately ten day high flood waters.** One locale in particular, around Lopelele (the lakeshore, or southern extent of the Omo Delta, at the mouth of the river) included Turkana and Dasanech fishers (with peaceful relations, at the time) and even the Ethio-Fisheries Corporation. All three groups of fishers continued fishing throughout, while agriculturalists and pastoralists moved laterally from the river to await its return to a lower level.
5. **The indigenous population along the Omo River is accustomed to the Omo’s floods and was already moving out of the active Delta region as the Omo waters rose.** While there were thousands of persons in the active delta region who needed to move to higher ground – a necessity that was familiar to all and was a matter of timing and decision-making about (no reliable estimates exist, but a figure of 6000 to 8000 would be reasonable).
6. **There was little if any assistance or ‘rescue’ of Dasanech in the Omo Delta region by the Ethiopian government.** (Residents report considerable show of force by the GOE, however, particularly when the Prime Minister arrived.) ‘Many engine boats’ were described, but moving only ‘few’ people: most reported that few villagers *wanted* rescue, as they knew to move away from the river with their livestock – some had to contend with livestock in mud.  
Villagers with social ties on the Omo’s west bank went there, especially to the Atalago, Kalaam, Kipercheria and Bokom village areas.<sup>18</sup> Many Dasanech in the Delta went to the east bank of the river, including to Afor (Afewerk) and Kapsusie – two locales just south of Omorate, where they did receive tents, food and some utensils – under observation by personnel from aid and other organizations. small number of them were kept after the flood and incorporated as ‘paid labor’ on government farms. Others migrated back to the Delta or scattered to new villages in the eastern region.
7. **Crops were submerged, but this was universally described as a divergence from the predominant experience over the years of insufficient Omo flood from their recession agricultural plots.**

SONT interviews with twenty elders from the Omo Delta and the Todenyang area (Figure 2) consistently supported the above Dasanech and Turkana characterizations of the 2006 Omo flood, and added historical perspective regarding the universal statement by indigenous community members that **the problem confronting their communities is too little flood, not excessive flood.** The table below summarizes their description of recent years’ Omo flood conditions.

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<sup>18</sup> Many of these Dasanech had to flee Atalago the following year, due to hostilities with the Turkana.

**2009 SURVEY OF WESTERN OMO DELTA & NORTHWESTERN TURKANA  
VILLAGERS REGARDING RECENT FLOOD HISTORY (25 RESPONDENTS)\***

YEAR	FLOODS 'SERIOUSNESS'	DELTA COVERAGE	AMT.DELTA/WEST	CATTLE LOSS	GOATS/ SHEEP
1968	BIG floods	Covered all the delta	West channels were full	Small losses	No reports
1986	Normal floods	Full deltas	"	"	"
1987	Little floods	Little to the deltas which had already started to dry	Gave room to Dasa...to move forward to the deltas	no	no
1988	Low inflow	Little coverage	West channels a half full/deltas	"	"
1993	No impact	Small flow into delta	West channels were full; others lacking	"	"
1994	Small inflow	"	"	"	"
1995	Too little.	Didn't reach most of delta	Very small	"	"
1996	The deltas got enough.	full	Normal	"	"
1997	"	"	"	"	"
1998	Floods that up rooted reeds that covered the whole part of the lakeshores.	"	"	Unknown number	"
1999	Small floods.	Extremely small	Very limited	no	no
2000	"	"	"	"	"
2001	moderate	Moderate coverage	Covered the deltas to west channels.	"	"
2002	Very very small	Small inflow inside the river.	Very small	"	"
2003	Very small	Little out but most the river	Very small to the channels in the west.	"	"
2004	"	"	"	"	"
2005	"	"	"	"	"
2006	Lasted 6-9 days lasted five to eight days.	Mixed with rains which caused additional water in streams to enlarge, so <b>people moved aside.</b>	Full water to both west channels and deltas. Fishing continued, villagers in delta moved to shores. <b>Several people drowned trying to retrieve animals.</b>	<b>50-90 lost; 'stuck in mud' along river;</b>	<b>No reports, but same as cattle.</b>
2007	Big floods	full	"	no	No reports
2008	No impact at all.	Normal coverage	No coverage	"	no

\* Terminology used by SONT interviewers and by respondents are retained in this table.

## **The Invalidity of the GOE's Mitigation Plan for Artificial Flooding**

*The consequences of the false promise of 'compensatory' action by artificial flood programs are dire in the Lower Omo River Basin and the Northern lake Turkana region, even compared with other Sub-Saharan African regions where such mitigation has failed. In the already thoroughly crisis ridden Ethiopia, Kenya and South Sudan border region, the result would be mass starvation, disease and death for hundreds of thousands of indigenous herders, agropastoralists and fishers, full-scale destruction of the region's predominant natural resource system and intense armed conflict in all three nations.*

- A specific downstream artificial flood (flood simulation) program has been put forward by the GOE as major 'mitigation' of the major decrease (60-70%) Omo River flow reduction caused by the Gibe III dam in the downstream zone, and in the words of the EEPSCO and GOE, any environmental and socioeconomic problems that 'might' arise. Along with the GOE's false assertion of uncontrolled and 'destructive' excessive flooding in the Lower Omo Basin, this assurance of annual artificial flood is used to help rationalize the Gibe III project. (While the EIB review offers substantial criticism of the flood 'plan', the AFDB report is markedly uncritical, despite its fundamental importance to Lake Turkana).
- The planning of numerous other large dams in Sub-Saharan Africa have been accompanied by national government and development bank 'assurances' of planned artificial flood programs. These programs have not been implemented. In the rare instances where African governments have initiated them at all, they have been for purposes other than sustaining the livelihoods of the disenfranchised populations downstream: for example, relieving pressure from excessive reservoir water buildup, and they have failed.
- There is negligible likelihood that the GOE would implement its 'planned' artificial flood, given its clearly stated priority for electricity production and revenue generation, falsified accounting of floods as 'excessive' and 'requiring' regulation and its blatant disregard of hundreds of thousands of indigenous peoples depending on the annual Omo River flood in the Lower Omo Basin.
- The GOE's artificial flood plan, even if it were to be implemented, is wholly inadequate to offset indigenous livelihood destruction (of flood recession agriculture, riverine zone livestock raising and fishing) and eradication of entire riverine and lacustrine ecological systems in both the Lower Omo Basin and the Lake Turkana region that would result from even the first phase of the Gibe III dam. This is documented by the European Investment Bank's Independent Review, as well as ARWG and SONT research.

- Two conflicting ‘logics’ are in effect in large hydrodam projects – the overwhelmingly dominant one being the logic of maximizing electricity production and revenue generation, whether through domestic or export marketing. The other logic is overwhelmingly one of rhetoric rather than reality – namely, that of providing for the survival and sustainment of downstream (and reservoir region) indigenous peoples and the natural resources upon which they depend.

The virtual absence of downstream flood simulation in Sub-Saharan Africa –even with the token-like, failed program in one context (the Manantali dam, despite the continued stating of an *intention* to carry out such mitigating action in EIA after EIA, including the Gibe III EIA, should be interpreted within this context.

In African hydrodam planning, downstream indigenous economies have been generally neglected or distorted to such an extent that dam construction and operational ‘guidelines’ rarely take account of the realities of these populations, including their major reliance on access to land and water resources – including annual floods.<sup>19</sup> In the case of the Gibe III, this problem is of crisis proportion as generated by the GOE and its development agency supporters –particularly the World Bank and the Chinese government.

- **The failure of ‘planned’ downstream artificial flood programs in Sub-Saharan Africa includes these instances:**

Pongola South Africa. Flood simulation that was initiated in the 1970s and 1980s was stopped in the 1990s, because political and economic pressures for in water for irrigation.

Nakuro Nigera. Downstream flood simulation was ‘recommended’ for inclusion in the management plan, but it has never been implemented.

Iteshi Teshi Dam, Zambia. In theory, downstream flooding was to continue for a significant period of time. However, such practice was only practiced “out of season”, and subsequently, ceased altogether, due to “conflicting priorities”.

Cabora Basa, Mozambique. This plan included the implementation of downstream flood simulation, and was considered by many as a “good case to watch”.

Manantali in Senegal. Downstream flooding was conducted for some short period, but was stopped altogether, due to “electric power needs in urban areas”.

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<sup>19</sup> In some instances, such omission has been intentional. For example, the author’s participation as a member of the scientific panel within the National Academy of Sciences, charged with overseeing the USAID’s environmental and socioeconomic baseline studies for the proposed large hydrodam on the Juba River in Somalia, revealed that field researchers conducting those studies were ‘instructed’ by the US Embassy and USAID in Mogadishu to omit considerations of land tenure from their investigation. One can only assume that the GOE’s influence in the assessment to be released by EEPSCO, the government agency in charge of the Gibe III project, would have been equally as forceful in such omission. **In any case, the omission of resource access and traditional tenural relations is fully absent from the GOE’s 2009 reports.**

Two of these cases merit closer attention.

- Regarding the Cabora Basa dam, Richard Beilfuss, of the International Crane Foundation, made the following statement  
*"One of the big problems with the management of Cabora Bassa dam is that each year they need to create capacity to store a possible large flood that could overtop the dam and so in order to do so they often have to release waters during dry season. Especially in wet years, they have to release waters downstream to make storage capacity available in the dam and its those dry season floods that have really been a terrible problem for farmers and fishers downstream because they can come at any time of the year. They can come in August or October and they can come and wash out crops along the lower Zambezi. It's quite a big problem, so not only is there the loss of floods during the normal time of peak flooding - there's also the potential for floods at any time of year. In temperate climates it would be something like getting snow in the middle of the summer at a time when you never expect it just coming down - it completely alters the way people can perceive their own environment."*
- The Manatali Dam in Senegal is sometimes cited as an 'exception to the rule' of failed artificial flood programs. Centuries old flood recession agriculture, fishing and cattle herding livelihoods in the Senegal floodplain were sustained by the river's annual flood - until the Manatali dam was constructed.

A report to the World Bank (Thomas, G. and K. DiFrancesco, 2009) described the severe impacts of the Manatali dam on the regional ecology, agricultural production, fisheries and public health in the downstream zone.

The report points out that inundating the floodplain below the dam:

*'...does require that some amount of power deliveries and revenues be foregone, as well as storage for irrigation purposes in subsequent drier years.' ... '[A]rtificial flood releases appear to have been provided only on those rare occasions when they do not result in a reduction in power revenues or irrigation deliveries. They have occurred only when the flood water could not be retained in storage in order to avoid the risks of overtopping the reservoir and creating a safety hazard.'*

This situation has prevailed in the Manatali case, even with that government's acknowledgment (reflected by its OMVS (Organization pour la Mise en Valeur du Fleuve Senegal) of the necessity to implement a downstream artificial flood (if only to appease the dam's critics). In order to provide the intended 2000m<sup>3</sup>/sec promised release of floodwaters (an amount roughly double that 'assured' by the GOE for the Gibe III/Omo River), the same report to the World Bank states:

*'it will be necessary to release water from the sluice gate and by pass the generator, requiring the OMVS members to forego some amount of potential hydropower generation and revenues. Thus, there remains a serious economic constraint in order to operationalize the Charter's commitment to optimal annual artificial flood releases.'*

The report continues, ‘As a result of these enduring trade-offs, the Water Charter and the Operational Manual do **not** [sic] guarantee that the artificial flood will be provided in the magnitude and frequency that the floodplain needs...This decision [on whether and how much of an artificial flood to release] is also likely to be influenced by economic and political considerations.’

To date, these releases appear to have been provided **only** [sic] on those occasions when they do not result in a reduction in power revenues or irrigation deliveries. They have occurred only when the flood water could not be retained in storage in order to avoid the risks of overtopping the reservoir and creating a safety hazard.’

- **There is no indication that the Ethiopian government would be the first African nation to actually implement a Gibe III situation would be counter to those throughout Sub-Saharan Africa. Moreover, should the GOE even initiate such a program, it would be wholly inadequate to provide for even the bare survival of the hundreds of thousands of indigenous people in the Lower Omo Basin and the Lake Turkana Region, let alone their sustained existence.**

There are several lines of evidence for this assessment.

- (1) **GOE spokesmen ranging from the Prime Minister and EEPSCO executives to the General Manager of the Ethiopia’s Environmental Protection Authority repeatedly assert the priority for electrical power production and generation of revenue as in the ‘national interest’.** Since there is in fact tradeoff between these objectives and artificial flood releases for the downstream population, as the Manatali experience clearly demonstrates, the GOE’s orientation is clear.<sup>20</sup> Moreover, its highly repressive political policies in the Lower Omo Basin effectively stifle any protest or urgent requests for it to effect such a tradeoff. (wording?)

The Independent Review of the EIB (which declined funding for the Gibe III project) stated the issue in this way: ... ‘It is probable that priority will not be given to recession agriculture; the cost of the controlled flooding is far from marginal.’

The recent decision by the World Bank to issue a loan for construction of electricity transmission lines from the planned Gibe III dam to Kenya is inexplicable, in view of its obvious awareness of this contradiction, through its own consultants’ reports.

<sup>20</sup> There are additional reasons that the Omo Basin/Lake Turkana experience of breached promises of artificial flood would be far worse than that in the Manatali case. Key among these is there are alternative sources of water for the Senegal floodplain, whereas there are not significant ‘secondary’ inflows to the Lower Omo River; the GOE wrongly asserts otherwise, misrepresenting major geomorphic features in the Lower Basin. Another rests with the political conditions in the two countries: unlike the Manatali/Senegal situation, dissent and indigenous ‘voice’ are fully repressed by the GOE.

**(2) There are numerous disclaimers in the GOE’s downstream impact assessment regarding its intention or its ‘ability’ to implement artificial flooding.**

*‘In the event that the annual release is not being implemented as scheduled, some possible adverse impact may occur as described below...’ p. 156*

*‘Further desirable instruments have been considered, and may be applied to both integrate the above main measures, compensate in case planned artificial floods are partially withheld due to unforeseen circumstances, and as desirable confidence-building actions to strengthen support of local authorities and populations.’ p. 169*

*‘Some of the potential interventions meant to offset possible negative impacts stemming from possible difficulties in fully implementing designed controlled floods as planned...’ p. 178*

*‘This may be necessary in case disruption of artificial floods may no longer fully contribute, by adequate submersion, to rejuvenation of grasses...’ p. 178*

*‘In case the annual release does not fully succeed as scheduled, some other compensation measures could be implemented including ...conflict prevent and resolution training programs...’ p. 179*

*‘Range Developments and Management- 16. Risks and Uncertainties: 3. Construction of devise along the Omo River to simulation flood may take time.’ p. 21*

The recent decision by the World Bank to issue a loan for construction of electricity transmission lines from the planned Gibe III dam to Kenya is inexplicable, in view of its obvious awareness of this contradiction, through its own consultants’ reports.

**(3) The invalidities of the GOE environmental and socioeconomic assessment of downstream socioeconomic and environmental realities, with consequent failure to acknowledge the true impacts of the proposed Gibe III dam and the absolute necessity of substantial annual flooding in order for hundreds of thousands of people to survive.<sup>21</sup>**

<sup>21</sup> The GOE briefly acknowledges the potential destruction of indigenous economy within Ethiopia in its impact assessment of the Gibe III (no attention is given to the 300,000 indigenous people living around Lake Turkana), in one inconspicuous place within its report:

*‘The potential loss of flood recession crop area, as well as grazing, would reduce their food supply and could possibly lead to conflicts over grazing areas. It is estimated that some 20,000 families are engaged in flood recession and cropping in the delta, on 12,000 ha or so, meaning that 100,000 people could be affected. The estimated annual crop production this represents is around 5,000 tonnes which may be some indication of the extra amount of food aid which might be required if there*

A number of these points of invalidity are outlined in this report. They include:

- GOE failure to establish baseline information regarding Omo River downstream flow volume and inflow to Lake Turkana – instead, relying on projections from flow measurements upstream where radically different physical conditions prevail.
- GOE omission, misrepresentation - even fabrication, of major physical and biological characteristics of the Lower Omo River Basin, including the high risk of a major seismic event causing catastrophe at the dam; Omo River tributaries in relation the lowermost river and Lake Turkana; annual flooding and its effects (posited as with repeatedly excessive and destructive of human life, by the GOE); the fissured volcanic rocks forming the walls of the planned reservoir, with major seepage and likelihood of extreme reservoir fill delay.
- GOE omission and misrepresentation of the precipitous drop in Omo River flow volume that would inevitably cause the desiccation of riverside environments, including the entire riverine forest and the Omo Delta – destroying flood recession agriculture and grazing potential throughout the delta and along the entire lower river. The GOE’s misrepresentation of the livelihood systems – for example, of the Dasanech and Nyangatom peoples – is so fundamental that it is clear that those planning Gibe III management know little if anything about the actual way flood recession agriculture, or even complex grazing subsistence, is practiced – let alone insure their sustainment. (????)  
To cite just one dimension of specific failure in this regard, the Gibe III dam’s planners have made no indication whatsoever that they know at all how flood recession agriculture is practiced by the indigenous peoples in the entire downstream region, let alone how to prevent that system from being decimated.
- GOE omission of the massive scale commercial irrigation agriculture program in its allegedly scientific impact ‘assessment’ of the dam, although this major nation’s most marginal indigenous peoples and is ‘abstracting’, or diverting, huge additional amounts of Omo River waters – waters that would be radically reduced by the dam, even without the (already underway) construction of major canals and irrigation systems. Moreover the
- GOE disregard for the fact that the Gibe III – even if the reservoir were to fill in three to five years, would cause major retreat of Lake Turkana’s northern shoreline, where fish reproductive habitat and annual fresh water pulses from the Omo River’s annual flood are essential to sustain

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*was no controlled flooding after dam construction, to allow the continuation of flood recession cropping.’ p. 155.*



the lake's biological system, including the northern shorelines major fish reproductive habitat - by at least 10 kilometers (Figures 7 and 14). The destruction of this and other fish reproductive habitat in Lake Turkana' shallow waters (e.g. Ferguson's Gulf and much of the northern shoreline), as well as the lake's littoral environments where hundreds of thousands of livestock survive through last resort grazing, is virtually ignored by the GOE.

**ARWG scientists calculate that the minimum impact of the Gibe III dam would be a drop in lake level of 3-5 meters – approximately the amount stored in the reservoir (ca. 25 km<sup>3</sup>). This estimate excludes consideration of waters diverted for irrigation and delayed reservoir fill – whether for a few years or indefinitely.**

**(4) The GOE assurances that its 'planned' artificial flood would satisfy downstream environmental and socioeconomic needs are based on number of invalid assumptions and calculations.**

- Firstly, there is no data base for even calculating what downstream flow volume exists (especially prior to the large scale commercial agriculture irrigation systems diverting waters), let alone what would be required for sustaining habitats and livelihoods in the Lower Basin. The GOE's assertion that such projections are 'analytical' to the point where *'suitable environmental flow and controlled floods have been made. The proposed river hydraulic model and outcomes of the Environmental Monitoring Plan will permit [sic] to optimize the required controlled flow.'* (p. 11) are fundamentally baseless

The EIB – which declined the GOE's request for funding of the Gibe III, stated in its Independent Review that *'the technical baseline for the estimation of the flood level is extremely limited and further hydrological and hydraulic investigations are necessary...'* (p. 83). A similar point is made by the EIB elsewhere: *'It is actually not possible to evaluate the effectiveness of such a mitigation measure without a scientific detailed survey which will determine what is required to obtain successful results from flood recession cultivation.'* (p. 108)

- Secondly, the proposed artificial flood release posited by the GOE – an approximately 1000 m<sup>3</sup>/second release for 10 days, should it be implemented (for example, when buildup in the reservoir dictates release to prevent overtopping or dam collapse), would be insufficient for the survival of downstream population or the sustainment of the riverine environments supporting their livelihood systems – for example flood recession agriculture within the Omo Delta or along riverside flats.

The GOE posits *'suitable'* environmental flow from which controlled flow calculations have been designed. According to the GOE, *'the proposed river*

*hydraulic model and outcomes of the Environmental Monitoring Plan will permit [it] to optimise the required controlled flow’. In the words of one ARWG physical scientists/hydrologist, this is ‘nonsense’, as if the GOE is capable – without any actual flow volume data for the Omo River in the lower floodplain or at the inflow point to Lake Turkana – to determine a ‘suitable environmental flow’.*

This release would also be entirely insufficient, in both amount and periodicity to prevent the death of the riverine forest and the entire fringing shrub grassland – essential to the region’s pastoralists and agropastoralists for last resort grazing by their remaining livestock, since this ecosystem requires a particular ‘residence time’ of soil inundation for its survival. (Note: there is no overbank flooding, as noted earlier; the ‘floodplains’ – misrepresented by the GOE as active – are in fact relict, or ancient floodplains.



**Dasanech cattle at the Omo River, where last resort grazing areas are sustained by the Omo River’s annual flood. (Photo at northern section of the Omo Delta).**

## VII. INDIGENOUS PEOPLES OF THE LOWER OMO BASIN: VULNERABILITY TO MASS STARVATION FROM GIBE III IMPACTS

- The indigenous groups in the lower portion of the Omo River Basin have experienced devastating livestock losses in recent decades, forcing them to depend increasingly on the Omo River for their survival. The riverine zone, including the modern delta area and northern shoreline of Lake Turkana, has provided last option subsistence for tens of thousands of pastoralists – for livestock grazing but increasingly for flood recession agriculture and fishing.

Far from addressing the extreme poverty of these indigenous groups, as the Ethiopian government and development agencies have repeatedly asserted – the Gibe III dam would decimate their last options for survival – namely, their flood recession agriculture and artisanal fishing, as well as the last remaining grazing lands for their livestock during drought periods.

- Operation of the proposed dam would also destroy the Omo riverine forest – the last pristine such environment in Sub-Saharan Africa, along with the forest’s food sources critical to the poorest segment of the indigenous people.
- These calamities would occur even during the impound phase of the reservoir - a phase likely to be extended for many years, due to seepage of water from the reservoir. In the highly unlikely event that an artificial flood program would be implemented by the GOE, the amount and duration of flooding would be wholly inadequate to sustain the ecological systems and livelihoods of the lower basin. No artificial flood plan has been implemented and sustained in Sub-Saharan Africa (as described in Section VI of this report).
- The Ethiopian government’s immense program of eviction of indigenous communities from their riverine lands in order to establish commercial and government agribusiness establishments has already sparked unprecedented crisis for tens of thousands of the indigenous people, both within Ethiopia itself, and increasingly, in Kenya’s Lake Turkana region.

## Pastoral Decline and Growing Dependence on the Omo River: the Dasanech

- Facing the crisis of radical herd losses and rangeland deterioration throughout their dryland pasturelands, largely due to restriction of their traditional pasture lands territory by the Kenyan and Ethiopian governments, the preponderance of Dasanech households have no choice but to diversify their economies, primarily to last resort grazing, flood recession agriculture and fishing along the Omo River and in the modern Omo Delta. Tens of thousands of Dasanech now live in the riverine zone/modern delta where they survive through a wide range of strategies including livestock raising, flood recession agriculture and fishing. The Nyangatom also have relied fundamentally on flood recession agriculture and other river-based livelihood along the Omo River.
- The destruction of river based Dasanech livelihood activities that would result from the Gibe III's construction would quickly reverberate to all neighboring groups. Surviving social units among these groups would naturally attempt to capture the few remaining resources in the region, and dangerous and increased levels of armed conflict would ensue throughout the transborder region.

The systematic nature of the crisis is summarized in Fig. 9.

➤ **Throughout the latter half of the twentieth century, the Dasanech were pastoralists with wide ranging movements in the dryland plains – a characteristic shared by most indigenous groups in the Transborder region (Almagor, 1978; Carr, 1977; Bassi, 2011).**

These movements ranged over major habitat variations, facilitating diversified food production and complex patterns of risk minimization for the pastoralists (Photo 11).

As a result of the direct and indirect dispossession imposed by the Kenyan and Ethiopian governments, along with pressures from other disenfranchised pastoral groups in the region, by the 1970s, the Dasanech were effectively confined to the plains West of the Omo River and east of the Kibish River, a portion of the 'bird-foot' small modern Omo delta area. They had been forced to relinquish the following areas:

- Dryland plains in the Ilemi Triangle (formerly a 'buffer zone' excluding all pastoral groups by agreement between the Ethiopian and Kenyan governments, but later with the reentry of numerous Turkana villages, by permission from Kenyan local officials.
- \* Critical grazing lands in the Kenya/Ethiopia border area - southeast of the Ilemi Triangle and northwest of Lake Turkana due to hostilities with the Turkana).
- \* Kibish River lands and watering places, Koras Mountain and pasture lands between Koras Mountain and the Omo River (Fig. 2), where the Nyangatom have remained dominant.
- \* Dryland plains eastward from the Omo riverine zone, due to hostilities with the Hamar (Fig. 2).  
Lands along the east bank of the river are now densely populated by the Dasanech, who were

## Habitat Variation in the Lower Omo River Basin & Lake Turkana Regions



**Photo Page 11. Habitat Variations in the Transborder Region.** Top Left: Meandering portion of Omo River in Lower Omo Basin, with mature riverine forest and subterranean water movement to center point/no overbank flooding). Top right: *Ficus sycamorus*, a dominant species in the Omo riverine forest. Center left: Transition between two grassland types with different soil and topography conditions, along edge of Ilemi Triangle. Bottom left: Yellow billed storks in shallow shoreline area of northwestern Lake Turkana. Center right: Doom palms in salt spring locale near Omo River (also abundant along Lake Turkana) – used for fishing rafts. Bottom right: Modern Omo River Delta with seasonal aquatic grasslands.

settled there the Ethiopian government following its development of the police/administrative center at Omorate and a 2006 Omo flood – falsely characterized by the GOE as “disastrous”.

- **In keeping with changes unfolding in the region more generally, the process of severe ecological degradation progressed throughout the Dasanech’s upland plains, following the radical constriction of their traditional territory.** This deterioration was already prevalent and increasing in the remaining territory of the Dasanech by the 1970s and has continued to the present day (?).

Carr (1977) studied the structure and floristics of ‘natural’ vs. disturbed grassland communities in the major plains habitats, including relict sandy beach ridges, cracking (margallitic) black clay basins and *relict*, or ancient floodplains. Despite clear differences among these habitats in terms of vegetation type and species composition, common features were shown to include:

- (i) sharp reduction of total vegetation cover, with creation of significant bare area,
- (ii) invasion and spread by numerous ‘disturbance indicator’ plant species – mostly unpalatable woody and herbaceous species, and
- (iii) increasing erosion (both water and wind driven) with loss of topsoil. Much of this degradation is irreversible in practical terms, particularly once sheet erosion and certain species invasion occur (e.g., *Acacia nubica*, *A. horrida* and other *Acacia* species).

The phases of this deterioration process were described by Carr (1977), based on detailed ecological transects to record soil and vegetation changes accompanying increased grazing pressure - in three different geomorphic units: silty/sandy relict beach ridges and plains, margallitic, or black cracking clay basins, and relict (ancient) floodplains near the Omo River. Increasing ecological degradation in the first of these three units is summarized in the figure on the next page.<sup>22</sup> In present day terms, most of the Dasanech’s pastoral lands are severely degraded, much of it to a point where recoverability is in serious question (Photo 12).

- **Dasanech (and Nyangatom) elders uniformly describe the degradation of their grasslands as the major change in lands and therefore their entire pastoral life – at least, until the recent evictions from their riverine lands by the Ethiopian government.** The words of one Dasanech elder on the west bank, in 2010 are illustrative of the general sentiment:

*‘When I was a young man, we had a lot of land. Now we don’t live in those lands, as the governments of Kenya and Ethiopia have taken them from us and now they let others into our lands – but not ourselves. Once we had the land of good grass but now we have no grass except for short times when the rains come and even then the grass goes away quickly. Before there were so many wild animals roaming the land: topi, oryx, wildebeest, lion, cheetah, foxes and many more. Now most of them are gone. Have they gone north? Or west? They have been chased away by the loss of grass that is killing our cattle too, and killed by poachers and by those who have gotten many guns from the war [points to Sudan].’*

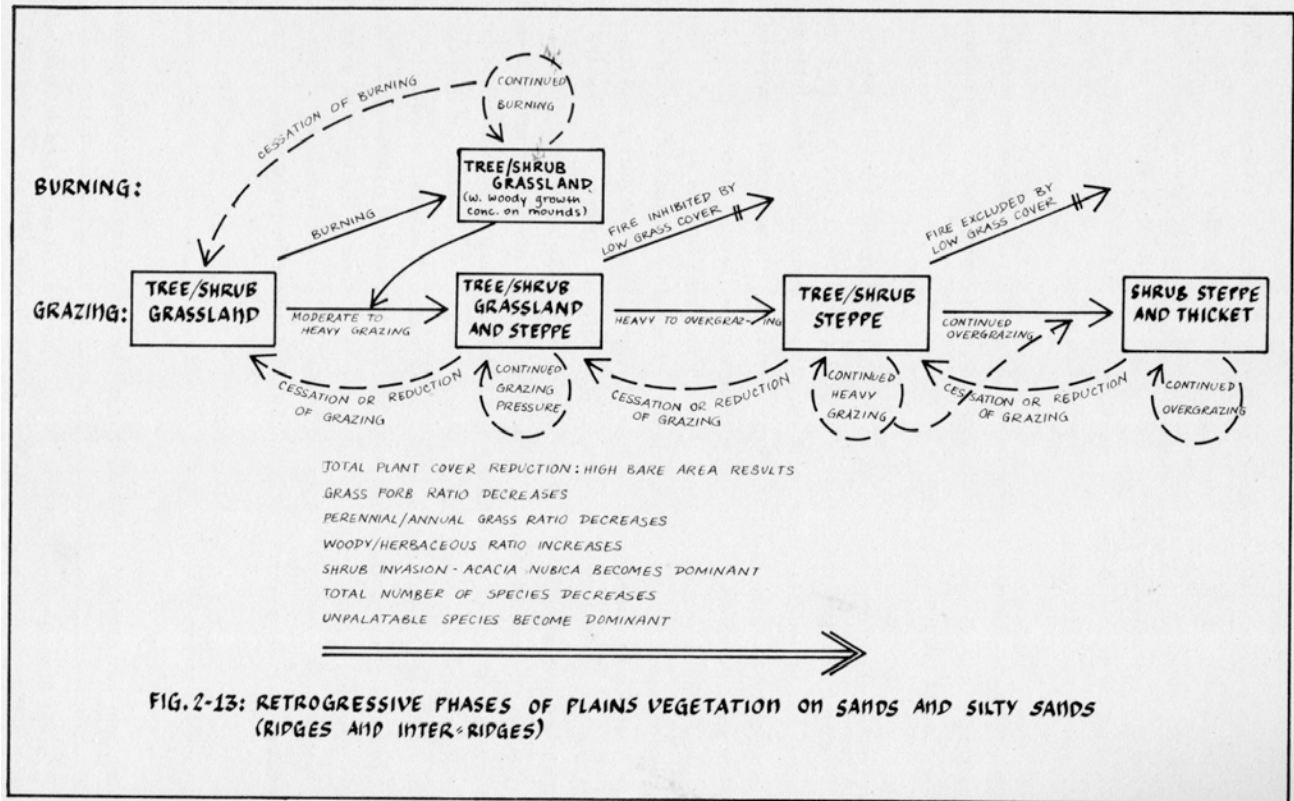
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<sup>22</sup> Grassland and other vegetation communities west of the Omo River are determined by a combination of factors including ancient sediment depositional patterns (alluvial, fluvial, etc., with broad variation among derivative soil types - ranging from silty clay relict floodplains through margallitic, or black cracking soils to sandy beach ridges) and soil development and land use pressures, and others. Community types – even in their natural state – form a ‘mosaic’ pattern, and this complexity is both understood and exploited accordingly by the region’s pastoralists in a fashion recognized by researchers through dryland regions of Africa to be extremely sophisticated.

## Pastoral Lands in the Lower Omo Basin: Phases of Ecological Decline



**Photo Page 12. Phases of Ecological Decline in Lower Omo Basin Pastoral Lands.** Top photos: Ilemi Triangle ('poaching' herders) with healthy grasslands, termite mounds. Center photos: Intermediate overgrazed condition with reduced grasses, new invader species and reduced total vegetation cover. Bottom photos: Highly overgrazed phase (right photo with near zero ground cover and unpalatable *Cadaba rotundifolia* shrubs).

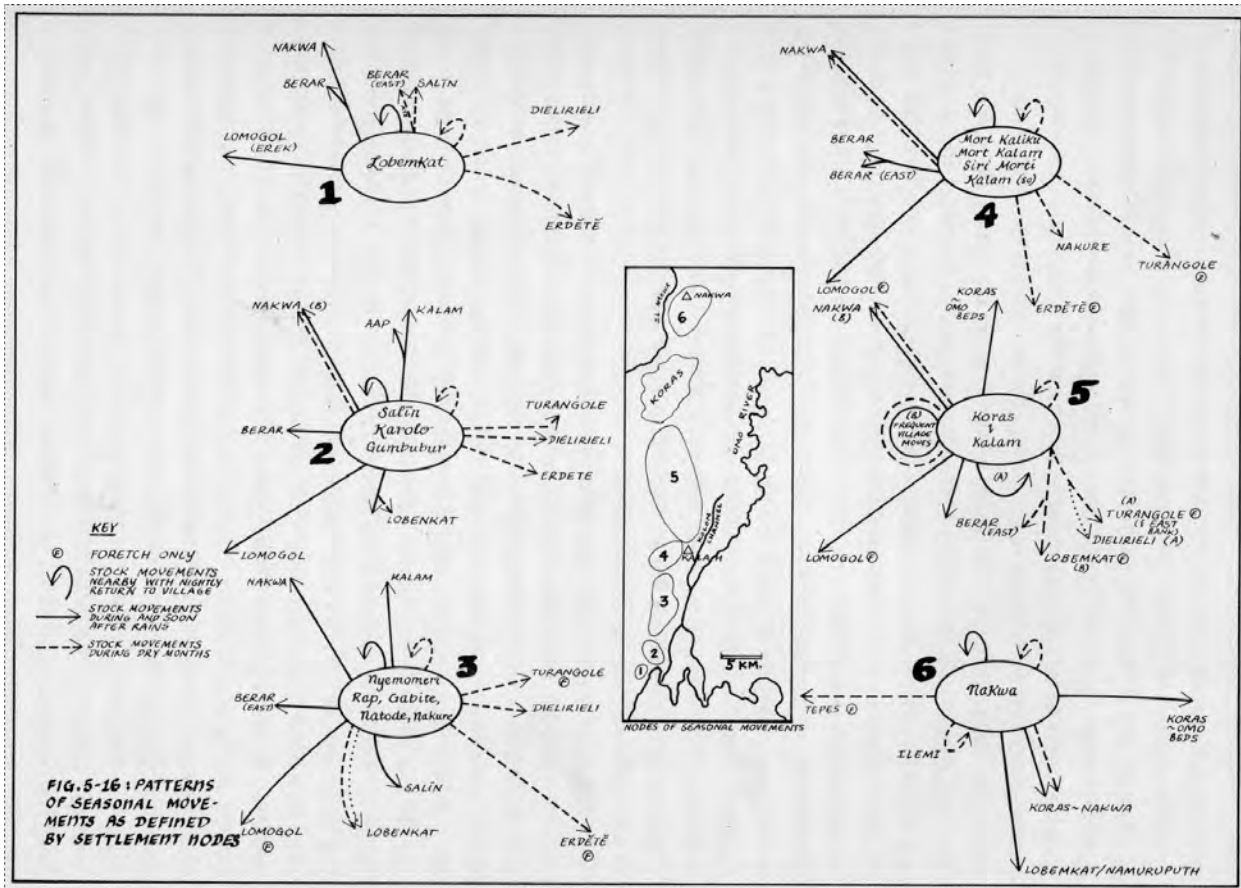


Source: Carr, 1977.

- **Pastoral Dasanech households have continually tried to adapt to these unprecedented resource losses for decades**, primarily through shifting seasonal movements, forming less mobile settlements and relying on complex management of 'stock camps' (*'forech'* in Dasanech language) and sharing of labor and herd rebuilding efforts. The author recorded seasonal movements of herders residing in six different village areas, revealing the exceptional complexity of such movements, which are determined by a host of environmental and social factors. These are shown in the diagram on the next page.

A series of prolonged drought periods in the 1970s and 1980s, along with increased livestock raiding by neighboring Turkana and Nyangatom - themselves suffering similar herd losses – greatly worsened Dasanech coping efforts. Moreover, Kenyan officers administrating the Ilemi Triangle began permitting Turkana pastoralists back into Ilemi lands by the 1980s, so even the longstanding 'illegal' but persistent clandestine use of the Ilemi by the Dasanech became impossible. This situation persists through to the present day.





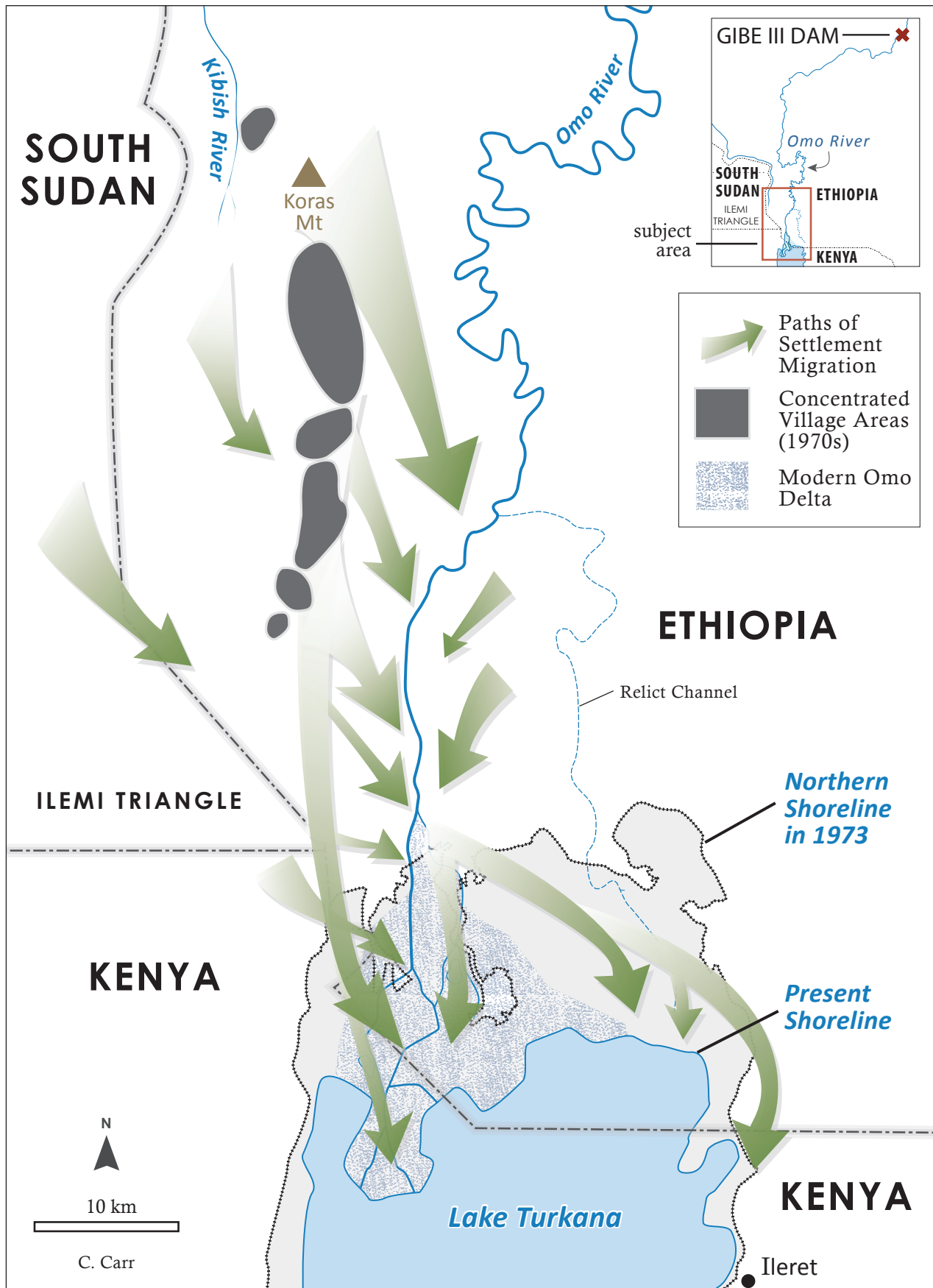
- Faced with rapidly diminishing herds and environmental degradation of their pasturelands, by the early 1980s it became imperative for the majority of Dasanech households to seek new grazing areas for their livestock herds, as well as to diversify their livelihood system as a whole.

The only real options open to them for such adaptation were the environments along the Omo River upstream from the modern Omo delta, in the delta itself and around Dipa (not to be confused with Lake Dipa), and along and the northeastern extreme of Lake Turkana (Fig. 11).

The urgency for additional grazing lands for Dasanech livestock in these three different environments actually emerged from a combination of four factors:

- First - the worsening environmental degradation of the dryland plains, due to overgrazing, with increased livestock mortality and herd losses,
- Second - increasing hostilities with neighboring groups, particularly the Turkana and Nyangatom,
- Third - continued exclusion from the Ilemi Triangle (and contiguous lands dominated by the Turkana), and
- Fourth – the rapid and large-scale expansion in recent years of the Omo modern delta, creating new grazing (and planting) lands .

**Fig. 11. Dasanech Settlement Migration to the Omo River/Lake Turkana: 1960 to 2010**



The major shift among the Dasanech - from highly mobile to more sedentary – unfolded as the Dasanech began sending their herds to these riverine, modern delta (and Dipa) and northeastern near-lake areas during the dry seasons. Increasingly the Dasanech faced a deepening crisis of diminishing herds and growing hunger - conditions sharply intensified by several severe drought periods during the 1980s.

- **Thousands of Dasanech households sent their herds to these different locales on a seasonal basis at first, then increasingly on a more permanent basis.** Many of these Dasanech pastoralists also engaged in subsidiary activities as well, occasional hunting and gathering of wild fruits in the riverine forest and adjacent lands as well as various exchange activities with surrounding groups (Fig. 4).

The Dasanech remaining in the plains west of the Omo River, including those along the river, commonly send cattle and small stock camps to grazing lands within the modern delta (and at Dipa), and engage in flood recession planting (and in a few instances, fishing). These pastoral villages remain relatively mobile compared with their counterparts at the river (Photo 13).

A small number of west bank Dasanech have continued to send their herds (particularly cattle) into pastures between Dasanech and Turkana territories, as well as opportunistically into the ‘closed’ lands of the eastern Ilemi, or around Koras - now strongly dominated by the Nyangatom.

Although the Dasanech were long ago ordered out of Kenyan lands around the northeast of Lake Turkana, by the 1980s, local Kenyan officials permitted their movement back to lands they had once settled in, as far South as Ileret (Fig. 3). This time, the Dasanech would migrate southward from Ileret to where they had to compete for lands with the Gabbra. As with the Hamar to the North, Dasanech relations with the Gabbra had once been friendly, including as peaceful neighbors in the same locales. However, as the region’s available pasturage deteriorated for all, hostile relations between them became the norm rather than the exception.

The ‘off limits’ grasslands of the Ilemi Triangle, as well as lands around Labur (the latter, a high conflict locale, northwest of Lake Turkana and southeast of the Ilemi and claimed by both the Dasanech and the Turkana), as well as localities around the Kibish River (Fig. 3) have drawn fewer herders, since taking livestock to these areas involves great risk of attack by the Nyangatom or Turkana, as well as seizure by the police.

- **By the 1980s and 1990s, a substantial portion of the west bank dwelling Dasanech began moving back to the riverine zone on the East bank of the Omo river** into lands traditionally theirs decades earlier. The danger of attack by the Hamar to the east, however, effectively confined both their villages and herds close the river and around Dipa. The settlement migration of the Dasanech in recent decades to Omo riverine and delta lands, essentially as environmental refugees, is summarized in Fig. 11.

Dasanech Pastoral Villages: Lower Omo Basin

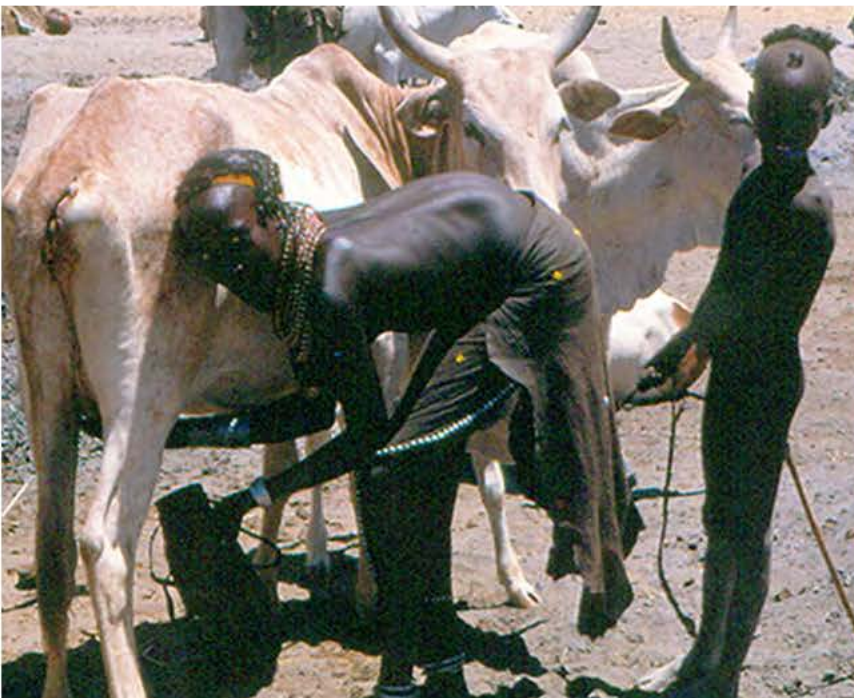
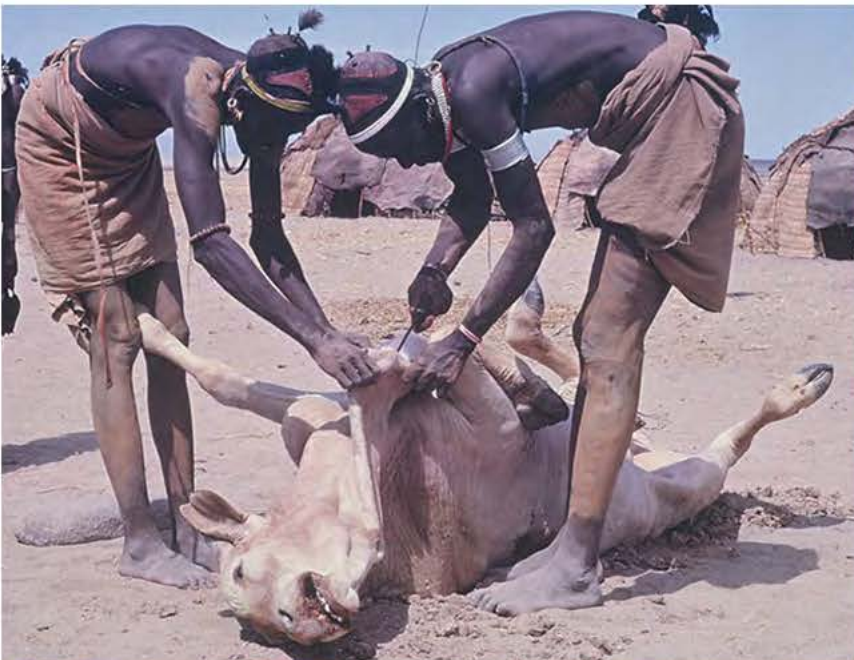
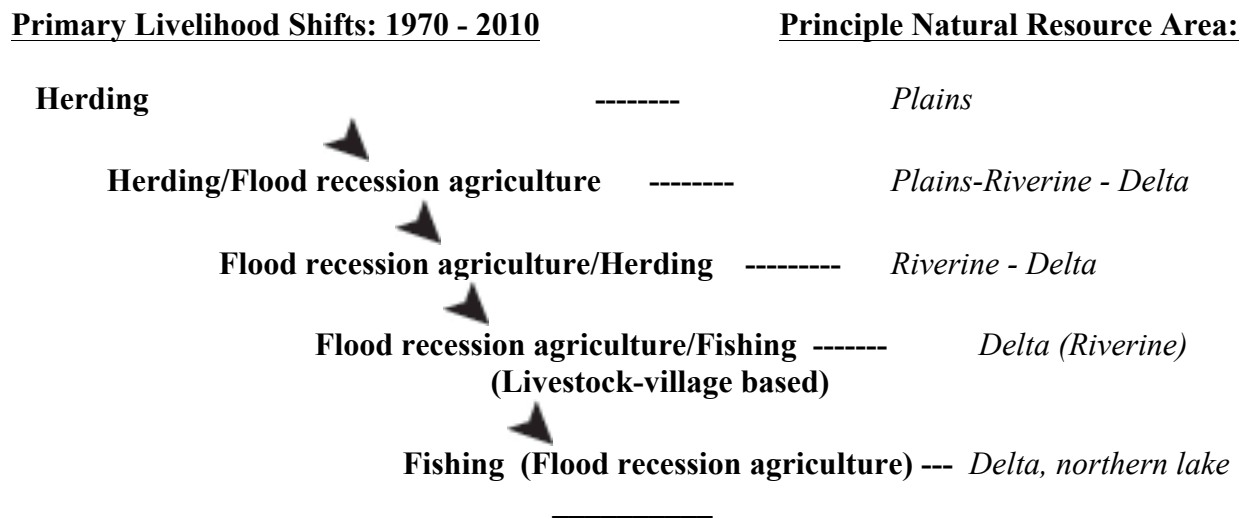


Photo Page 13. Dasanech pastoral villagers and activities.

- **Dasanech seasonal movements remain highly complex and pronounced. Movements are primarily oriented to stock raising needs, and they have radically changed in the past few decades.** Herding movements are no longer confined to the west Bank, as most of them were in the 1970s, when the author first characterized the pastoral economy. Rather, range herds range widely throughout much of the modern delta, the Dipa on the eastern end of the delta, and other locales near Lake Turkana. The situation is further complicated by opportunistic stock camp movements into the grazing areas between west bank Dasanech territory and the grasslands in extreme northwestern Kenya (for example, the locales of Meyen, Labur and the margins of the Ilemi Triangle. Fig. 6 indicates the general seasonal patterns of the Dasanech, along with those of neighboring ethnic groups.
- **Dasanech outmigration from the degrading plains environments and increasing reliance on the Omo River and modern delta region directly reflects the failing economic conditions for the group as a whole.**<sup>23</sup>

A simplified version of the downward trajectory of Dasanech economy, from pastoralism to agropastoralism to fishing, along with shifts in resource area dependency, can be summarized in the most general sense as:



This downward transformation of Dasanech economy represents both the transformation of predominantly pastoral Dasanech livelihood system to one highly diverse but also dependent on the Omo River, on the one hand, and a statement of the hierarchy of wealth among Dasanech households, on the other. In reality, all sorts of combinations of these production types occurs among Dasanech villagers, often varying from household to household even within one village.

<sup>23</sup> Although strong differences in wealth have long existed, the resulting huge decline of livestock herds affected the Dasanech as a whole, since those stock owners fortunate enough to retain larger herds were obliged to distribute at least some of their wealth to varying combinations of clan, age-set and affinal (in-law) relations (as well as to their offspring), as prescribed by centuries of pastoral tradition.

- **Presently, thousands of Dasanech are settled along the east bank near the river as far northward as Omorate, with major new settlements added under the direction of the Ethiopian government after the 2006 flood. This population is variously dependent on pastoral, recession agriculture and fishing.**

Despite their historical distaste for fishing, an increasing number of the poorest Dasanech pastoral households took up fishing, both in the Omo River and along the northern shoreline of Lake Turkana.<sup>24</sup> Moreover, the number of fishing households has increased substantially since the 1980, first, because the plains environment and livestock herds have continued to deteriorate, and second, the recent Ethiopian government's eviction of thousands of villagers has pushed most of them into the Omo Delta, where they often have no recourse but to learn to fish. Those with some remaining livestock tend to focus on herding and flood recession agriculture, but fishing is the last option for survival and it has been taking hold rapidly throughout Dasanech society.

- **There are no reliable estimates of the Dasanech population, since no census or field based investigation has been carried out – GOE statements to the contrary.** Estimates by government and individuals making brief visits to the region have varied from 35,000 to well over 100,000. The reality is likely about 70,000, with tens of thousands of them crowded along the Omo River and within the modern Omo Delta.

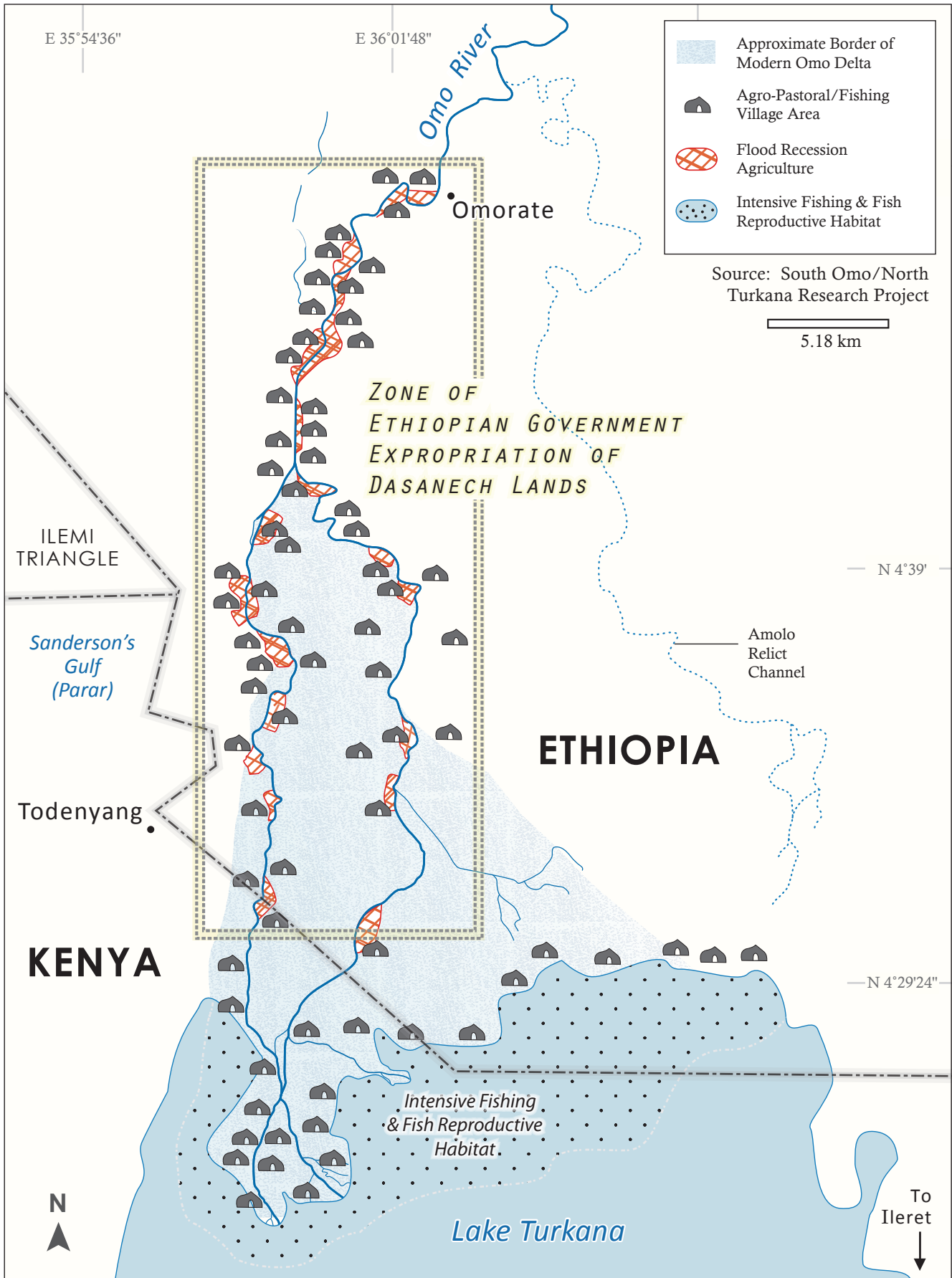
**SONT mapped the individual village complexes of the Dasanech residing along the Omo River and within the Omo Delta, between 2009 and 2011, based on the combination of field reconnaissance, satellite imagery and interviews with villagers (Fig. 12).** All village complexes were named and the primary livelihood activities recorded. Those villages located along the northern shoreline of the lake are primarily fishing. Overall tens of thousands of Dasanech either live entirely within Kenya's portion of the Omo Delta, or they utilize fishing, planting or grazing resources there during part of the year.

The Ethiopian government is expropriating much of the land and evicting thousands of villagers on the east and especially the west bank, from the Omorate region (Fig. 3) southward to the active Omo Delta. East bank Dasanech population, like that of those residing on the west bank, in order to establish large-scale commercial agriculture and a major system of irrigation to serve it, while abstracting large amounts of Omo River waters.

A similar program is afoot in Nyangatom territory. The GOE's 'cooperative' development program is only selectively including some Dasanech while displacing large number of villagers. The eviction policies of the GOE are detailed in a forthcoming report by SONT. Several non-governmental organizations and individual researchers, including Human Rights Watch, the Oakland Institute and [www.mursionline.org](http://www.mursionline.org) have described the eviction and commercial development underway in the Lower Omo Basin, more generally.

<sup>24</sup> In the Dasanech language, the term for 'poor man' and 'fisherman' are the same: '*dies*'.

**Fig. 12. Dasanech Villages along the Omo River and Government Expropriation Zones**



- **The key villages complexes in the Omo Riverine zone are shown below for the west bank, east bank, and modern delta (between the two main channels of the Omo ). The major presence of these villages is virtually ignored in all development bank and GOE documents.** Clearly, such ‘omission’ lends itself to misrepresenting these riverine lands as ‘underutilized’ or ‘available’ for development of the ‘national economy’.

In fact, these villages are populated by tens of thousands of Dasanech whose bare survival depends on their access to them, as well as to the waters of the Omo for their last option survival through recession agriculture, riverside grazing by livestock, and most recently, fishing. Some of these villages have now been fully expropriated, with all or most of the Dasanech villagers forcibly evicted.

**DASANECH VILLAGE COMPLEXES ALONG THE OMO RIVER:  
WEST BANK, EAST BANK, MODERN DELTA (2009-2010)**

<b>WEST BANK</b>	<b>EAST BANK</b>	<b>MODERN DELTA (Between channels)</b>
Goto	Afuor	Lomosia
Damish	Kapuse	Ngymoru – Lulung
Akudingole	Tieli rieli	Ediporo
Nyemomeri	Lobele	Kipur-cheria
Atalago	Edete	Andora / Ililokelete
Salany (Salin)	Lobaoi	Bokom (both banks of channel)
Lochuch	Apaluka – (largely fishing)	Lonyangereng
Koro	Derish	Nakabila
Bokom	Aluuli	Chongochongo
Olmin	(Loyere, Nyikiki – East of Omo River zone)	Aachuun
Gabite		Jiete-Konya
Toltale		Budori
Malsipi		Nakoida
Terishichess		Araloput
Tuushe		Lokielinya
Turite		Kaakulu
Lopelebin		Koranyilutu (Koro Nyingabite)
Naakale		Naichari



- **The population of Dasanech, along with Nyangatom, is not known.** This problem rests with the same one pertaining to the declining survival conditions of the Dasanech and the reasons for them - namely, that investigation with villagers and drawing on their detailed knowledge of their circumstances – has been almost uniformly avoided, except for the author’s work and that of Almagor, along with a few other individual and non-governmental organization efforts.

The Ethiopian government’s alleged census in recent years was in fact done by administrative officers of the government, often far removed from the Omo River zone where the bulk of the population lives, thus nullifying any claims of counts. The fact that the Dasanech households and villages fluctuate greatly, especially seasonally, with herding sometimes as far away as the highlands in the Kenya/Ethiopian border region or in the Dipa grasslands of the eastern delta, coupled with survival strategies over wide areas involving recession agriculture, herding and sometimes fishing, underscores the importance of ‘census recording’ at the household level and with the trust of community members.

No such conditions existed in the region. Dasanech villagers uniformly informed SONT members that no individuals arrived to record such information. Dasanech population ‘estimates’ by government staff and individuals working by agreement with government offices (for example, Awoke Amzaye) have produced figures ranging **from 40,000 to more than 200,000**. The consulting firm for the European Investment Bank’s ‘Independent Review’, likewise, could not possibly have generated the specific figures for people (and livestock) presented, in the 10 days of field time described for the entire region from the Gibe III dam site to Lake Turkana. These figures would have to have been projections based on faulty premises, as would aerial (satellite photo) estimations, given the high mobility and high frequency of abandoned villages, among other characteristics thwarting an accurate accounting.

The highly repressive political conditions in the area, along with logistical constraints of SONT, prevented any systematic information gathering from indigenous ‘chiefs’, since any individuals and villages offering such information would almost certainly face serious reprisal, whether as beating or jailing or worse, by the Ethiopian government. The exercise of identifying the villages named in the above Table, suggests a minimum figure of 60,000 – 70,000, but this figure must be taken as fundamentally speculative.

**Whatever the actual population of the Dasanech, it is clear that there are at least tens of thousands of Dasanech whose lives depend access to and sustainment of the Omo River.**

➤ The major dimensions of economic diversification, from pastoral to agropastoral, agrofishing or fishing livelihood, are evident from timeline household data collected in the 1970/1972 and 2009/2010 by Carr. Of 75 households surveyed in the 1970s, update information was obtained for 35 of them in the later period Table 4). In this households from the original survey were randomly selected from four of the six major settlement areas indicated in the diagram above.

**TABLE 4**  
**DASANECH HOUSEHOLD WEALTH STATUS & LIVELIHOOD CHANGE**  
**West Bank of the Omo River: 1972 - 2009**

Household Number	1972					2009				
	Village Location P-Plains R-River D-Delta	# Cattle	# Goats Sheep	Farm	Fish	Village Location	# Cattle	# Goats Sheep	Farm	Fish
1	P	140	180	No	No	P	38	30	Yes	No
2	P	150	45	No	No	P/R	40	48	Yes	No
3	P	60	0*	No	No	R/D	18	30	Some	Some
4	P	28	65	No	NO	R/D	5	22	Yes	No
5	P	47	5*	No	No	D	0	0	No	Yes
6	P	280	350	No	No	R/D	15	0*	Yes	Yes
7	P	44	60	Yes	No	R/D	18	24	Yes	No
8	P	120	210	No	No	R	35	68	Yes	No
9	P/R	32	44	Yes	No	D	0	5	Some	Yes
10	P/R	30	12	Yes	No	D	2	0	No	Yes
11	P	310	155	No	No	R	34	50	No	No
12	P	41	15	No	No	R/D	15	33	Yes	Some
13	P	58	40	Some	No	P/R	22	6*	Yes	No
14	P	155	85	No	No	P/R	10	34	Yes	No
15	P	550	200	No	No	P/R	18	400	No	No
16	P/R	50	30	Yes	No	D/R	12	22	Yes	(Yes)
17	P	210	60	Yes	No	R	32	85	Yes	No
18	P	800	110	No	No	R	160	60	No	No
19	P	540	85	No	No	P	105	73	(Yes)	No
20	P	65	38	Yes	No	R/D	40	55	Yes	(Yes)
21	P	75	22	No	No	R/D	14	5	Yes	No

22	P	0	8	Yes	No	D	0	0	No	Yes
23	P	80	130	(Yes)	No	P/R	65	60	Yes	No
24	P	90	45	(Yes)	No	R	20	48	Yes	No
25	P	82	70	No	No	R/D	7	36	Yes	(Yes)
26	P	125	150	No	No	R/D	26	38	Yes	No
27	R	4	23	Yes	Yes	D	0	5	Yes	Yes
28	P	87	110	No	No	R	26	44	Yes	No
29	P	12	15	Yes	No	D	0	3	No	Yes
30	P/R	4	15	Yes	No	D	0	3	No	Yes
31	P	65	50	(Yes)	No	R	16	24	Yes	No
32	P	90	55	No	No	P/R	80	110	(Yes)	No
33	R	12	20	Yes	No	R/D	10	48	Yes	(Yes)
34	P	65	30	No	No	P/R	20	35	Yes	(Yes)
35	R	0	4	Yes	Yes	D	0	0	No	Yes

\* Lost in raids by neighboring Nyangatom or Turkana

The major patterns evident from these household timeline data include:

- Of the households updated, all had moved to other locations, clearly reflecting major changes in production activities.<sup>25</sup>
- Almost all households (with one exception) experienced major livestock losses between the two periods recorded, and a high percentage of them had lost more than half of their cattle. Changes in small stock numbers were considerably more variable. In general, as cattle herds decline (from rangeland resource deterioration, mortality through disease, etc.), small stock is relied upon more heavily as they are more highly adapted to degraded lands. The historically based strong preference among the Dasanech for cattle over small stock has clearly been offset by the necessity to herd small stock.
- Some herd owners lost *all* livestock, and others who had diversified their economic production managed to partially rebuild small stock herds through barter or sale of grain or fish. Dasanech herd owners on the west bank and those in the delta were interviewed concerning their loss of livestock to disease. A typical response was:

<sup>25</sup> The relative similarity or difference between the specific household in question and neighboring ones from the original sample was also recorded. Names of household heads are excluded for the protection of individuals.

*'No, only a few people near Omorate got help for their livestock diseases. Those living in the delta and the whole west bank received no help from the government.'*

- All households retaining livestock now depend on grazing in the Omo riverine zone, within the modern delta or shoreline areas around Lake Turkana during part or all of the year. Those Dasanech with remaining livestock, mostly agropastoralists who now constitute the majority of the people - commonly send their animals to the modern Omo River delta and nearby areas, including a locale in the eastern portion of the southernmost modern delta that has become critical to their survival in recent years - *Dipa* (not to be confused with 'Lake Dipa' in the Kara/Mursi region to the north). Tens of thousands of herding household members depend on relatively rich pastures in *Dipa* for months of the year, pastures sustained by Omo annual floodwaters giving way to grasslands that are clearly 'last resort' options for these Dasanech.

- Most of the 35 households recorded in both periods had diversified their production from herding to include flood recession agriculture or fishing, or both. All of these households had moved part or all of their household to the riverine or delta region, at least for a substantial portion of the year. Many households planting in the delta region return to the west bank during the Omo flood.

- 
- **The general shift in settlement to the Omo River, modern delta and lands bordering this area to the northeast, accompanying this economic transformation among the Dasanech is both dramatic and likely irreversible, given the level of environmental deterioration already prevailing in the upland plains throughout the region.**

The following is typical among the statements by elder Dasanech herd owners about their lives in recent decades:

*"In the time of our fathers and grandfathers, our land was the land of good grass and it was big [gesturing to the horizon]! The grass was tall for our cows and we moved our herds apart when danger came. Wild animals were everywhere. The river (Omo) gave us what we needed – water and also grass for our animals then. Our life was good... But look at our land now! It is bare and you can find our dying animals everywhere – look at those carcasses! Our fathers and grandfathers did not know this hunger – they did not know this life. We have had to bring our villages to the river to find grass for our animals and to plant so we can feed our children. The poorest of us are even fishing. Now we are afraid that we will lose our river waters because growing our crops is the only way we can stay alive. What is happening to our land – do you know? Because we are afraid for our children and for their children."*

Dasanech elder, west bank of the modern Omo River delta, in Ethiopia

## **Last Resort Survival: Flood Recession Agriculture, Fishing and Herding At the Omo River**

These statements recorded in conversations by SONT researchers with Dasanech agropastoralists and fishers in the delta are representative of the villagers' expressed views.

*'We have to move with our households and animals to stay close to the river channels and the delta where there is water and grass for us and for our animals and where we can farm. The areas east of the river are getting barer or grass and drier, except when there is good rain. We can find food and water only here so people have to move here.'* [Agropastoralist from the eastern edge of the modern delta.]

*'We never had such hunger in my father's and my own time – until recently, when we became old men. Only this hunger can force us to eat fish! Herders do not eat fish – the fish eaters are the 'dies'. Our times were better. Our land was good for all Dasanech and even a man with fewer animals would eat well from his animals. The animals were healthy and they gave much milk. We didn't have all this bush – it has come to us only recently when we have lost our land of good grass. I used to stay with my animals in the grasslands. Now I must be in the Omo riverine lands where I can get food and where I have learned to farm. I must farm because my family will not eat from our few animals. Even people with many animals don't get enough milk. And when the flood doesn't come to our land and we cannot farm, we eat fish. I don't want any more of our children to die so we eat fish.'*  
[Dasanech elder from a riverside village just upstream from the modern delta.]



**Dasanech crossing Omo River in delta region, at flood stage**



**Dasanech woman making dugout canoe, in Omo Riverine forest.**

- **Dasanech and Nyangatom villagers consistently cite their major problem as too little flooding, not excessive flooding.**

The Dasanech talk almost entirely about ‘good’ flood, ‘poor’ flood, and ‘no’ flood – not ‘excessive’ flood. While the largest recent flood in recent, in 2006, is considered to have been 'exceptional' by the Dasanech, it is by no means described as destructive of human life or of extensive livestock.

The only substantial survival options for the overcrowded and failing pastoral population in the Lower Omo basin *remain* primarily along the Omo River and within its modern delta. These are (i) livestock raising, (2) flood recession agriculture and (3) fishing

- **Access to riverine lands upstream from the modern delta, for last resort grazing, flood recession agriculture and fishing** is critical to the already precarious survival of tens of thousands of Dasanech.

These types of production depend on sufficient Omo River flow volume, annual flooding of modern delta lands and low-lying flats along the river’s lower reaches, and inundation (*not* overbank flooding) of for planting, to sustain the riverine forest along the river’s natural levee.

- **All three types of livelihood would undergo destruction by the Gibe III dam as a result of the 60-70 per cent reduction in river flow volume.** This drop in flow volume would cause cessation of flooding of the delta and riverside flats, the multi-kilometer southward retreat of Lake Turkana and the loss of soil moisture in natural levee soils.

Both the EIB and AFDB impact assessments accept some critical points of misrepresentation and falsification include in the GOE’s downstream impact assessment.

**Planting by the Dasanech and their northern neighbors, the Nyangatom and the Kara is practiced only on the Omo River’s waterside flats, on river banks and within the modern delta. Rainfall in the insufficient in the Lower Omo Basin for agriculture in the vast ancient floodplains and upland soils.**

When the ephemeral Kibish River, which dissipates in the dry Sanderson’s Gulf, has sufficient flow some flood recession planting is undertaken along that river’s banks in the Nyangatom controlled Kibish area).

- **Omo River overbank flooding occurs only within the modern Omo delta and along its northernmost limit. Flooding does not occur in what are in fact relict, or ancient, floodplains in lateral to the river upstream from the modern Omo Delta.**

**Flood occurs only within the modern delta and along its northern margin, there is no 'excessive flooding' 'excessive evaporation', despite GOE assertions to the contrary.**

The GOE's misrepresentation of the Omo's annual flood rests is based on its false assertion of floodwaters spreading throughout the vast plain extending east and west of the river in its downstream section (upstream from the the modern Omo delta (Figures 2 and 3). This plain is in fact ancient (or relict), not active floodplain.

Consequently, the Gibe III dam would have no potential for 'recovering' waters There is offsetting its radical decrease from the development, and there is no potential for 'recovering' waters through river regulation, or the Gibe III dam.

The GOE's Gibe III impact assessment falsely asserts the opposite of these realities. Even the briefest field observations, as well as conversations with elders from communities throughout the region (those not under government scrutiny) confirm this reality. The AFDB and EIB assessments do not challenge these GOE assertions.

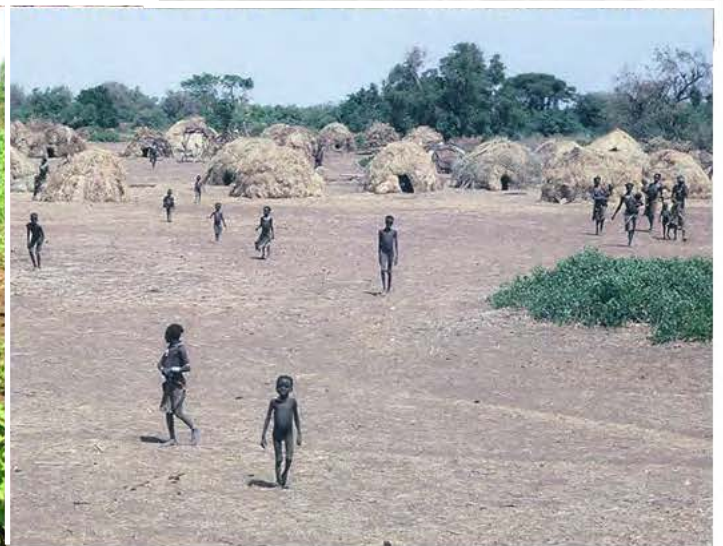
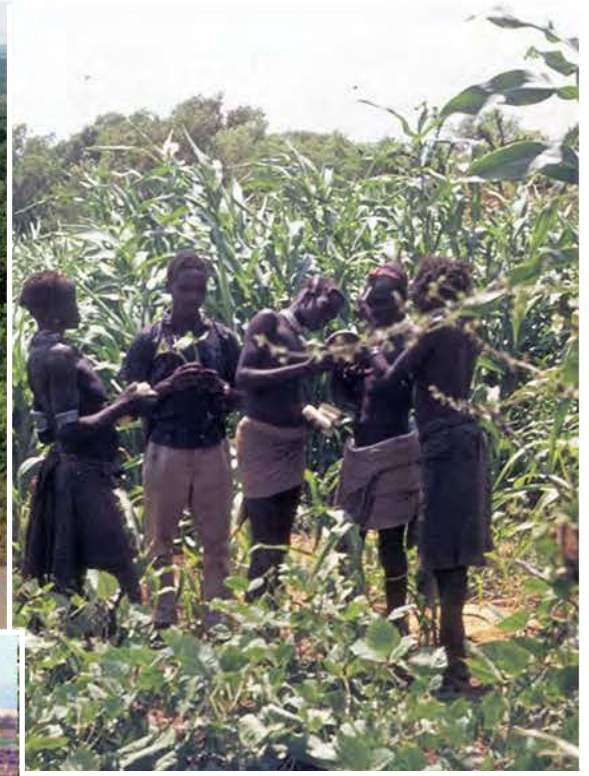
➤ **For the Dasanech and their Nyangatom neighbors living upstream, flood recession agriculture has long been the first option for alternative survival means, in the face of herd losses, and for livelihood diversification in order to minimize risk in their difficult environment (Photos 14 and 15).**

- Other than as a risk minimizing strategy, a major incentive for Dasanech households to diversity to agriculture was emerging by the late 1970s and early 1980s. The Omo Delta, which was a relatively limited land area of 'birdfoot' form (Fig. 2) and limited localities available for planting, began extending into Lake Turkana with the southward retreat of the lake (Fig. 2 compares the delta of the mid 1970s with that of 2005). This expansion happened to coincide with the plummeting livestock herds of the Dasanech as they were increasingly crowded into a restricted area, which has progressively deteriorated in ecological terms. The major transformation of Dasamech economy, evident from the household level survey recording livelihood changes between the early 1970s and 2009/2010 (Table 4) shows the stark shift from pastoral plains life to relatively sedentary agropastoral life in the riverine/delta zone.

This underscores the extreme vulnerability of most households to losing the water source for their 'last stand' survival efforts.

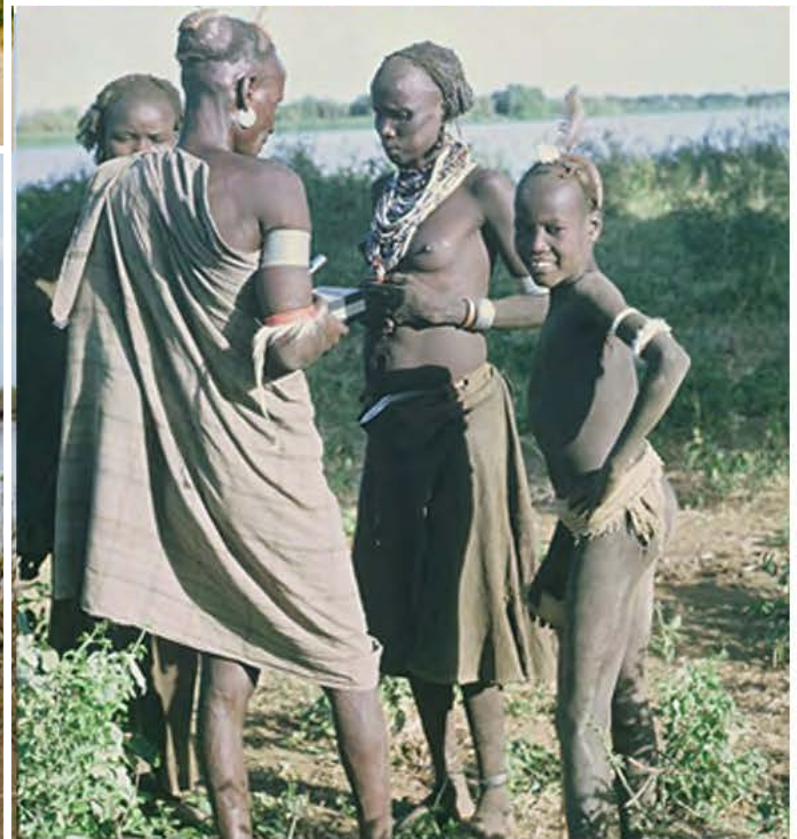


## Flood Recession Agriculture at the Omo River



**Photo Page 14. Flood (Recession) Agriculture Along the Omo River.** Top left: sandy/silt spit on inside bend, with flood agriculture. Top right: good millet crop on waterside flat. Center left and bottom left: field preparation for beans, squash and millet on farms in northern portion of modern Omo Delta. Right bottom: Dasanech riverine village.

## Life Along the Lower Omo River



**Photo Page15. Dasanech Life Along the Lower Omo River.** Top left: Livestock grazing during drought period at Lake Turkana edge of the delta (in Kenyan portion of Omo Delta). Top right: Cattle at ‘Dipa’ locality in modern delta – excellent pasturage for drought periods. Bottom left: Malnourished cattle search for grazing at Omo River, next to flood (recession) agricultural land. Bottom right – Agropastoral Dasanech family at riverside flood agricultural plot.

- By the 1970s, Dasanech planting was a limited phenomenon, as documented by the author (Carr, 1977) and Almagor (1978). Those who did plant were either compelled to do so by extreme livestock losses and intended to rebuilding herds by trading grain for small stock (or cattle) or to minimize risk of hunger during severe drought or other hardship periods, by growing and storing grain or both. Grain reserves were kept inside pastoral villages. These granaries are evident throughout the pastoral villages remaining in the dryland plains of the west bank and clearly indicate the dependence of even this segment of the Dasanech on the Omo River.

The GOE's ESIA falsely describes a far more mesic (relatively wet) environment with its inclusion of a highly detailed vegetation map indicating an active river channel extending from the main channel just above Omorate to Lake Turkana, when in fact this channel is a relict one only collecting water during strong rainy periods. While this relict channel (termed '*Amolo*' locally) used to be an active part of the Omo River active flow and annual flood - system, '*Amolo*' did not flow for many years (with the one exception of the flood in 2006): it may simply have standing water during rainy periods. Not only is '*Amolo*' not an active channel, the lands near it are not the relatively favorable environments indicated by the GOE— all in all, a very large area. The land area surrounding this relict channel is actually part of the extensive ancient floodplains.

➤ **A steadily increasing proportion of the emerging agropastoral and agricultural Dasanech has been settling in the Omo delta.** The withdrawal of Lake Turkana and major expansion of the modern delta (to 500 square kilometers or more) has facilitated the in-migration of thousands of Dasanech who would otherwise have faced major threat of starvation (Photos 14 and 15).

- The major expansion of the modern delta between the 1970s and the early part of this century, from the 'bird foot' to its present form with 500 square kilometers added (Fig. 2), greatly increased the potential for the Dasanech's desperately needed diversification to agriculture, along with fishing and last resort livestock grazing.

- Diversification of livelihood activities is uniformly a primary survival strategy among the Dasanech – at least for those fortunate enough, in recent years, to manage it. Many herding Dasanech settled near the river, for example, also plant in the modern delta region, often negotiating labor sharing arrangements with other pastoralists or with more sedentary households doing flood recession agriculture. When crops fail in the modern delta, generally from insufficient annual flood, agropastoral households are able to sell or barter some of their remaining small stock, however reluctantly, in order to obtain millet from households in locales with successful harvests. An increasing number of households in the delta area are beginning to fish, at least in some limited fashion. The poorest among them

Those without livestock at all who lose access to farming plots or whose harvest fails, and who do not fish, may be reduced to gathering wild fruits, particularly the fruits of *Cordia sinensis*, *Salvadora* spp. and several other local plants (the Dasanech names for which are *mier*, *damich*,

*barbar*, and *nyaa*), in order to survive harsh times. These plants are relied on as last resort food source are found along the river and throughout much of the in delta.

One relatively lush area in the eastern portion of the Omo Delta, known locally as ‘*Dipa*’ (not to be confused with a locality with the same name, far upstream along the Omo) provides what the Dasanech consider to be the absolute last option grazing in drought times. The extensive grass *Dipa* grassland is sustained by waters from both Lake Turkana and the Omo River.

All of these mesic, or seasonal wetland environments in the delta region, would be desiccated by the Gibe III dam’s reduction of river flow volume – even during the fill period. Without question, the result would be exposure of tens of thousands of

- **Within the modern delta, a mosaic pattern of different vegetation types and water conditions has accompanied the recent expansion of the delta – providing habitats that are critical for last resort livestock grazing, flood recession agriculture, and fishing, and food gathering.**

Villages and resource use patterns within the modern delta naturally shift with changes in Omo channel morphology as well as other environmental and social factors. A majority of villages in the western portion of the delta have been migrating to its *central and eastern* portions, due to (i) the threat of Turkana attack, (ii) decreased annually flooded lands and reduced planting locales on the western margin, (iv) drainage conditions favoring woody vegetation (shrubs) followed by increased **tsetse** presence, and (v) ongoing threat of Turkana attack.

Dasanech elders describe conditions as highly variable in the delta. One such statement is typical of these descriptions:

*‘Many people here have some small stock. But they don’t give enough milk. So a lot of people have to rely on what they can harvest from their farms. In some places, the crops do well if they get flood from the river, but in some places there is no flood and crops fail, so people have to find other ways to survive, like eating fish or buying grain from those who have it.’*



Above: Wetlands along the northwestern edge of the Omo Delta at Lake Turkana, with cattle grazing. Below, Dasanech village complex at lakes edge, with Delta wetland and graze nearby.



Along with this eastward movement within the delta, more and more Dasanech households have been forced to move to the delta as they have undergone major herd losses in recent years. The problem of excessive concentration of villages, farmers, fishers and livestock herders has therefore been on the increase.

Several major soil types prevail in the delta zone where flood recession agriculture is practiced, and these vary among sand, silt and clay like in texture. Although two of these (locally termed *maal* and *digirte* are known to be superior among them, planting is carried out in a wide range of soil types and with different degrees of flooding. Tools are simple, primarily simple axes (*hoolte*), sticks (*yugeny*) and broad heavy knives ('pangas', or in Dasanech – *nyewolo*). Labor patterns are flexible, although with men doing more of the clearing and harvesting, women doing planting, and both cooperating in weeding.

- **Thousands of Dasanech villagers engage in flood recession agriculture in the modern Omo delta and on waterside flats (including point bars and low sand/silt spits).** They plant a variety of crops, including these primary traditional ones:

millet (sorghum) – Dasanech name- ' <i>ruba</i> '	pigeon peas – <i>gadda</i>
maize – <i>nakapono</i>	other vegetables – <i>eri</i>
squash – <i>bote</i> ; gourds - <i>turum</i>	tobacco – <i>tampo</i>
sweet potato – <i>lokoto</i>	
beans – <i>am haamo</i>	

**These crops are primarily for household consumption, except for millet, which is critical for meeting both subsistence and exchange needs.**

Millet may produce two crops a year and has lower water requirements making it by far more suitable for the Dasanech's cultivation than maize, particularly since its seeds are more easily available from previous harvests by individual planters, or else available from nearby relatives. Millet's key uses for consumption and trading also account for its major importance to all agricultural households. Beyond its importance as a household food staple, it is traded for small stock (sheep and goats) or even cattle, for example, both within the Dasanech economy and in a wide range of inter-ethnic exchange relations (Fig. 4).

- **East bank and eastern delta Dasanech households harvesting millet trade their product with the Hamar some of whom are highly dependent on this grain supply.** The Dasanech trade grain for the Hamar's small stock (the Hamar have very few cattle). They also obtain knives, axes, earthen pots and hides from the Hamar, who have better access to these highland products. Dasanech settled on the west bank and in the western delta, on the other hand, are more likely to trade with the Turkana or in local markets, conflict conditions permitting.

Without a successful millet harvest, east bank Dasanech agropastoral households, for example, often have no alternative but to market their remaining cattle or small stock in various trading centers, including Omorate in markets frequented by Hamar, Arbore or Kenyan Somalis. West bank agropastoralists suffering similar hardship conditions generally also have to sell or trade livestock from their remaining herds, whether to the Nyangatom, the Turkana or local traders.

Failed crops due to insect damage often result in grain heads that are mainly useful only as cattle fodder. Other options, primarily for those of poorer status, are noted below.

Yields of millet vary widely, depending on the extent, periodicity and duration of Omo River flood, the soil type and land use practices. SONT data indicates that yields range from ‘good years’ when many households produce enough for months of household subsistence as well as substantial amounts for trade, to failed harvests altogether. Most respondents state in the strongest terms, *‘It all depends on the floodwaters.* In general, millet yields are greater than maize, particularly when the possibility of two crops per year is realized.

Labor for flood recession planting is highly variable, ranging from communities with broad scale and pervasive cooperation in most phases of farming, to those with relatively sharp household delimitation of plots accompanied by limited cooperation primarily, in land preparation and harvesting. Within the household, labor cooperation is flexible, particularly in households with mixed economic activities.

- **Households settled in the delta when confronted with failed crops from insufficient Omo River floodwaters most often sell any remaining livestock in order to obtain grain for their survival.** In this way they are similar to agropastoral and pastoral villages in the upland plains. Recession agriculture at times may produce a ‘surplus’ (defined here as product sufficient for more than one year), but it may also produce no yield.

Problems of crop disease are sometimes severe, especially from insects and rust. Dasanech villagers consistently state that the Ethiopian government has not helped them deal with these diseases and in fact, that they have had no agricultural services at all from the government. This problem for the Dasanech (and others within the Transborder region) parallels that of the pastoralists, who have received *no government assistance* for the rampant and often devastating livestock diseases affecting their herds.

Knowledge and management of these conditions has rendered these systems sustainable – as opposed to the more monolithic and less sustainable systems introduced by missionaries – not to mention the commercial style and chemical laden systems presently being brought into the region by the government and private companies, at the direct expense of this sustainable ‘last resort’ food production.

- **Missionary presence was a major dynamic in external economic and political incursion into the Lower Omo.** First among the missionaries was the Hiwot Church, an Ethiopian branch of an international evangelical church, **which** became established along the lower Omo west Bank by the 1960s, after a lengthy stint in Sudan. By agreement with the Ethiopian government, the Hiwot mission had already taken some of the best planting lands of the Dasanech and began planting bananas, tomato, mango, onions and other crops. The Hiwot mission has routinely selected those Dasanech for these farms who ‘agree’ with the new system and generally are willing to ‘learn’ the teachings of the church.

Missionaries have installed windmills for growing the non-indigenous crops. Windmills are actually used for three purposes: irrigation, grinding grain to flour, and tool sharpening. These

windmill/pipe systems served as a forerunner to the more capital intensive, diesel driven systems brought in recent times. There is a substantial monetary charge for use of the windmills. Moreover, the notion of privatization was also introduced by the missionaries, since private individuals with sufficient capital, that is, individuals removed from the indigenous survival system networks – are able to purchase them for their own use.

- **The retreat of Lake Turkana and expansion of the modern delta in recent decades has accompanied the increase in shrub growth and decreased flow in the western portion of the modern delta.** As a consequence, farming has been reduced in these lands and villages have migrated to lands in the central and eastern portion of the delta where annual floods are more likely to occur and where planting can be done. In the western zone, even where flooding does occur, crop yields are diminished and the lands are more suitable to livestock grazing.

There are serious problems for agricultural Dasanech in terms of accessing seeds for planting and coping with crop diseases. A small number of households get seeds through the Ethiopian government; many more buy them from other Dasanech – a difficult access, at best, for maize in particular, as this comment by an elder residing in the delta points out: [insert comment]

Moreover, crop yields are compromised by disease attacks previously unknown to the Dasanech: in some years, entire harvests are destroyed by disease including grasshoppers and insect larvae. There has been no assistance from the government whatsoever in solving crop pest attacks, according to all household heads interviewed by SONT. Livestock typically graze the stubble from crops harvested in the delta, although stockowners describe this food source for cattle as a poor but necessary option during periods when other resources are eliminated.

- **The Gibe III dam would destroy virtually all recession agriculture, due to the radical drop in Omo River flow volume, resulting in the cessation of flooding on waterside flats, desiccation of the modern delta, and major southward retreat of Lake Turkana's shoreline.**

Largely in anticipation of the planned Gibe III dam being completed, indigenous community oriented flood recession agriculture is being dismantled by the Ethiopian government.

This is occurring through both:

- (1) Expropriation of thousands of villagers by the Ethiopian government for the establishment of private commercial, state and 'cooperative' farms (for selected individuals), with overcrowding in the remaining lands, and
- (2) Decreased Omo River flooding, particularly as the Ethiopian government builds large irrigation systems, along with 'canals', all for the new farms on expropriated lands. With decreased flooding, soil conditions facilitate increased bush invasion.



- The EIB assessment of the Gibe III plan clearly stated two key inevitable environmental effects of the planned dam in the lower Omo basin, namely:
  - the desiccation of the modern delta and
  - the southward retreat of Lake Turkana by at least 10 kilometers.

These critical points are omitted from the EIB's Executive Summary, however.

The GOE has ignored these clear outcomes altogether, instead asserting exactly inverted conclusions – all of which run counter to all logic and empirical information from the lowermost Omo basin, leaving no rational interpretation other than that they are falsified.

- Despite their inclusion of increased detail in certain dimensions of assessment, in their own 'rush to rationalize', the AFDB reports, in fact, uncritically accept the GOE's misinformation and fabrications concerning the physical nature of the lowermost basin and the predictable impacts of radically reduced Omo River flow on riverine and delta habitat, as well as the entire northern section of Lake Turkana.
- Government 'assurances' of downstream annual artificial flooding are not only extremely improbable, as an 'assured' mitigation program – an assurance that has failed in every single context in Sub-Saharan Africa, such simulation is counter to the 'logic' of hydroelectric production and has virtually no correlation with the high/low volumes and duration of high water that would be required to sustain the riverine zone habitats necessary to indigenous survival systems.

➤ **The 'poorest of the poor' among the Dasanech are fishers. Dasanech pastoral and agropastoral tradition is such that only economic desperation has driven the most desperate among them to take up fishing.<sup>26</sup>**

Escalating desperation of the Dasanech due to herd losses and presently due to large-scale eviction from their riverside agricultural lands by the Ethiopian government, tens of thousands of Dasanech urgently need to taking up or increase their reliance on fishing.

One elder in a fishing village within the modern Omo delta described their recent livelihood problems in these straightforward terms:

*'We eat fish every day. But if some have millet, they will cook it and eat it. Some of us have been fishing for a long time – more than those others. Some more Dasanech came to join us after they lost their cattle and small stock from drought and disease. Our land has changed much in recent times! They had to come here to learn how to farm and to fish. Now they are staying here too. Many thousands of us are here. But many people died because they had nothing to eat - before they could get here to fish or before they could get farm land.'*

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<sup>26</sup> The Dasanech reluctance to fish is reflected in their term for 'fishers' – *dies* – which also has the meaning, 'poor people'

➤ **Fishing is done in the waters of the modern Omo delta and in the northernmost portion of Lake Turkana, where they confront constant danger of violent conflict with Turkana fishers, particularly as stocks dwindle from increasing catch by Ethiopian companies in these Kenyan waters.**

- For the most part, the *dies* or fishing households have only the simplest of technologies: metal spears and simple harpoons with string (from barter with other ethnic groups), locally crafted dug-out canoes fashioned from riverine forest trees, or simple rafts constructed from doum palm trunks lashed together. From the beginning, the Dasanech have acquired their knowledge of fishing and their technology from the Turkana (both boats and gill nets, from purchase, trade or increasingly – from capture). More recently, gear is obtained from Kenyan Somali traders.

Dasanech boats are generally smaller and far fewer in number than their Turkana neighbors along the northwest shoreline of Lake Turkana. Since they generally lack the boat-building know-how of the Turkana, and especially the Luo who build boats at Kalokol and don't yet know how to make sails, as the Turkana do, although they are well familiar with them on Turkana boats venturing into the delta region and around Ileret.

Other than the few boats and nets they receive in 'token' quantities from the Ethiopian government or the government supported fishing corporations, a matter provoking anger among the Dasanech, these fishers have few if any options for upgrading fishing efforts.

- The most common fish caught by the Dasanech at the mouth of the Omo channels and along Lake Turkana's northern shoreline are *Tilapia* and Nile perch. For the most part, the most common catch species for the Dasanech are the same as those for Turkana fishers. Dasanech male fishers have also hunted crocodile and hippo at night, while these animals were grazing with such killing primarily opportunistic.

➤ **Pulses of fresh water and nutrients from the Omo River's annual flood are critical to the sustenance of fish hatchery and nursery locales, so that major fish reproductive habitat occurs along the delta channels and in the northern Lake Turkana shoreline/near shore waters.**

Major fish reproductive habitat along the delta channels and northern Lake Turkana shoreline would be destroyed by the Gibe III dam, since the modern delta would be desiccated, the river level would precipitously drop and the northern shoreline of Lake Turkana would undergo a radical retreat southward further into Kenya. Such impending destruction of fisheries is clearly indicated in the bathymetric maps of Figures 7 and 14. This impending destruction is entirely misrepresented by the GOE in its assessment.

- **Dasanech fishers uniformly report to SONT that their fish catch is not only limited, it is in fact rapidly declining, primarily because of fishing by large, motorized commercial boats from Ethiopia, basically, companies solicited and protected by the Ethiopian government.**

**-- The Ethiopian fishing corporations are both urban market and export oriented private commercial and mixed enterprises.**

Three corporations were predominant during SONT research in the area: Ethio-Fisheries, Ethiopian Cooperatives Society (headed by an Ethiopian elite, Santayo Ahsa) and Egachu Wolde.

-- These fishing corporations have steadily increased their range of exploitation of fish stocks in Lake Turkana, virtually all of which is within Kenya. Armed Ethiopian guard boats frequently accompany the relatively large boats. Facilities for refrigeration and processing are being established in Omorate, and the Ethiopian government's Board on Investment for the region, the SNRPP has been actively soliciting further investment in such facilities.

**The expanding fish catch by Ethiopia based fishing companies in the river and northern portion of the lake has diminished catch by Dasanech, by all the accounts of local villagers. Moreover, fish discards have left large deposits of fish bones throughout the delta region creating further problem for the small nets of the Dasanech.**

The following is a typical response by Dasanech fishers in the Omo Delta to SONT question regarding how the villagers view the foreign fishing companies:

*'What is bad about them is the amount of fish they kill. Some of them flay the fish in the lake and throw the waste in the lake so this makes the lake water poisoned. We get small nets from some of them, but mostly we are losing our fish, so nets don't help us if the fish are gone'.*

Local Ethiopian administrators insist that there is 'assistance' to the Dasanech fishers by the private and government corporations, local Dasanech adamantly deny this, instead uniformly reporting that only a few nets have been provided to them by the government. This provision is are termed 'nothing' by the Dasanech who, face increasing numbers large motorized commercial boats taking their fish and leaving discards throughout the delicate fish reproduction area.

- Protest of any sort is not an option for the Dasanech, they point out, due to the highly repressive policies of the Ethiopian government throughout their region. Quite simply, people are terrorized for opposing the very policies that are costing them their livelihood.
- The GOE's eviction of Dasanech communities from their riverside lands for commercial agribusiness enterprises greatly exacerbates the stress on artisanal fishers, since many of those evicted flee into Omo Delta and lakeside locals where they must survive thorough varying levels of dependence on fishing. The Gibe III dam would in any case destroy the entire fishing livelihood since the lake's northern shoreline would radically recede.

- **The activities of these companies are carried out with complete disregard of not only Ethiopia based indigenous fishing community needs but also Kenyan sovereignty along with that nation's fisheries management principles and requirements.**

**It should be reemphasized that a major portion of the modern Omo delta is within Kenyan borders and the commercial operations penetrate well into Kenya's Lake Turkana – as far as North Island.**

These Ethiopian commercial boats fly an Ethiopian flag, including throughout their fishing expeditions in Kenya's Lake Turkana, and their agents are armed. Fish catch from the boats is taken to other regions of Ethiopia in iced trucks for further processing and export. No export fees are paid to Kenya, nor do they obtain fishing licenses.

No catch reports are made to Kenya's Beach Management Units, as required by Kenya's Fisheries Act Cap 378.

Ethiopian commercial fishing in this portion of the delta and throughout the northern segment of the lake amounts to Ethiopian state sponsored piracy of Kenyan waters. This piracy is not only a matter of international sovereignty – it adds fundamentally to the crisis faced by vast numbers of Kenyan Turkana who depend on Lake Turkana's resources.

Turkana fishers around the northern section of Lake Turkana have appealed to the Kenyan government numerous times. While the rising Ethiopia based catch by commercial interests is fully evident to Kenya fisheries officials, the Kenyan government has taken no effective action to stop the incursion.

- **The dire poverty of Dasanech experiencing catch problems already has led some villagers along the lake edge to engage in gear theft and conflict with Turkana fishers venturing into the delta zone. These conflicts frequently end in violence, even killings.** Because competition for fishing resources is already a major source of armed conflict in the delta and northern shoreline region between the Dasanech and Turkana, conflicts between the two groups have worsened in the past few years. Kenyan and Ethiopian police have been deployed to the region, but no account is taken of the cause of the crisis.

No mention is made in the GOE's ESIA or AFDB and EIB assessments of the Ethiopian government backed corporate fishing, let alone its impacts on the indigenous economies of the Lower Omo Basin or the Lake Turkana region. In fact, there is no consideration of Dasanech (and Nyangatom) dependency on fishing, nor of the entire downward spiral of the pastoralists' livelihood system to the point where major dependency on agriculture and fishing exists.

Nor is there treatment of the projected collapse of fisheries altogether, the full-scale destruction of the Omo delta and the major retreat of Lake Turkana's shoreline, including its northern area with major fish reproductive habitat.

The full-scale destruction of the Dasanech people and their livestock that would result from the Gibe III's construction would quickly reverberate to all neighboring groups. Surviving social units among the Dasanech would naturally attempt to capture the minuscule remaining resources in the region.

Since similar demise would occur among the Nyangatom, Turkana and other neighboring groups as a result of the Gibe III dam, explosive levels of armed conflict escalation would ensue, as the summary diagram in Fig. 9 outlines.

### **Nyangatom Livelihood Dependence on the Omo River**

Construction of the Gibe III dam would be disastrous for Nyangatom survival in at least four ways.

- The precipitous drop (60-70%) in Omo river flow volume would destroy Nyangatom's basic livelihood of flood recession agriculture, since the waterside flats along the river would no longer flood.
- The major loss of river flow would destroy the fish stocks and fishing secondary economy of the Omo dwelling Nyangatom, due to changes in oxygenation, nutrient replenishment and physical elimination of reproductive habitat.
- The Omo riverine forest habitat would be destroyed, due to the precipitous drop in river flow and duration/'residence time' of soil moisture –eliminating Nyangatom food sources from wild plant gathering, hunting and bee-keeping.
- The economic desperation from livelihood collapse of Omo dwelling Nyangatom would both spark and contribute to major armed conflict among ethnic groups throughout the Transborder region.

- **The Nyangatom, like the Dasanech and other neighboring pastoral groups, have a complex and highly adaptive survival strategy system (Sobania, 1988). Like that of the Dasanech their economy is dependent on both Omo River and rangeland resources.**

Nyangatom settlements range from an extensive zone of riverine forest zone along the Omo River westward to those around Kibish River near Koras Mt. and well into the Ilemi Triangle where they live alongside the Toposa, with whom they share language and cultural history. Their relations with the Turkana are volatile, with peaceful periods punctuated by mutual raiding and violence; in recent times, the situation is inverted, with primarily hostile relations. This is even more the case between the Nyangatom and the Dasanech, as resources in the region are under major decline. One area where clashes are often extreme is around Koras Mt. and the Kibish River, where one of the only alternatives to stock watering at the Omo River exists (hand dug water holes here extend to 5 meters in the dry season), along with livestock graze and browse. The Nyangatom has long practiced flood recession agriculture here, but it has been largely impossible in recent years, due to decreased river flow (see Photo below).



Nyangatom at a Kibish River (Fig. 2) water hole during the dry season: the only real alternative water source when access to the Omo River is not possible. Water holes can extend to 5 meters depth. Access to them is a source of major conflict among Turkana, Dasanech and Nyangatom.

- The exclusion of all indigenous groups from the contested Ilemi Triangle for several decades, beginning in the 1960s – effectively created a ‘buffer zone’, as viewed by the Ethiopian and Kenyan governments.

These Ilemi lands were long shared by the region’s pastoralists, and largely because of having sufficient lands for their seasonal mobility patterns; the pastoralists’ herds utilized its pastures without significantly disturbing the pristine ecological character of the grasslands (described in Carr, 1977), and in balance with the huge wildlife populations resident there.

For the Nyangatom, exclusion from their lands in the eastern portion of the Ilemi Triangle – extending on the east to the Kibish River effectively split the group into two segments– the largely pastoral Nyangatom in the Ilemi, alongside the Toposa, and agropastoral/agricultural Nyangatom along the Kibish and the Omo River.

- Movement between the two poles of settlement, and therefore critical exchange relations between the two food production systems, were fundamentally disrupted.<sup>27</sup>
- Major overcrowding of their villages and livestock was initiated around the Kibish River and eastward to the Omo River, where increasing numbers of them settled - generally to the North of the Dasanech but pushing them out of the forest zone toward the modern delta. Such concentration of livestock caused severe overgrazing with ecological deterioration and increased livestock mortality. Given no options for alternative grazing strategies, the Nyangatom were forced to endure their changing conditions for survival. The degradation process has intensified by prolonged droughts that have impacted all transborder groups.
- The ecological degradation of the Nyangatom’s remaining rangelands clearly resulted in *precipitous* losses of livestock numbers. Many Nyangatom herd owners report similar losses to those of the Dasanech.<sup>28</sup>

- **Nyangatom villagers along the Omo River all largely rely on flood recession agriculture for their livelihood, although some households bring their livestock for ‘last resort’ grazing in the riverine woodland and throughout the relict floodplains (Photo 16).**

Longstanding tsetse fly infestation in the Nyangatom riverine zone has reportedly decreased in

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<sup>27</sup> Government expropriation of pastoral lands that has effectively geographically split two different segments of indigenous economy is evidenced in other contexts within Ethiopia. The author documented the critical split between the largely agricultural (and agropastoral) Ittu Oromo and their pastoral Ittu relatives – who were forced westward. Exchange relations between the two groups became critical to the precipitous decline of each (Carr).

<sup>28</sup> For the Dasanech, it forced them to over concentrate their herds between the Kibish and Omo Rivers, causing overgrazing and ultimately, further loss of livestock. This precipitous decline, coupled with intensifying conflict with the Nyangatom, cause thousands of Dasanech villagers to resettle along the Omo River and in the delta.

The Turkana also suffered from the exclusionary policy in the Ilemi. Large numbers of them were compelled to move southward into Kenya, where they too were compelled to overgraze their remaining lands. By the 1980s, however, the Kenya government began encouraging the Turkana to reenter the Ilemi. Many observers have interpreted this as a Kenyan move to establish dominance in the area, which is contested by all three nations. Oil companies are now actively exploring the area.

## Nyangatom Villagers Settled Along Omo River



**Photo Page 16. Nyangatom Villagers Settled Along Omo River.** Top left: Nyangatom herders water livestock at hand-dug (20ft.) water hole in Kibish River bed during dry season. Top right: Village center along Omo River. Bottom left: Nyangatom village with grass huts & practicing agriculture along Omo River. Bottom center: Nyangatom family under storage granary in riverine village.



Recent years, facilitating the movement in of at least some herd animals. Most herd owners, however, keep their livestock around Koras and the Kibish River or in their lands adjacent to the Toposa within the Ilemi. Stock camps in more remote areas throughout the region are frequently exposed to conflict with northern Turkana and Dasanech herders.

Increasing conflict among all groups in and around the Ilemi Triangle has resulted from the continued exclusion of Nyangatom and Dasanech herders from that region, particularly in the face of continued encouragement by the Kenya government of Turkana presence in the Ilemi. The excluded Dasanech and Nyangatom herders have been driven by their desperate economic circumstances into increasing conflict with the Turkana in the region.

➤ **Flood recession agriculture is the now the key economic activity of Nyangatom living along the west bank of the Omo River.**

Planting is mainly done on seasonally flooded point bars and river silt/sand flats next to the Omo River, since overbank flooding does not occur along the river northward of the modern delta. The particular crops, crop yields and labor patterns in Nyangatom agriculture generally parallel those of those Dasanech settled along the Lower Omo River.

Nyangatom villagers settled in the Omo riverine area have long practiced a wide range of secondary types of food production, including fishing, gathering of plant parts, occasional hunting and most recently, bee-keeping/honey making. These production activities have become crucial to their survival during times of severe hardship – including at present. Along with grain and other products from their flood recession planting, honey in particular is traded or sold in local markets and with neighboring groups during times of intense hunger. Most of these secondary sources of food depend on the Omo River or the Omo riverine forest and woodland. All livelihood activities are enmeshed with the Nyangatom's exchange relations throughout the region (Fig. 4), including with their own relations at Kibish and in the Ilemi Triangle.



**Nyangatom girl at deep waterhole – at Kibish**

### Nyangatom Food Production Activities and Habitats

Production Activity:	Location:
Flood Recession Agriculture	Riverside point bars/sand spits
Livestock Raising	Plains – between Omo R. and Kibish R.
Gathering – Wild Foods	Plains, riverine woodland/forest
Fishing	Omo River, Lake Turkana
Bee-keeping	Riverine forest/ woodland

- **Fishing by Nyangatom villagers along the Omo River is confined to the river itself, since they are removed from the modern delta and Lake Turkana.** For years, the poorest Nyangatom households have done limited fishing, generally from dugout canoes fashioned (generally by women) from fig (*Ficus sycamorus*) or other riverine forest trees. Fishing has also been traditionally done with locally made rope and harpoons, or nets, although newer tools are available to some villagers, in recent years.

With the recent government supported incursion of commercial fishing interests, efforts by both Nyangatom and Dasanech fishers are not only dwarfed, they are defeated altogether in some locales, depending on the catch taken by the companies.

The Nyangatom have had to increase their reliance on both Omo River based agriculture and Omo River fishing in response to their herding economy around the Kibish River and Koras Mountain being increasingly stressed and in response to the loss of most flood recession agriculture along the Kibish River as severe droughts and reduced flow in that ephemeral river have occurred. While using most highly primitive technology, some Nyangatom fishers have managed to acquire some new fishing gear through Omorate and other informal markets.

- **The Nyangatom have no territorial ‘alternatives’ to the Omo riverine lands they now reside in.** Bounded by the Kara, Mursi, Suri and other ethnic groups to the North, the Hamar to the east of the river, the Turkana throughout much of the Ilemi Triangle; since the Kenya government, which has been administrating the Ilemi for many years, has been permitting the Turkana to utilize much of the Ilemi in recent years. There is strong resistance among the Nyangatom, and substantial numbers of them have associated with the liberation forces of South Sudan, returning with new arms and the experience with weaponized armed conflict.

Dispossession of their Omo riverine livelihood would not only be devastating for the Nyangatom residing alongside the river itself, but also for the indigenous people in adjacent lands. Dispossession would immediately impact a far greater number of indigenous people than the riverine Nyangatom themselves and contribute to the expansion of armed conflict among different ethnic groups throughout the tri-nation Transborder, as represented in Fig. 8.

➤ **Construction of the Gibe III dam would be disastrous for Nyangatom survival in at least four ways:**

**Firstly**, the precipitous drop in Omo river flow volume (at least 60-70 per cent) would cause the cessation of flooding in the riverside habitats where the Nyangatom, like the Dasanech, rely on flood recession agriculture. Extensive Nyangatom communities between the Omorate latitude through their entire upstream settlement area (Fig. 3) would face starvation, with no alternatives for survival.

**Secondly**, the drop in water level would destroy both fish reproductive and live cycle habitat in the river, compounded by the disruption of biological systems more generally and the chemical relationships, including oxygenation, nutrient replenishment and so forth.

These changes would be compounded by the destruction of fish reproductive and life cycle habitat throughout the riverine environments, as well as the \_\_\_\_ (migratory) species that would no longer be migrating upstream. The entire modern delta would be desiccated and Lake Turkana's northern shoreline would have migrated southward, further into Kenya, by at least 10 to 12 kilometers.

**Thirdly**, the biological resources for the Nyangatom's subsidiary food production – including food gathering, hunting and bee-keeping would be destroyed, since the forest/woodland itself would cease to exist, due to radically reduced flow of the Omo River. The rich wildlife populations in the Omo riverine forest, the last pristine riverine (gallery) forest in dryland Sub-Saharan Africa includes several species of primates, buffalo, leopard, lion, elephant, and a rich assemblage of bird species. These wildlife populations would also be exterminated by the Gibe III construction, due to elimination of their habitat.

This reality is fully contrary to GOE assertions, which are based on *misinformation*, including characterization of these forests as equivalent to those far upstream in higher elevations along the Omo River.

**Fourthly**, the collapse of interdependent survival system of the Nyangatom in the three regions, the Omo River, Kibish/Koras area and the Ilemi Triangle, would bring starvation and new levels of mortality to their own communities but also spark new and intensified conflict to the region as a whole. This would clearly immediately impact a far greater number of indigenous people than the riverine Nyangatom themselves, and contribute to the expansion of armed conflict among different ethnic groups throughout the tri-nation transborder, as depicted in Fig. 8.

**Like their Dasanech neighbors downstream, the Nyangatom are experiencing the dismantling of their survival system due to actions by the Ethiopian government.**

Entire villages have been evicted from their riverside lands for the establishment of large commercial farms. Extensive riverine deforestation and destruction of other riverine habitat is underway, including for canal and irrigations systems which are diverting Omo River waters and blocking the Nyangatom access to their limited remaining lands. Agricultural options do not exist for the Nyangatom.

As their means of survival collapse along the Omo River, conflicts among Nyangatom, Dasanech and Turkana over desperately needed resources are intensifying (Fig. 8).

## Fate of the Riverine Forest and its Resources: Destruction by the Gibe III

*The Omo riverine forest and woodland is the last remaining pristine riverine forest in the drylands of Sub-Saharan Africa. It is essential to the survival of the Kara, Nyangatom and Dasanech peoples of the Lower Omo Basin. The Gibe III dam would eliminate it altogether.*

- **The Omo riverine forest and associated biotic communities are essential to the survival of the Dasanech and their northern neighbors, including the Nyangatom.** Specifically, the forest and forest/upland transition zone is essential for:
  - last resort grazing by their livestock and
  - secondary food production. including wild plant gathering, bee-keeping, hunting and other activities.

While these subsidiary food sources have long been important during prolonged droughts (sometimes lasting for years, such as the recent 2007 to 2010 drought), livestock disease epidemics and conflict with neighboring ethnic groups, they have become fundamental to the continued existence of thousands of indigenous residence as their herding livelihoods have been collapsing. This situation is exponentially worsened by the Ethiopian government's expropriation of their riverine lands for agribusiness development and construction of irrigation and canal works.

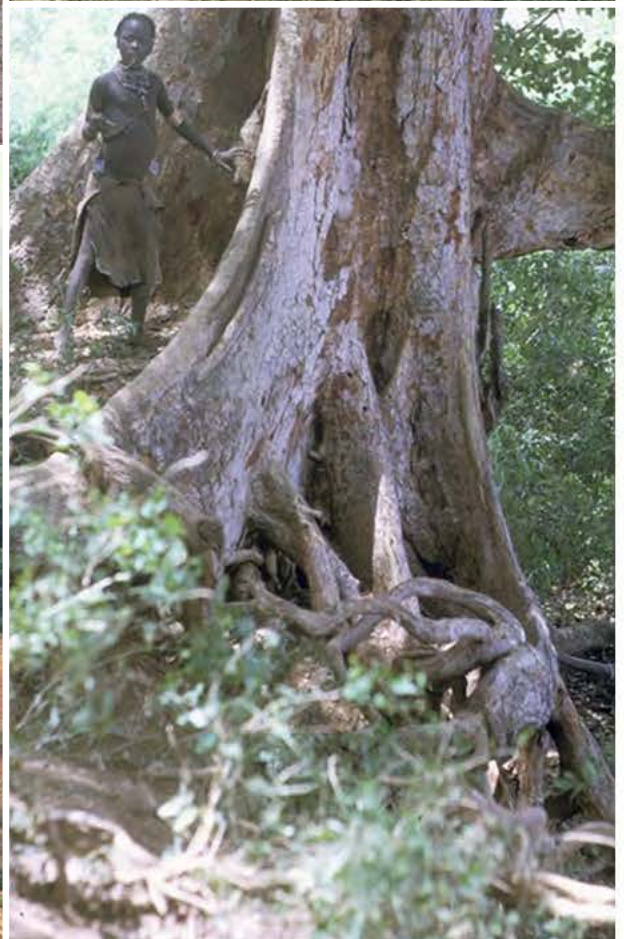
The riverine forest is a highly delicate community type, with emergent trees extending to 30 meters, with a secondary level of spreading shrubs. Large portions of the landward side of the forest are dominated by shrub thicket with vines and succulents. Some inside bends receive sufficient subsurface inundation of Omo River floodwater to create grassland swamps (Photo 17).

- All aspects of the Omo riverine forest and its importance to the survival systems of the region's indigenous people are either omitted or misrepresented in the GOE's assessment.<sup>29</sup> They are
- The GOE's supposedly field based data for this lowland forest system is in fact information from higher altitude forests. Both the floristic and structural characteristics described in the GOE's assessment are inapplicable to riverine forest in the entire Kara, Nyangatom and Dasanech region. This difference stems from divergent rainfall, soil and water conditions in the two types of environment.
- The failure of the Ethiopian government to study the lowland forests or to consult existing literature concerning this zone invalidates its conclusion that the forest will be preserved, even '*benefit*', following the radical flow volume changes of a regulated Omo River.

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<sup>29</sup> The illusion of scientific study in the GOE assessment is created by the GOE's use of specificity –for example, species lists for forest vegetation – although they are inapplicable to the region, as noted elsewhere in this report.

## Vegetation in the Omo Riverine Forest



**Photo Page 17. Omo Riverine Forest Vegetation.** Top left: *Ficus sycamorus* at at waters edge (with Dasanech man). Top right: Clear understory in mature forest. Center left: Sand spit along river with flood agriculture bordering well developed riverine forest (with colobus monkey, elephant, buffalo, monitor lizard and crocodile along river's edge). Bottom right: Highly buttressed, shallow rooted mature forest trees.

Investigation of the the Omo riverine zone (Carr, 1998) revealed a wide range of vegetation types that are associated with the forest, ranging from various types of grassland, for example, grasses with and without scattered trees and shrubs, and with different amounts of herbaceous ground cover. Shrub thickets are common throughout the relatively broad ‘transition zone’ from forest/woodland to the broad relict floodplains.

Complex depositional patterns and water conditions produce a mosaic-like pattern of these vegetation types, increasing the plant resources for grazing by livestock types with different nutritional needs and sensitivity to changing water and disease conditions. (Tsetse has been a problem in the forest for a number of decades).

Especially in recent years, the ongoing threat of conflict with neighboring ethnic groups - themselves desperate to access the region’s disappearing resources – has become a primary factor in herding decisions by all groups, including the Nyangatom.

The figures shown from the author’s study (*ibid.*) summarize some of the structure and floristics of those communities as well as their transition to the adjacent relict floodplain.



**Riverine forest transition to upland plains, with Omo River subsurface water inundation supporting woodland and grasses essential for livestock grazing during prolonged drought and other hardship periods.**

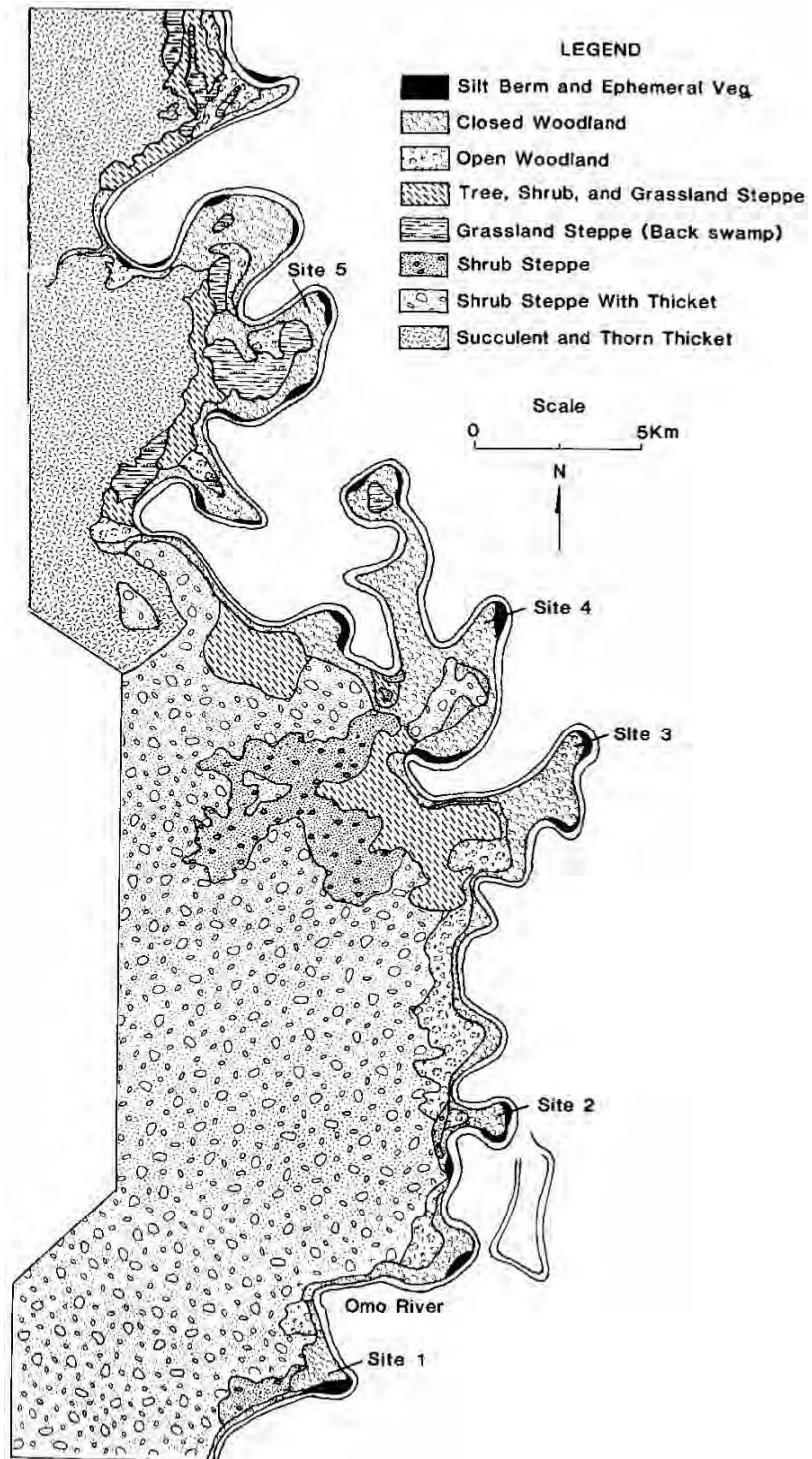
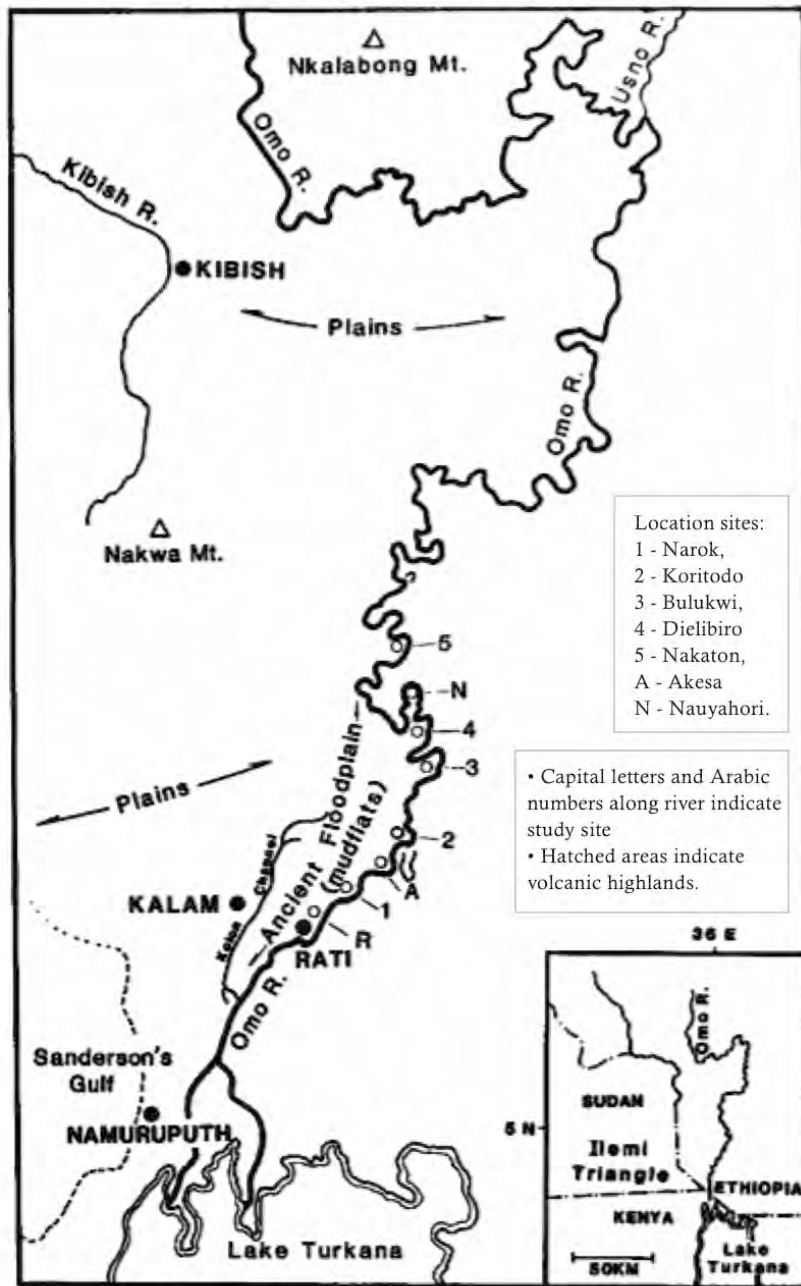


Figure 2. Riverine vegetation types along the Lower Omo River.

Locational map for Lower Omo River Basin Study



- Location sites:
- 1 - Narok,
  - 2 - Koritodo
  - 3 - Bulukwi,
  - 4 - Dielibiro
  - 5 - Nakaton,
  - A - Akesa
  - N - Nauyahori.

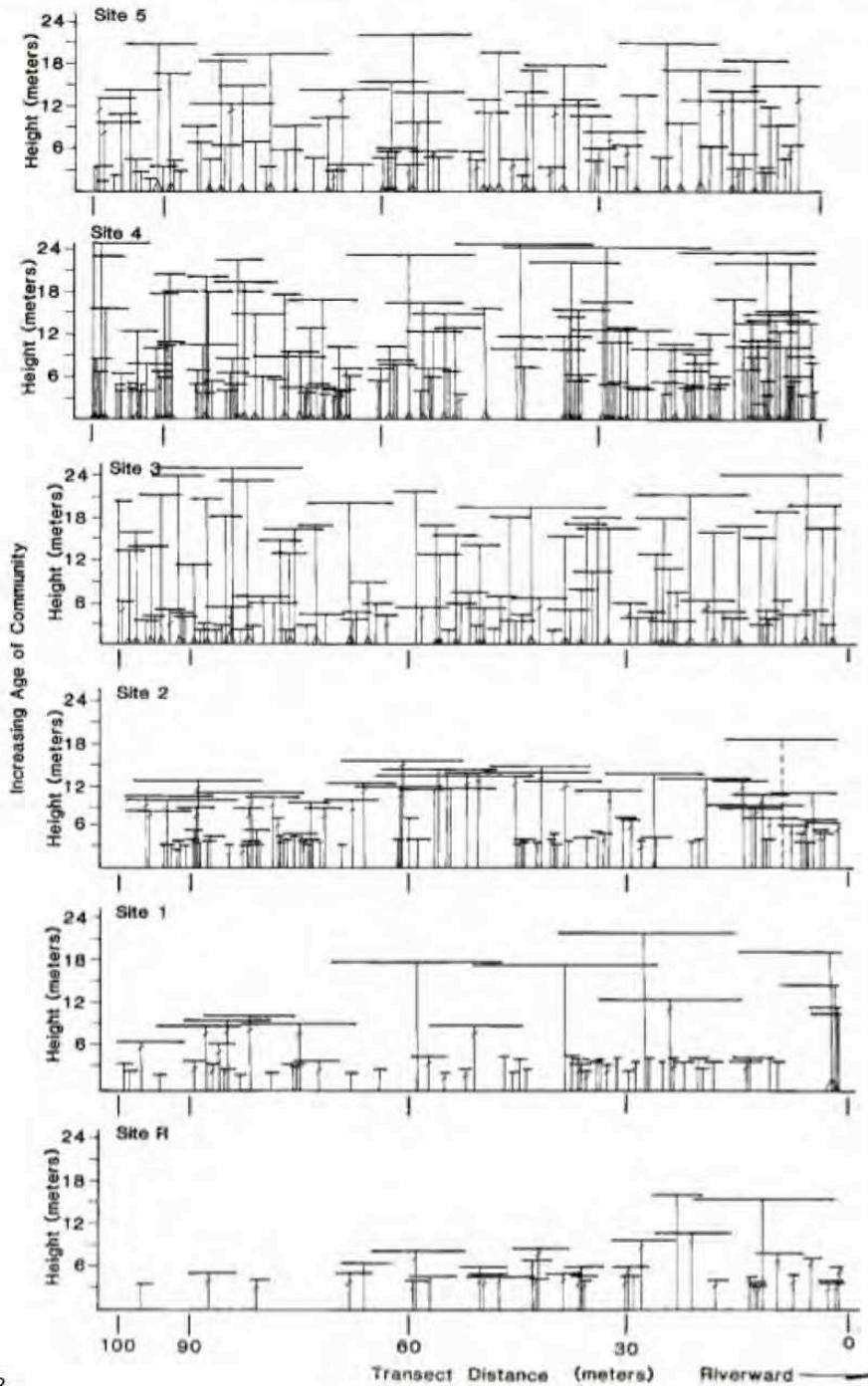
- Capital letters and Arabic numbers along river indicate study site
- Hatched areas indicate volcanic highlands.

C. Carr, 1998



Riverine woodland and forest structure profiles in order of increasing age of site development.

'Birdfoot' base indicates multiple stem at ground level; diagonal cross on stem indicates buttressing.



C. Carr, 1998

- **The rich wildlife populations in the Omo riverine forest, nearly undisturbed for centuries prior to now, would be exterminated by the Gibe III construction, due to elimination of their habitat.**

Wildlife in the Omo riverine (or ‘gallery’) forest zone, includes the Nile crocodile, hippopotamus, elephant, kudu, buffalo, lion, leopard, kudu, monitor lizard, colobus monkey, grevet money, baboon, bushbuck, kudu, and a host of water-loving birds, including the fish eagle. In addition to the critical importance of the riverine zone to indigenous survival and to the region’s biodiversity, there is recognition by the Ethiopian governmental and international conservation organizations of the potential for conservation, park and tourism development in the Lower Omo region. Wildlife experts at the University of Addis Ababa describe the area as the second richest wildlife area of Ethiopia, underscoring its importance to Ethiopia’s natural heritage.

- **The death of the riverine forest along the lower Omo would result from its extremely delicate adaptational response to the natural amplitude and extremes of river flow.**

Due to its highly sensitive root systems have evolved in adaptation to these patterns of soil moisture and subterranean nutrient replenishment (since overbank flooding of along the natural levees does not occur upstream from the modern Omo delta).

Riverine forests in semi-arid/arid regions throughout Sub-Saharan Africa have without exception been eliminated by river flow reduction from large hydrodam construction – in all cases, dams much smaller than the proposed Gibe III. In the African Horn and East African region alone, these riverine forests include those along the Awash River, Tana River, and Turkwel.

**The level of soil moisture from the Omo River, should the Gibe III dam be completed, would be comparable to that of the present dry season: this would be entirely inadequate for survival of the forest and woodland species of the riverine forest.** This riverine vegetation would in fact be destroyed from lack of water, particularly the long established and necessary period of retention of river waters by soils (‘**residence time**’) for the root systems of the complex forest ecosystem: that is, the duration of soil moisture retention during high river flow periods. This is a critical variable in the survival of the forest.



A group of Nile crocodile along a silt berm of the Omo River.

## Ethiopian Government Eviction of Indigenous Communities for Commercial Irrigation Agriculture

- The Ethiopian government has been implementing a major program of forcible eviction of Dasanech (and Nyangatom) communities from their riverine lands for several years, in order to establish hundreds of thousands of hectares of large, irrigated commercial farms.
- The government's expropriation of indigenous flood recession farmlands and settlement areas, along with the major diversion of Omo River waters for commercial irrigation systems, are devastating the Dasanech's last option survival systems.
- Most of the thousands of Dasanech dispossessed in this way have no choice but to move into the Omo Delta, where they search for available farming and grazing areas, or along the northeastern Lake Turkana shoreline. Some of poorest among them take up fishing
- The Gibe III dam would cause the drying out of Omo delta lands - ironically, the very areas the Dasanech are being forced into. The dam retreat of Lake Turkana's northern shoreline by *at least* 10 kilometer (undoubtedly increased by river diversion for irrigation) would destroy planting, grazing and fishing for tens of thousands of Dasanech.
- The GOE's planning and impact assessment documents omit its plans for indigenous expropriation and establishment of commercial enterprises - instead, positing extensive 'community development' and 'social services'. It continues to misrepresent its current actions in official communications.  
Political repression and fear pervade the entire Dasanech region, with numerous reports of intimidation, beatings and arrests.  
Events involving torture have also been reported by villagers.
- The World Bank, the African Development Bank and the Chinese government have apparently turned a blind eye to these actions and misrepresentations of the GOE.

- **Nearly every Dasanech village complex along the Omo River, including in the Omo Delta, has either been expropriated by the GOE directly, or has been impacted by the influx of desperate villagers (and their livestock) who have suffered eviction elsewhere.**

Thousands of Dasanech villagers, particularly along the west bank of the Omo River, are already blocked from their livelihood activities along the river, not only from seizure of their riverine agricultural plots and settlement areas, but also expropriation of grazing lands for their livestock.

Evicted villagers have few if any survival options, since they nearly all have too few livestock to move back into pastoral life where rangelands are severely deteriorated in any case. And they have few options for obtaining access to any alternative flood recession agricultural plots since for the most part these lands are already being utilized. Most of them move into the modern (active) delta region, where lands are already inhabited by tens of thousands of Dasanech.

- **Implementation of the Ethiopian government’s plan for hundreds of thousands of hectares of irrigated, large-scale commercial farms has been underway since late 2008 and 2009, despite Ethiopian government statements to the contrary. Both Ethiopian government and private commercial irrigated agricultural enterprises are being established.**

Although the GOE has long discounted any systematic or extensive plan for eviction and commercial agriculture, the European Investment Bank's 2009 Independent Review included a map of the GOE's projected commercial agricultural development along the Omo River (see below).

- Hundreds of thousands of hectares are already designated or formally 'leased' to corporate and private investors for irrigated commercial agriculture - some of these in partnership with the GOE itself, in the Lower Omo Basin. These are best documented upstream along the Omo River, in the higher altitude traditional territory of the Mursi, Kwegu and neighboring groups, where access is easiest and more specific information reaches the public domain.

For example, information at [www.mursi.org](http://www.mursi.org) (quoted by Human Rights Watch in its 2012 report on the Gibe III crisis) details that ‘30 of the 52 (58 percent) Mursi and Kwegu “villages” are in the areas that are either delineated for sugar plantation development or are in the lands being actively marketed by the government of Ethiopia for agricultural development. 114 of the 157 (73 percent) Mursi and Kwegu sites that are identified as “agriculture” (cultivation sites) are in the areas that are either delineated for sugar plantation development or are in the lands being actively marketed by the government of Ethiopia for agricultural development.’ Two sugar block plantations alone (in the map provided by [mursi.org](http://mursi.org) and verified by GOE documents) total more than 162,000 hectares, and there are 245,000 sugar plantations planned altogether.

- **In Nyangatom and Dasanech territory along the South Omo, commercial farms are already planned or already with construction underway on more than 120,000 hectares – and by some information provided to SONT researchers – considerably more area.** All of these farms are irrigation dependent and involve major physical infrastructure construction, including several large canals. Such water diversion from the Omo River means inevitable major reduction of flow into the entire lowermost segment of the river This reduction is of

course in addition to the 60 – 70 percent flow volume reduction from the planned Gibe III dam itself.

The major crops planned for these commercial farms are cotton, sugar and oil palm, destined for a combination of international export markets and Ethiopian urban markets. These are high water consumption/chemical requiring crops, so that major water diversion is necessary, along with chemical discharge into the Omo River from the farm – with major impact on Lake Turkana, as well. The extensive irrigation systems, including a large number of diesel pumps for water diversion and large canals is already partially constructed and expanding.

Private investors along this segment of the river are of Indian, Chinese, Ethiopian and European nationalities.

- **The GOE's eviction of Dasanech (and Nyangatom) from their flood recession farms and settlement areas is evidence enough of the government's actual development intentions in the South Omo.** Its commercial priority over the survival of its own indigenous population is underscored by its communications with the international business community.

The administrator of Debub Omo Zone, Kaydaki Gezahegn, told Fekadu Beshah in an interview for *Fortune* magazine,

*'We granted the land to the company along the Omo valley, which is the most suitable area for the plantation of palm oil, to encourage investors to come to the region with the prospect of exploiting this huge potential'.<sup>30</sup>*

Although recently removed from the SNNPRS (Southern Nations, Nationalities and Peoples Regional State) section of the GOE's website, the Board on Investment long advertised the 'unlimited' industrial agribusiness, tannery and other industrial opportunities at Omorate and along the lowermost Omo River. The Italian electric power firm planning a 20,000 hectare palm oil plantation, with GOE/company acknowledgment that the palm oil is inedible (highly acidic) and useful only as an industrial input (for plastics, car parts, soap, furniture and other products).

- **The Ethiopian government maintains that the following conditions prevail in the South Omo – all of which have been shown by SONT research to be major misrepresentations of reality.**

- The South Omo project area is *'hardly inhabited at all except at a widely scattered pattern', and that the population density 'at the South omo [sic] project site is below 5 persons per square kilometer'.<sup>31</sup>*

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<sup>30</sup> There is extensive literature on ecological damage from commercial scale palm oil production. Despite this, an Ethiopian agricultural economist, Abas Gerasu, in support of the GOE's promotion of palm oil production, unabashedly stated to *Fortune* that 'palm oil is vegetation friendly and has no negative impacts on the environment.'

<sup>31</sup> These (italicized) statements were made in a letter from the Minister of Federal Affairs in the GOE, in response to a letter from Human Rights Watch in November of 2011. They are representative of numerous statements issued by the GOE's EEPKO and other key government officials.

To the contrary, SONT researchers documented thousands of Dasanech living in major village complexes along the west shore of the Omo River riverine zone in close proximity to one another, as indicated in Figure 12.<sup>32</sup> This condition is manifest, even to the casual observer visiting the riverside zone.

- The government *‘will not displace a single person involuntarily in Gambella or elsewhere in the country’*.

Those villages that SONT witnessed first hand had been evicted from their flood recession agricultural lands and in some instances, from their settlements as well are listed below. These evictions alone have targeted thousands of Dasanech on the west bank alone.

- *‘An irrigated land of 0.75 hectares of land each is prepared for 2050 households. There will not be any land scarcity for any family with a capacity to produce more. Training on improved agronomy practices, technology inputs and livestock management including range land will be provided’*.

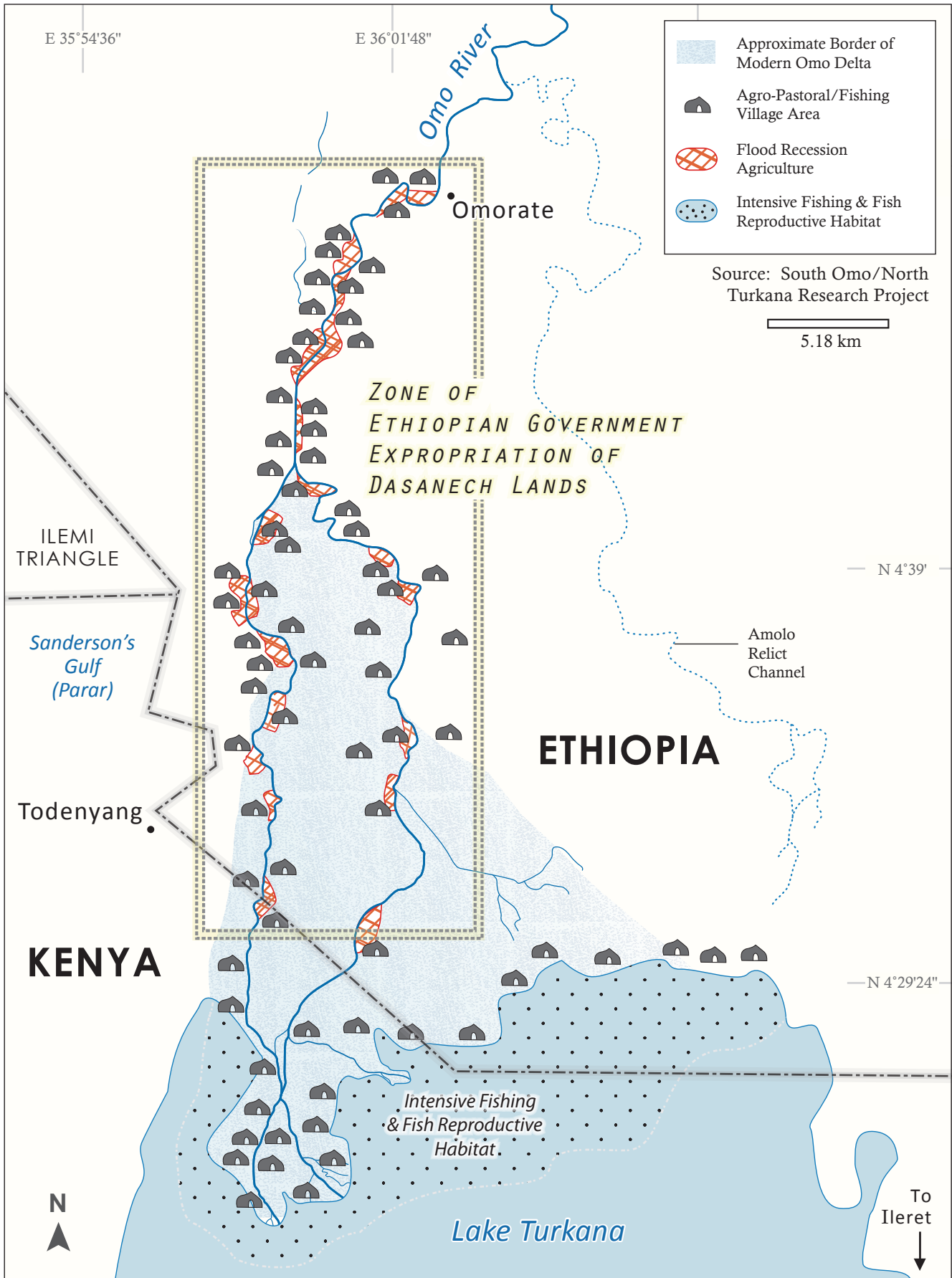
This statement is false. The communities listed below include those whose riverside farming areas have been simply expropriated. There are expropriated communities where a small number of young Dasanech (for example, 20 to 70 or hundreds of villagers evicted – or more commonly, thousands). Even these more ‘fortunate’ individuals are removed from their livelihood networks and generally incorporated as ‘wage laborers’ into the new commercial schemes, to the detriment of the society, more generally.

These false assertions by the GOE are accompanied by the myth of ‘excessive flooding’ and ‘major destruction of human life and livestock’ repetitively occurring along the South Omo. This statement, along with that of overbank flooding along the Lower Omo more generally, was dealt with in Section 6 of this report.

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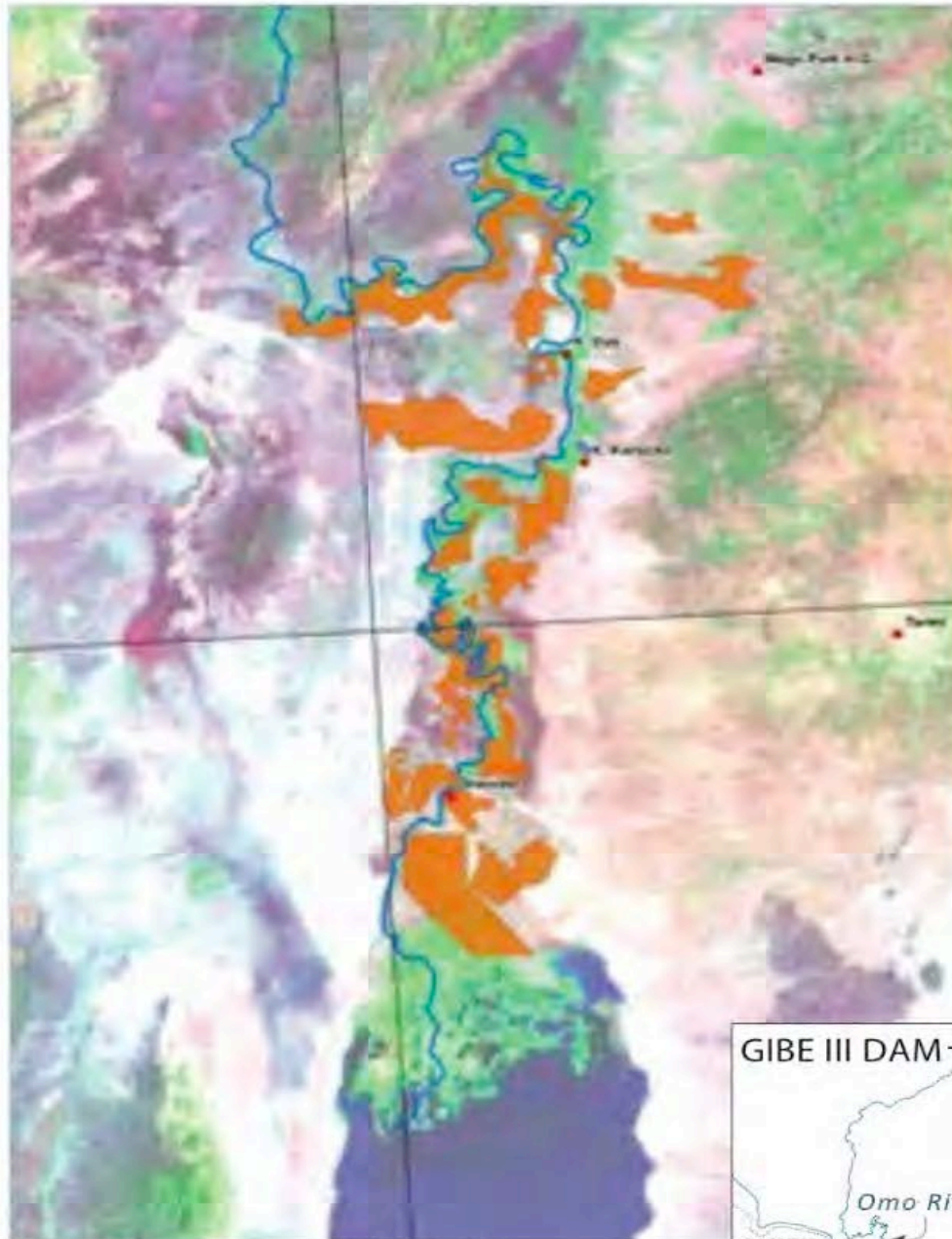
<sup>32</sup> For the convenience of the internet reader, the Fig. 12 map, summarizing present day Dasanech riverine villages and zone of expropriation/eviction, is reinserted on the next page.

**Fig. 12. Dasanech Villages along the Omo River and Government Expropriation Zones**



## Planned/Potential Irrigation Agriculture in the Lower Omo River Basin

Identified by the Government of Ethiopia



Imagery Source: Government of Ethiopia



Map reproduced from EIB Independent Review, 2010 ( p. 34); inset added.



**The Ethiopian government maintains that the following conditions prevail in the South Omo – all of which have been shown by SONT research to be major misrepresentations of actual conditions.**

- The South Omo project area is *'hardly inhabited at all except at a widely scattered pattern', and that the population density 'at the South omo [sic] project site is below 5 persons per square kilometer'*.<sup>33</sup>

To the contrary, SONT researchers documented thousands of Dasanech living in major village complexes along the west shore of the Omo River riverine zone in close proximity to one another, as indicated in Figure 12. This condition is manifest, even to the casual observer visiting the riverside zone.

- The government *'will not displace a single person involuntarily in Gambella or elsewhere in the country'*.

Those villages that SONT witnessed first hand had been evicted from their flood recession agricultural lands and in some instances, from their settlements as well are listed below. These evictions alone have targeted thousands of Dasanech on the west bank alone.

- *'An irrigated land of 0.75 hectares of land each is prepared for 2050 households. There will not be any land scarcity for any family with a capacity to produce more. Training on improved agronomy practices, technology inputs and livestock management including range land will be provided'*.

This statement is false. The communities listed below include those whose riverside farming areas have been simply expropriated. There are expropriated communities where a small number of young Dasanech (for example, 20 to 70 or more commonly, thousands) are evicted – or more commonly, thousands). Even these more 'fortunate' individuals are removed from their livelihood networks and generally incorporated as 'wage laborers' into the new commercial schemes, to the detriment of the society, more generally.

These false assertions by the GOE are accompanied by the myth of 'excessive flooding' and floods causing 'major destruction of human life and livestock' along the south Omo. This myth was dealt with in Section 6 of this report.

- **The Ethiopian government repeatedly describes its 'consultation' with local communities. Communities throughout the west bank riverine zone, where eviction is most pervasive and devastating, testify to the exact opposite situation.**

According to local residents throughout the region, the Ethiopian government simply orders local residents to vacate their flood recession, riverside grazing along the river and entire village areas, with no warning or 'consultation' whatsoever. Any resistance or even questioning brings swift and severe reprisal.

<sup>33</sup> These (italicized) statements were made in a letter from the Minister of Federal Affairs in the GOE, in response to a letter from Human Rights Watch in November of 2011. They are representative of numerous statements issued by the GOE's EEPKO and other key government officials.

The Dasanech, along with their Nyangatom neighbors upstream, had virtually no warning of the evictions afoot, just as they have had no warning of the government's plans to build the Gibe III dam upstream from them. As of 2011, very few local residents had the slightest idea of even what a dam is, let alone how profoundly the Gibe III dam would affect them.

Dasanech (and Nyangatom) resistance to eviction is almost impossible, since reprisals are immediate and severe. There are clear reports of beatings, jailing and even torture of those who have resisted or even questioned their expulsion by the government. On occasion, Nyangatom villagers – equipped with arms they have obtained from South Sudan, have attempted to resist the government's actions, but the government has quickly quelled these. These events are well known to local residents throughout the region.

'Consultations', according to local police interviewed by SONT, consisted of a few government representatives, local police and local residents 'trusted' or closely aligned with the government, wherein they were simply informed that there would be 'great benefit' for everyone in the Lower Omo with a new development of the Omo River. One local government representative in Omorate stated directly to SONT that he had assisted in the 'filling out forms' of approval by local community members. Development bank documents make reference to the consultations carried out by the GOE, but these rely entirely on the GOE's description of its actions, not that of local residents.

Overall, a strong *culture of fear* prevails throughout the lowermost Omo region, particularly in the face of the 'yadik' police, as they are termed by local residents. These police are outsiders, rather than recruited locals. Unlike the local police, they are often hostile to local residents and carry out reprisals against local residents without hesitation. This Ethiopian police component remains relatively isolated from the local population, although with a base in Omorate, and the Dasanech and Nyangatom fear its harsh measures.

They do not have sufficient livestock to return to the dryland plains as pastoralists nor can most of them find sufficient alternative flood recession agricultural plots for their subsistence, since these depend on finding lands not yet being exploited and in areas where they have strong social ties (defined in societal segment and clan terms). The vast majority of those evicted are forced to move to the modern (active) delta with whatever livestock they may have retained. Here they must beg other Dasanech for access to increasingly overcrowded planting lands and agreement for their livestock to graze. Some of them try and take up fishing, often even further toward the lakeside villages within the Omo Delta.

- **The resultant rampant hunger and malnutrition, along with loss of recovery potential of thousands of Dasanech evicted from their riverine locales has inevitably increased their aggressive stance toward neighboring Turkana and Nyangatom, ratcheting up levels of livestock raiding, killings, and general armed conflict throughout the region. This**

increasing conflict has ushered in new and harsher Ethiopian police action, creating ever-increasing repression and fear throughout the region. Paradoxically, the increased government repression - reported by Dasanech villagers to include beatings, jailing and an increasing fear of government surveillance helps sustain the government's program of eviction and development of and commercial enterprises.

- **Expropriation and eviction plans and activity by the GOE are omitted from their planning and impact assessment documents. The active solicitations of private investors by the government are also omitted.** While the European Investment Bank Independent Review of 2009 offers some detail of irrigation plans, it does not notate the actions already underway, nor does it question the impact of these plans on indigenous communities. The 2010 AFDB report ignores these irrigation plans, except to note that in the event that such development occurs, a new Environmental Impact Review would be necessary; this point was omitted from any major visibility in the AFDB hydrology review of the project, despite the fundamental impact on lake inflow of such development.<sup>34</sup>

➤ **The GOE's evictions of villagers from their lands and settlements along the Omo River is already extensive, and expanding**

Those indigenous settlements experiencing the greatest eviction impacts these include the following, as of mid 2012, include the following:

### **THE ETHIOPIAN GOVERNMENT'S EVICTION OF DASANECH VILLAGERS FROM FARMLANDS & SETTLEMENTS**

#### **WEST BANK OF THE OF THE OMO RIVER (2009 – 2012):<sup>35</sup>**

- Goto:** Eviction from extensive flood recession agricultural lands.  
Thousands forced to evacuate to find new resource areas for planting, livestock grazing.  
Large commercial farm established
- Damish:** Eviction from extensive flood recession agricultural lands.  
Most households forced to find new resource areas for planting, livestock grazing.  
Large-scale irrigated commercial farm established.
- Nyemomeri:** Eviction from extensive flood recession agricultural lands.  
Eviction of village complex (Evangelical missionary operations remain)  
Major canal construction westward, creating barrier to livestock movement.  
Large commercial farm established; water works

<sup>34</sup> The AFDB consultant carried out reconnaissance of the region for his review of Gibe III's hydrological impacts on Lake Turkana and had to have seen the irrigated agricultural enterprises being built along the lowermost Omo River. But it was mentioned in the review in purely hypothetical terms. While the same consultant provides details of such development in his November 2012 report, its absence from the 2010 review - that most influential in securing investor and development bank funding - is inexplicable.

<sup>35</sup> Many thousands of Dasanech evicted from the West Bank of the southernmost Omo River, from the Omorate latitude (Fig's 2 and 12) southward into the modern Omo Delta.

(Small number of Dasanech incorporated as wage laborers)  
Population forced to find new areas for subsistence (for  
planting, livestock grazing; some undertaking fishing)  
Villagers remaining in the region highly subject to Turkana attack.

**Akudingole:** Eviction from extensive flood recession agricultural lands.

Villagers forced to find new areas for subsistence (for  
planting, livestock grazing; some undertaking fishing.

**Salany (Salin/Selegn):** Eviction from flood recession agricultural lands.

Highly vulnerable to attacks by Turkana; Plains lands severely degraded  
by livestock overgrazing, due to exclusion from riverside lands.

Many villagers forced to move, primarily into modern Omo Delta.

**Kolon Lochuch:** Many villagers evicted from flood recession plots; some Dasanech  
farms remain.

Village remaining, but a substantial percentage of the population forces to leave  
in search of new planting locales.

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**Dasanech communities downstream from the above village complexes are heavily  
impacted by the influx of households evicted from their recession  
agricultural lands.** These impacts are threefold as the newcomers:

- (1) Beg for use of their already exploited recession agricultural lands,
- (2) Bring their remaining livestock that add grazing pressure to already heavily  
utilized Omo Delta pastures,
- (3) Take up fishing (the poorest households, at least).

#### **EAST BANK & INTERIOR OF MODERN (ACTIVE) OMO DELTA:**

**Afewerk/Afor:** Government run large farm – established early (2006).  
Dasanech

**Kapusie:** Government run large farm - established in 2006/2007.

**Ediporon:** In the modern Omo Delta; No agricultural land but impacted by the  
influx of evicted villagers and their livestock into the delta.

**Bokom** (both west shore & delta interior villages): impacted by new settlers and their  
livestock. Flood recession agriculture land heavily impacted by influx of  
evicted Dasanech from villages upstream.

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**Fishing villages** in lowermost delta and along Lake Turkana northern shoreline are also  
heavily impacted by the poorest Dasanech who take up fishing.

**The thousands of Dasanech pushing into the annually flooded modern Omo Delta lands as a result of the Ethiopian government's evictions of villagers from the riverine farm and settlement lands face a new and barely imaginable future if the Gibe III dam is completed. They will have to make way for the dam's major program of irrigated commercial agribusiness development to take place.**

**The very lands that most of the Dasanech are now being forced into – the Omo Delta and lands nearby, along the lake - would be desiccated as radical Omo River flow reduction and Lake Turkana retreat set in, even in the earliest phase of reservoir impoundment. The bathymetric maps of Figures 7 and 14 were introduced to indicate the extent of this drying out. The devastating effects of this process are clear.**

➤ **There is historical precedence for the expropriation of Dasanech lands and eviction of villagers, involving both expulsion of the Dasanech (and Nyangatom).**

Following the overthrow of Haile Selassie in the mid-1970s the then new military regime (the 'Dengue') greatly increased the government's presence in the Lower Omo region. Until that time, little had been impacted by direct government presence although the pastoral groups had been forced out of large territories by Ethiopian & Kenyan government restrictions and by neighboring ethnic groups who were themselves increasingly confined.

- The government's establishment of the 'frontier style' town of Omorate along the East bank of the Omo (Fig. 2) furthered the displacement process of prior years and led to rapid incursion of traders as well as elements bringing alcohol, prostitution and other social problems previously unknown to the indigenous communities.<sup>36</sup> Within a relatively short time, Omorate became the hub of a 'development' program focusing on the development of large-scale plantation agriculture, with the rationale of settling the pastoralists. Highland agricultural officers in Addis Ababa viewed this as 'for their benefit'.<sup>37</sup>

Omorate (including Addis Ketema ("New Addis")) originated as the Ethiopian government's police and administrative center, as well as a town of trade, by the 1980s. This has resulted in an unprecedented mixing of Dasanech, Nyangatom and Kara people, as well as a large population of individuals from numerous ethnic groups of Ethiopia and beyond. This new social influx, combined with the increasingly desperate economic conditions of the local people, the essentially unbridled power of local officials and various forces of corruption, has also brought

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<sup>36</sup> In recent years, the social problems have worsened in not only these general terms, but also in destroying the cultural fabric of youth/elder relations (viewed as "progress" by the dominant social forces from the highlands, for the most part), introduced HIV infection in significant scale and quickly marginalized whole new segments of the local population.

<sup>37</sup> The author personally discussed plans for such development with officials from the Ministry of Agriculture, for example. These individuals described their objective of 'settling the Dasanech (they termed 'Geleb') and 'teaching them to grow tomatoes' and to drop their 'primitive ways'.

widespread prostitution, alcoholism, sexually transmitted disease and crime – phenomena completely unknown to the area prior to the 1980s.

- The 1980s incursion by the national government for agricultural ‘development’ and new police/administrative presence came on the heels of many years of Christian evangelical missionary presence along the lowermost Omo, with the government approved seizure of Dasanech riverine lands that were common property. The institution of small-scale agriculture (with windmill driven irrigation for growing non-indigenous crops that were considered to be superior by the missionaries) was combined with missionary demands for local participants to become Christianized.

- The predecessor to the recently announced Italian palm oil plantation was a large commercial cotton enterprise Ethio-Korea Joint Agricultural Development Project, established in the 1980s, under the Ethiopian dergue. This venture was set up just north of Omorate on the river's east bank, in the silty clay soils of the ancient (relict) floodplain). As elsewhere throughout the Lower Omo Basin’s relict floodplains, the soils have numerous sinkholes and cracking networks, with cracks extending to depths of more than 4 meters. These features, combined with soil texture and high evaporation, easily produce salt accumulations. Predictably, the venture was a failure, including under subsequent non-governmental organization management, with resultant major salt concentration, radically decreased soil quality and invasion by persistent non-indigenous plants that are unpalatable to livestock.

The destruction of the Korean plantation-style irrigation ‘experiment’ was highly predictable, as it is for the irrigated commercial farms presently being set up by the GOE in vast areas of comparable silty clay soils in the ancient floodplains.<sup>38</sup>



**Dasanech family at flood recession farm on the Lower Omo’s west bank**

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<sup>38</sup> This early commercial irrigation agriculture, as that underway now, was similar to agribusiness within the Awash Valley in eastern Ethiopia, where both Oromo and Afar pastoralists have suffered eviction and radical livelihood impacts from reduction of Awash River flow volume, due to the Koka Dam upstream.



**Cracking silty clays in relict floodplains, where irrigated commercial farms are being established.**

- Another large expropriation of Dasanech communal grazing land was carried out on the East Bank. This was the Afewerk Plantation, a 10,000 hectare unit, south of Omorate, appropriated by an Ethiopian highlander favored by the dergue. This enterprise was abandoned when the then head of the military government, Mengistu Haile Meriam, fled the country in 1991. The land was later used by the present government's settlement of people displaced by the large flood of 2006, for commercial production.

Individuals at this plantation noted to SONT researchers that they were ordered into the new settlement by the government, even though they wished to return to their traditional village areas after the unprecedented, but ultimately nondestructive, 2006 flood subsided. Communal landholding and exchange systems were replaced by delimitation of individual farms and expulsion of all Dasanech but designated participants. Dasanech farmers here are required to grow specified crops for the government's storage facility and for marketing in Omorate and beyond.

The GOE states that its grain storage there is for the Dasanech's use during times of hunger, Local Dasanech insist that hunger times already prevail and that there is zero assistance from the government, even in the worst of hunger periods. The Dasanech here view themselves as little more than wage laborers for the government.

- An Ethiopian non-governmental organization, EPARDA (Enhancing Pastoralist Research and Development Alternatives), formed in the late 1990s by Ethiopian highlanders, initiated several small irrigation schemes on the east and west banks in Dasanech territory (and one in Nyangatom territory). EPARDA projects were set up based on individual plots, not communities with traditional labor and exchange networks. Just as they were expanding in the region, even initiating artisanal fisheries projects, EPARDA was closed down by the GOE in 2006, as the Gibe III project was being initiated and when they disagreed with the GOE's official description of the Omo flood as a 'disastrous' one, with major losses of human life and livestock.

- A prominent evangelical church in Ethiopia (the Hiwot church) has long undertaken small riverside agricultural projects on lands approved by the Ethiopian government. Also taken from common property lands and dating as far back as the 1960s, these missionary projects have expanded in recent years along both east and west banks of the Omo River. Small windmill driven irrigation is used, with 'participants' chosen by the Hiwot church for *individual over cooperative* farming. Non-indigenous crops (bananas, tomatoes, mangos, cassava, etc.) rather than the traditional millet, beans, sweet potato, pumpkin, maize and other crops consumed by local villagers, are grown. Dasanech farmers pay fees to the church for use of the windmills, tool sharpening. The impact on local systems of traditional land tenure, food and other product exchange, and social relations (including through required Bible learning) has been significant.

➤ **Expropriation, or eviction, plans and their implementation are entirely omitted from all GOE planning and impact assessment documents for the Gibe III project, as is information regarding the GOE's active solicitation of private investors for commercial agriculture and other industrial development in the South Omo.**

- The EIB's Independent Review mentions possible large-scale irrigation planning in the



Lower Omo Basin (and includes the GOE map of possible irrigation - shown above). However, the Review's primary attention in the matter is on prior GOE and EPARDA (Ethiopian non-governmental organization) small-scale irrigation projects in the region, with bare mention of large scale projects (except the Joint Korean-Ethiopian project at Omorate) and no mention of land expropriation. Although the EIB consultants spent considerable effort accurately describing some specific aspects of flood recession agriculture, they apparently felt obliged to accept, at face value, the GOE's assurances of its plans for agricultural development to benefit the indigenous population. Even the most rudimentary (five minute) interviewing of the Dasanech in the entire west bank area of the Omo River would have contradicted such statements by the GOE.

- The 2010 AFDB report essentially ignores the GOE's irrigation systems under construction altogether, except for the brief assertion that 'if' such development were to be planned, it 'would' require a new environment impact review. Even this comment, however, was embedded in the general text of the report, but omitted from the consultant's Summary and Conclusions. The AFDB consultant clearly had accessed the irrigation map and information included in the EIB Independent Review, and did reconnaissance of the Omo Delta region, so surely viewed some of the irrigation works and large canal construction underway.

An October 2012 report produced by the same AFDB consultant and published by Oxford University did include details from the irrigation development in progress, including as reported by Human Watch Watch and other organization. Yet the consultant's failure to identify this development in the 2010 hydrological review, a failure repeated in his 2010 representation of the AFDB in that agency's 'Compliance Review and Mediation' process with representatives from the non-governmental organization, Friends of LakeTurkana (FoLT) concerning the Gibe III, in fact provided critical legitimation for the securing of development bank and other investor support for the project and clearly thwarted further criticism of the project.



**Dasanech elders in in riverine zone of Omo Delta.**

## VIII. INDIGENOUS PEOPLES IN THE LAKE TURKANA REGION: VULNERABILITY OF KENYA’S TURKANA PEOPLE TO CATASTROPHE FROM THE GIBE III DAM

*‘We have lost our livestock and much of our lands to outsiders.  
Now we must fish, or we will all die.’*

Turkana elder male from lakeside village (Lowarengak)

- The life conditions of the northern (and central) Turkana – basically, from the Turkwel River northward to the Ilemi region – have emerged from more than one hundred years of colonial impacts in the Kenya/Uganda region, and the repercussions of these impacts for the Turkana and neighboring ethnic groups.
- The exclusion of central and northern Turkana pastoralists from large portions of their traditional lands has compelled them into overcrowded conditions producing severe overgrazing and loss of livestock. Coupled with prolonged drought, livestock disease and raiding by surrounding groups, at least 200,000 Turkana have now have been forced to migrate to Lake Turkana where they are dependent on fishing for their survival. Tens of thousands more Turkana rely on fish through barter or purchase, and thousands of Turkana pastoralists use the lake for ‘last resort’ watering of their livestock.

### **Turkana Pastoral Decline and Migration to Lake Turkana for Survival**

- The major human and livestock disease epidemics extending across Sahelian and East African drylands during the latter years of the nineteenth century resulted in famines striking the Turkana. By both written and oral accounts, these Turkana were left at slight advantage relative to surrounding ethnic groups, however, a situation facilitating raiding and appropriation of cattle by the Turkana from their pastoral neighbors, including the Pokot, the Samburu and the Dasanech.

From colonial travelers’ descriptions and the limited historical accounts available for the northernmost region of Turkana, along with oral histories recorded by the South Omo/North Turkana Research Project, the pervasive expropriation of Turkana land and livestock under the British colonial administration is clear (Gulliver, 1955; Lamphear, 1992); Collins, 2006). British domination of Turkana unfolded largely from its colonial base in Uganda.<sup>39</sup>

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<sup>39</sup> A small British post near the Uganda border (at Lokiriama) constituted an early foothold in the region, both for military and civil presence. Other military outposts followed. Headquarters of the British were to be transferred from Lorugumu to Lodwar by 1920: Lodwar has remained the center of administration since that time.

Dispossession of the northern Turkana during the end of the nineteenth century and in the early decades of the twentieth century occurred mostly at the hands of the British colonials, but also from Ethiopian and Kenyan competition for land and resources. Pressures from the Abyssinians, under Menelik, were strong by the first decade of the 1900s, but ‘protection’ by the British led to further dominance by the foreigners. The British preoccupation with Uganda and their interests regarding the Nile River were important in their treatment of the Turkana, and the British claimed the northern end of Lake Turkana (named Lake Rudolf by the explorer Count Teleki – after his patron, Prince Rudolf of the Austro-Hungarian empire).

A spike in Turkana hostilities followed the defeat of the northern Turkana in 1914-1915 by the British, as well as large-scale seizure of their livestock, with their neighbors (the Pokot to their southwest, as well as other groups). Increasing British military presence was established, particularly following World War I, when major confiscation of Turkana livestock and loss of land access led to real famine conditions.

- **An early settlement along Lake Turkana formed in 1924 as a displaced persons (‘famine’) camp at Kalokol (Fig. 1): these Turkana became some of the first to take up fishing.** Meanwhile, Lodwar became the new regional headquarters – which it remains to the present time. The entire central and northern Turkana region was described as suffering from extreme hunger, with conflicts building along the Turkana’s borders with their neighbors, including the Pokot, the Nyangatom and the Dasanech – all of whom were experiencing similar dispossession.

The British instituted a hut tax, with confiscation of Turkana villagers’ livestock as the penalty for nonpayment. Unrest in the region – in a small way a reaction to these and other aggressive policies toward the pastoralists – provoked further reprisals and the government declaring the region a ‘closed district’, a condition that persisted until the 1970s.

- **The British established the town of Lokitaung (Fig. 3) as their northernmost military post and their increased colonial presence brought whole new segments of the Turkana under subjugation.** Lokitaung was also the center for monitoring and controlling the Ilemi Triangle area, which was administrated by Kenya but with periodically redefined boundaries.

The widely described severe droughts of the 1960s had disenfranchised huge numbers of Turkana pastoralists: those who were obliged to take up fishing from displaced persons camps settled at Lowarengak (southwest of a prior established British military post at Todenyang (Fig. 3). The Todenyang post was adjacent to the Ethiopian-Kenyan border, close to the Omo River’s terminus at Lake Turkana; a strong contingent of the poorest Turkana were also settled there.

A small group of expatriates undertook to teach some of the poorest Turkana the practice of fishing. Like the Dasanech, the Turkana regarded fishing as undesirable in all regards, but necessity reigned and many of them became skilled fishers in short order despite their severely limited technology.

- The severe territorial losses of the Turkana due to government restrictions – worsened by land and livestock losses to equally pressured neighboring groups including the Pokot and Dasanech

as well as prolonged droughts – caused overcrowding of herds, in turn leading to overgrazing with ecological deterioration, loss of stock vigor and major increase in stock mortality. These losses have been particularly critical for the northern and central Turkana, and they were followed by waves of displacement and an intensification of conflicts with other ethnic groups in western and northwestern territories.

Additional herd losses have occurred from periodic government seizures and from failed ‘development’ programs causing livestock sell-off and mortality.

Taken as a whole, the Turkana’s dispossession over more than a half century has resulted from:

- Government restriction from large areas of traditional pastoral lands
- Government seizures of livestock as taxation or ‘reprisal’ from conflicts
- Raiding by neighboring pastoral groups
- Prolonged drought periods
- Failed ‘development’ program, with increased livestock mortality and sell-off.

- **Pastoral Turkana households have continued to experience a plummeting of their herds within the central and northern region during the past several decades. Overall, tens of millions of livestock have been lost.**

The Kenyan ministry for development of northern Kenya has generally characterized the crisis there as deteriorating in all (four) livelihood zones that it defines (pastoral, agropastoral, fishing and ‘peri-urban’), but neither the ministry nor the aid organizations active in the region have investigated the specifics of that crisis, or its causes.

- **Drawing on centuries old adaptive strategies, the pastoralists have responded to their major losses by trying to rebuild their herds, but when that is not feasible, by undertaking new means of survival.** The specific strategies used by herd owners have varied with their particular geographic (for example, pasture land access), environmental conditions (level of degradation of grasslands, etc.) and social resources (such as borrowing and labor sharing potential).

**Most prevalent among the recovery strategies of the central and northern Turkana are:**

- (1) Alteration of herd composition and herd mobility.** Herd owners have generally increased their reliance on small stock, or sheep and goats, rather than cattle (requiring more favorable grazing and water conditions). Some regions favor camels, which many Turkana herd while also maximizing their small stock. These different stock types are commonly sent to different grazing areas, requiring intricate planning and social cooperation. Herd owners typically have no choice but to send stock camps into wider

geographic areas for pasturage and water, such as the Ilemi region and areas overlapping with Nyangatom and Dasanech herders, despite high risk of raiding by those groups.

- (2) **Increased reliance on supplemental food sources with herding.** Key among these subsidiary activities by pastoral villagers is household based chicken raising– both for consumption and for sale, or barter of eggs, or, in some localities, charcoal production and marketing. A few Turkana have engaged in rainfed agriculture primarily in government or international aid organization development projects, but with little success due to insufficient rainfall throughout the highly aridic northernmost Turkana lands. Options for new types of subsidiary production or increased reliance on these particular activities are extremely limited for pastoral households, let alone for entire regions. The only remaining source of food for countless thousands of Turkana pastoral households is food aid, or relief efforts: such efforts constitute an essential lifeline in the region.

The clear limitations of these two major responses – especially with the quickening pace of ecological deterioration and herd losses throughout the region – have led to Turkana pastoral households having to resort to the next two strategies.

- (3) **Migration to Lake Turkana for fishing and ‘last resort’ livestock watering/grazing.**

A very large number of Turkana have now migrated to the lake in order to survive through ‘last resort’ watering and grazing of their remaining livestock, and for fishing. By the 1970s, the impoverishment of Turkana pastoralists and the inception of fishing as a ‘last resort’ subsistence means was becoming a dominant theme throughout much of the central and northern Turkana region west of the lake.

- (4) **Migration to towns or to internally displaced persons (IDP) camps.** For northern and central Turkana west of Lake Turkana, two of the major IDP camps are at Lodwar and Kakuma. These ‘refugees’ seek assistance, including any type of possible in IDP oriented towns. Other Turkana migrate to ‘spontaneous’ and sometimes more temporary camps (for example, in the transborder region of the Ilemi Triangle and at the national border and along roads), where assistance is makeshift and temporary, at best. Turkana is a net importer of food and most of the IDP focused towns (especially Lodwar) have recently undergone radical population increases, with nearly unprecedented drought periods, escalating food prices and other crisis conditions.

Results from SONT interviews with 90 household heads in two strongly pastoral northern Turkana localities clearly indicated that the dominant strategies of (shifts in herd composition and mobility, increased reliance on subsidiary food sources) have failed to adequately provide for the barest survival of the uplands based households. Consequently, they are increasingly turning to the latter two strategies, with occasional food aid now providing the major means of avoiding migration to the lake.

- Migration by pastoral Turkana to Lake Turkana for subsistence by fishing has occurred in several major ways, according to information derived from SONT village survey and in-depth life history interviews of pastoral and fishing household heads.

- (1) Large cattle herds, some camels → lost cattle numbers, emphasis on camels → small stock (goats, sheep) → cattle herds extremely small, camel herding removed from village, migration to locations near Lake Turkana, with seasonal reliance livestock grazing and watering at Lake Turkana and exchange of animal products for fish from lakeside villagers.
- (2) Large cattle herds (no camels, some small stock) → lost cattle numbers with sharp increase in small stock → move to lake with small stock; subsidiary production (some fishing, chicken raising, charcoal production/marketing) → few livestock remaining with growing engagement in fishing.
- (3) Small cattle herds (no camels), some small stock → cattle lost, very limited small stock → village move to the lake, few or no small stock, and full reliance on fishing (for consumption and exchange).

### **Last Option Survival at Lake Turkana: Present-Day Fishing Livelihood**

- **At least 300,000 indigenous peoples now depend on the fisheries of Lake Turkana for their survival. The majority of them are settled along Lake Turkana, particularly from Ferguson’s Gulf to the northern Kenyan border near Todenyang (Fig. 3).** These Turkana are in large complexes as well as diffuse settlements. They are primarily fishers, although some retain small livestock herds. A multitude of additional Turkana villages are established in locations slightly removed from the lake, from which they both herd their remaining livestock and participate in the artisanal fishing economy through offering fishing labor or through trade relations.
- Even though the majority of Turkana still depend on a pastoral economy (Makama et al, 2008), fishing has now become the last means of survival for the pastoralists, especially since they lack opportunity for flood recession agriculture.
- Recent SONT Surveys in lakeside fishing villages by the South Omo/North Turkana Research Project (SONT) reveal extreme vulnerability of this vast population to starvation and even extermination by the reduction of Lake Turkana that would result from the Gibe III dam.

- **As indicated in Fig. 5, these Turkana have migrated from a broad geographic range as herd losses have forced them to migrate to Lake Turkana and take up fishing in order to survive.**

Despite the failure of the Kenya government to determine the extent and specific character of pastoral economy collapse throughout the central and northern Turkana region, the fact that very large numbers of Turkana have recently taken up fishing and are essentially sedentary in villages along the lake is clear testimony to major losses of their herds following decades of disenfranchisement. This migration is continuing.

Those Turkana who now depend on fishing for their subsistence do so either directly – as independent fishers or wage-labor for other boat owners, or indirectly – for example, by preparing or repairing sails or fishing implements, drying and packaging fish for market, or assisting marketers. Very few individuals own their own boats). The scenes in Photos 18 and 19 are from shoreline villages along the extreme northwestern portion of Lake Turkana.

Tens of thousands of additional Turkana are part time participants in fishing or are pastoralist households relatively near the lake who exchange animal products (live animals, skins or milk, especially during wet seasons) for fish. These Turkana depend on these labor and product exchange relations for their survival during part or all of each year.

**Village complexes of both types, primarily fishing and pastoral/fishing, were identified for the region between Ferguson’s Gulf and the Kenya-Ethiopia border by SONT researchers. These are located and named in the map of Fig. 13.**

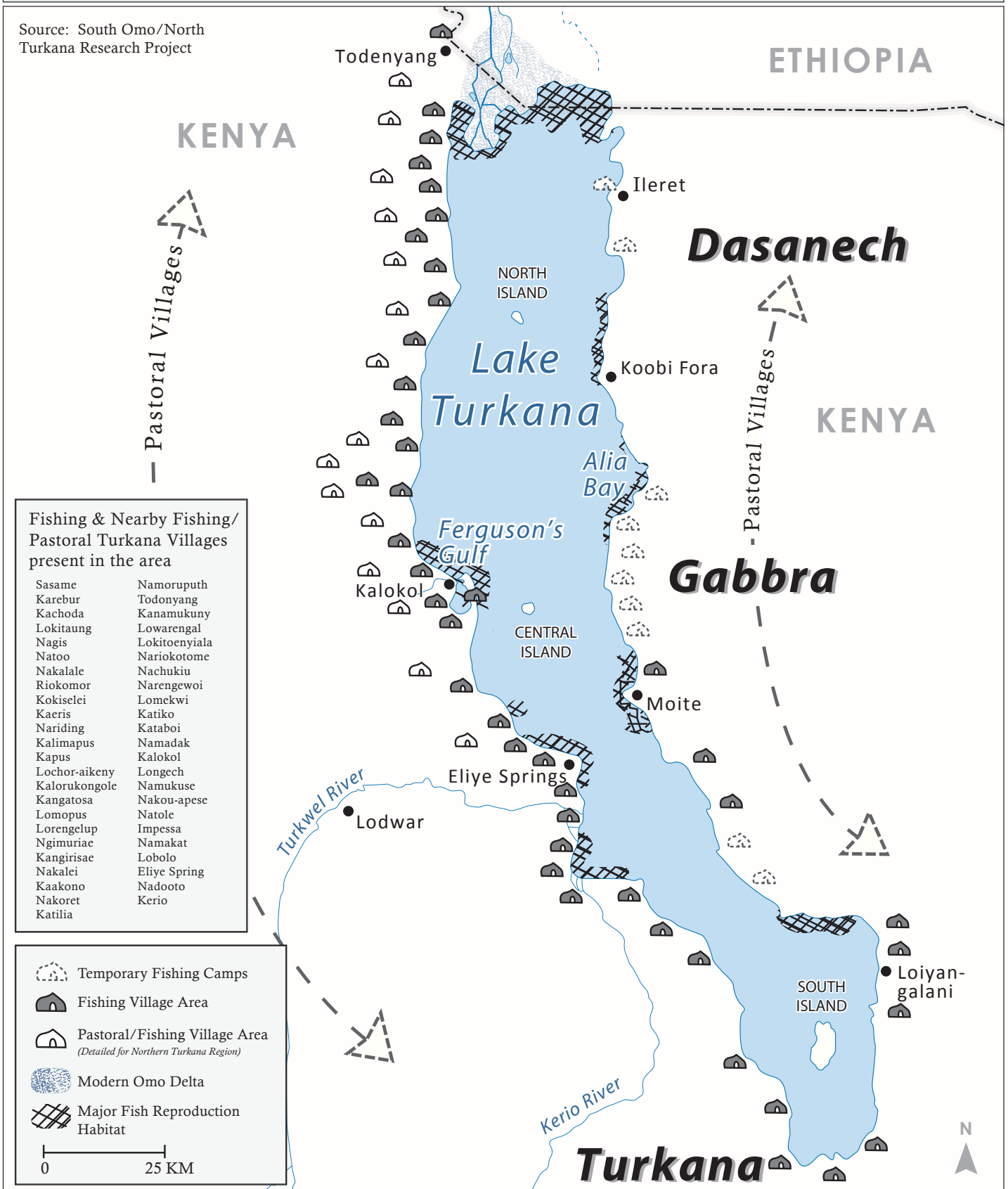
As indicated in Fig. 5, these Turkana have migrated from a broad geographic range as herd losses have forced them to migrate to Lake Turkana and take up fishing in order to survive. Many of them keep small amounts of livestock at the lake, where they share the limited grazing resources with the numerous herds brought for watering from the upland plains (Photo 20).

Despite the failure of the Kenya government to determine the extent and specific character of pastoral economy collapse throughout the central and northern Turkana region, the fact that very large numbers of Turkana have recently taken up fishing and are essentially sedentary in villages along the lake is clear testimony to major losses of their herds following decades of disenfranchisement. This migration is continuing.

- **Local fishers define seasons in terms of the combination of changes in winds, lake level, nutrients, and fishing conditions.** The seasons of Lake Turkana as defined by the dominant group depending on the lake's resources, the Turkana fishing communities, are shown in Table 5. All of the factors in that create fishing conditions in the lake would be drastically altered by even short-term cessation of the Omo River inflow, including the river's annual pulse of water, sediment, and nutrients entering the lake. The interplay of these different factors in creating fishing conditions would be drastically altered by even short-term cessation of the Omo River inflow, including the river's annual pulse of water, sediment, and nutrients entering the lake, let alone longer-term reduction of total flow into the lake. All of these factors are part of the calculus of fishing strategies for local fishing communities.

**Fig. 13. Turkana Villages Dependent on Lake Turkana Resources: A Fishing and Pastoral/Fishing Survival System**

Source: South Omo/North Turkana Research Project





## Fishing Livelihood Along Northern Lake Turkana



Photo Page 18. Turkana Fishing Villagers Along Western Lake Turkana Shore.

## Turkana Lakeside Fishing Villages



**Photo Page 19. Fishing Village Life Along Northwestern Lake Turkana Shore.** Top left: Lakeside huts with doum palm & acacia scrub. Top right: Turkana household mixed production: geese/chicken raising, fish drying for market. Bottom left: Dried fish pallets at roadside awaiting merchant purchase. Bottom right: Children in fishing family living near northern Kenyan border.

## TABLE 5. FISHING SEASONS FOR TURKANA FISHERS

### **SEPTEMBER to EARLY DECEMBER : ANAMAPOL ON\***

Omo River: Major inflow to Lake Turkana

Currents: Extremely strong southward current due to from Omo River inflow, facilitating movement of west shore Turkana fishers to eastern waters.

Winds: From the north - relatively mild to moderate.

Lake level: Generally at a maximum level in the northern portion of the lake, as well as in the lake's southern portion.

Ferguson's Gulf and bays with highest waters.

Fishing: Plentiful stocks and maximum catch.

Strongest currents around delta dangerous & avoided. Fish stocks around in shorelines & near shore areas particularly plentiful.

High level of movement by West shore fishers to East shore waters, but western near shore locales also fished. Up to one month trips..

Ferguson's Gulf - maximum fish available.

- Quiet backwaters, tiny bays ('Ahaar') forming in modern delta with fishing by local Dasanech.

### **DECEMBER to JANUARY : WAR GUDOHA**

Omo River: Swollen, generally at maximum level in delta/inflow zone.

Currents: Slowed considerably, wind controlled.

Winds: Extremely strong, from Southeast.

Lake level: Swelling increase ceases.

Fishing\*\*: Most lake travel suspended because of high winds.

### **JANUARY to APRIL: ALELES NGAITIA**

Omo River: Relatively quiet, low inflow to lake.

Currents: Moderate/ relatively slow.

Winds: Moderate, allowing traditional boats throughout the lake

Lake level: Northern waters (only) swollen.

Fluctuating, with varying rainfall patterns

Ferguson's Gulf - waters reduced - low level.

Fishing: Expeditions throughout eastern lake as well as northern shoreline and modern delta (day expeditions, due to Dasanech opposition).

Ferguson's Gulf – catch levels reduced.

Destinations dependent on boat type, gear, labor issues

### **MAY to SEPTEMBER:**

Similar to above 'Aleles Ngaitia' ) Strong fishing emphasis on northern nearshore waters, delta fringe and eastern shoreline. Ferguson's Gulf: low waters.

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\* Monthly periods are approximate- subject to fluctuation.

- **The Gibe III dam, in radically reducing the Omo River's flow – by at least 60-70%, not including the river water abstraction of major irrigation agriculture, would fundamentally**

**disrupt not only this seasonality of fishing, but fishing in general.** The artificial flood proposed by the GOE (and essentially unquestioned in all AFDB and other development bank reviews) would not mitigate the desiccation of the Omo delta or of Ferguson's Gulf and all other bays and shoreline areas.

**The destruction of Ferguson's Gulf and the northern shoreline area that would immediately ensue with even a 'minor' (2 m) lake level reduction, as viewed by the dam's proponents, is shown in bathymetric terms in shown in Fig. 14.**

Even the planned reservoir impoundment process, posited as 2 years by Gibe III developers but considered by experienced geologists to require multiple years if not an indefinite period of time, due to the highly fractured volcanic rocks bounding the reservoir, would bring a radical retreat of the shoreline and entirely desiccate the modern Omo delta, the northern shoreline, Ferguson's Gulf and Alia Bay.

➤ **Technology among Turkana fishers remains relatively simple and is generally geared to fishing in near shore areas, Ferguson's Gulf and similar habitats.**

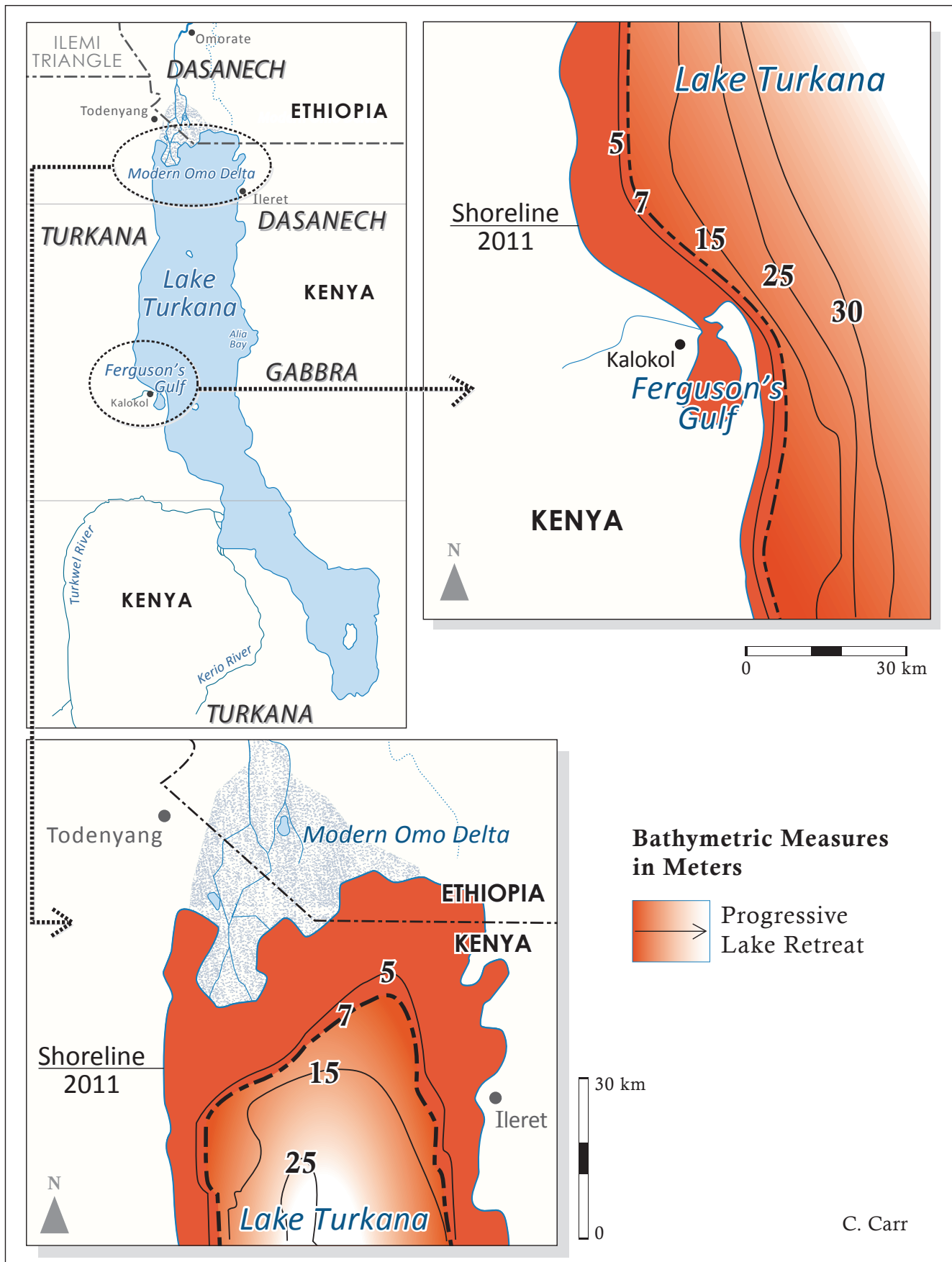
- According to Bayley (1982), substantial indigenous fishing did not emerge until well into the 1960's. This occurred through a combination of Kenya government, missionary and international aid organization initiatives over several decades. Fishing was regarded by the Turkana as a 'last resort' means of livelihood and only as a necessity when pastoral life has become inadequate – an orientation shared by the Dasanech to the North and others around the lake. The Turkana were aware of the practice, however, including through the neighboring El Molo group in the Loyangalani shoreline region (Fig. 2).

The Turkana started fishing primarily with basket nets introduced in the early 1960s for fishing in Ferguson's Gulf and near the Kerio River inflow to Lake Turkana. Some fishers turned to harpoons and also began constructing rafts by lashing together the trunks of doum palm trunks – a technology persisting through the present time.

- A series of ambitious but ill-conceived large-scale fisheries 'development' programs at Lake Turkana were initiated by the Kenya government and aid organizations, from the 1960s through recent years. Most of these have been at or near Ferguson's Gulf, although others in the lower Turkwel and Kerio River zones and northward from Kalokol (Fig. 2), along the lake have been significant. The Kenya government initiated fisheries 'training' by the mid 1960s and a Turkana 'cooperative' society was formed, marketing of fish. Turkana brought to Kataboi from their collection as 'internally displaced' households who had lost their livestock; they were issued nets – though little follow through was offered and success was limited.

When prolonged drought periods and pervasive hunger conditions struck in the late 1960's, the Kenya government drew a large population of Turkana to Kalokol where they were to be taught the ways of fishing; nets were issued to Turkana fishers at Kalokol and in Kataboi (north of Kalokol). The project failed, however, leaving a large number of the people stranded.

**Fig. 14. Projected Lake Turkana Retreat in the Modern Delta and Ferguson's Gulf**



- Gill nets eventually became dominant and they remain such through the present day.<sup>40</sup> For the most part, wooden boats have replaced doum palm rafts, although rafts are still used in Ferguson's Gulf and other relatively quiet waters. Wooden vessels are pointed at both ends and constructed from timber planks with a v-shaped bottom and up to 10 meters long, are propelled by paddles or sails. Sails are often fashioned from plastic bags from international aid brought to the region, and the Turkana are adept at repairing them as well. These canoe-like boats can also be adapted for motors. Very few Turkana can afford motorized boats, however. SONT research efforts recorded few owners of engine boats between Todenyang and Kalokol.

The economic crisis at hand, as described by most fishers to SONT, is insufficient funds for purchasing a boat at all – a pressing issue, since most fishers have few if any remaining livestock. Lack of funds for boat purchase is a universal complaint among Turkana fishermen among villages along the lake's western shoreline.

- **As sailing has become more familiar among the Turkana, the growing dependency on fish for survival has led to the fishers' navigation across broad areas of the lake, including with temporary camps along the eastern lakeshore.**

The SONT Project mapped the major fish reproductive areas along the eastern shoreline of the lake and these generally correspond to fishing camp localities: both are shown in Figures 7 and 14. Fishing camps along the eastern shoreline of the lake are established at considerable risk, given the interethnic competition for resources as all groups have been subjected to increasing struggle for survival. Just as herders' utilize a wide range of localities for their livestock, if available, fishers too frequent a wide range of localities although with definite and overriding seasonality changes influencing their movements.

Because of changes in the overall economy of the region and the increasing marginalization of Turkana who have taken up fishing, sails are essential for fishing over wide areas of the lake, particularly since very few fishermen can afford an engine. In fact, given the large population of Turkana depending on the lake, very few can afford a boat at all.

- These expeditions can last up to a month or so, with catch preserved by sun drying (and more recently, salting) being returned to the west shore villages; the duration of such trips is highly variable depending on a number of technical (e.g., size of boat) environmental (currents, winds) and social factors. In eastern near shore waters, Turkana fishers mingle

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<sup>40</sup> The Dasanech were barely engaged in fishing well into the 1970's. Only a few of the poorest Dasanech (named *dies*, or 'poorest people') undertook in fishing, while they learned from their Turkana neighbors in the border region. Dasanech fishing has long relied on harpoons and strings with their dugout canoes in shallow waters, only recently gaining some technology – mostly from the Turkana, including through vessel and gear theft viewed by them as a necessity. The movement of thousands of Dasanech into fishing in recent years (often in combination with flood recession agriculture) as their livestock herds have collapsed from overgrazing in their confined territory - is outlined in an above section.

with El Molo fishing boats in their targeting of tilapia, Nile perch and other species. Turkana fishers frequent the eastern portions of the lake during most of the year, including the September to December (*Anamapolon*) period, when currents in the northernmost lake and Omo River outflow are too strong for movements there, in the January to March/April (*Aleles ngaitia*) period of much calmer waters, and during the period when intensive fishing in the northern area is predominant – between April and August.

By the 1990's and 2000's, Turkana individuals and groups had developed real expertise in boat making (although this requires capital, so the Luo have retained control over boat making – especially at Ferguson's Gulf), in sail making and repair, and in the fashioning of fishing gear, including nets.

- Lake Victoria has long constituted the major part of Kenya's freshwater fish production for the market. However, the introduction of Nile perch and Nile tilapia to Kenya's lakes in the 1980s has transformed much of the fisheries sector – particularly as it affects the extremely marginalized indigenous peoples of the Lake Turkana region – peoples increasingly forced to rely on the lake's fish stocks.<sup>41</sup>
- Although simple in construction, Turkana sailboats and gear remain far superior to the technology available to the Dasanech, many of whom have had only dugout canoes, and some using simple strings and harpoons. This differential has clearly been a contributing factor to the intensifying conflicts between the two groups — particularly as their respective survival conditions become more desperate.

Fig. 8 indicates the multiplicity of conflict areas in the delta area. The months from April to September, when fishing in the northernmost portion of the lake is prevalent – in fact a matter of desperate dependence by both Turkana and Dasanech – are times of especially intense conflict between the two groups within the lake.

- **Fishing for markets is a precarious and unpredictable business for the Turkana.** As early as the 1960s, a few Turkana fishers sent small quantities of fish – primarily Tilapia and Nile perch – southward to Kitale and other markets. For the most part, preparation of catch for market has not changed substantially since that time. There are no post-catch facilities for cleaning fish, so fish pieces are generally cleaned on the sandy shores of the lake, and then sun dried (and more recently, salted) on netting racks strung well above the ground.

Stacked and bound into large piles, the product for market is left at roadside along the northern and central lake shore villages for pickup by merchants' trucks traveling southward markets to markets in Kalokol, Lodwar and beyond –especially Kisumu. The price paid to villagers is entirely set by the merchants – a matter of real upset to all Turkana fishers, especially since the number of days lapsing between preparation for market and pickup by the commercial trucks may be so extended as to greatly reduce the price they receive.

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<sup>41</sup> The quantity and 'value' (calculated as market value, not value for survival of local [people](#)) of Lake Turkana's fish catch was only 2,493 tonnes and 86,471 [K. Shillings](#), compared with 133,526 tonnes and 6,675,685 [K. Shillings](#) from Lake Victoria.

## **The Turkana Population Along Northwestern Lake Turkana's Shoreline**

- The Kenya government's 2009 census of the region vastly underestimated the indigenous population living in the shoreline region of Lake Turkana.
- The Turkana population in the northwestern shoreline region of the lake, the indigenous population facing full-scale livelihood destruction from the Gibe III dam's radical impact on Lake Turkana is at least 200,000. This figure exponentially higher than the approximately 75,000 recorded by the GOK.
- Inclusion of the southwestern, southern and eastern indigenous populations dependent on Lake Turkana results in a far higher number, certainly well above 300,000.

**The greatest concentration of Turkana fishing population is located around Kalokol/Ferguson's Gulf, with villages extending all along the western shoreline and northward to Todenyang and the Ethiopian border (Fig. 13).**

- **Local Turkana administrators and members of the Council of Elders, in this entire region along the lake consistently described the 2009 census takers as vastly underestimating their populations. Local administrators and Turkana groups protested the GOK's approach to the census, after which the GOK announced that the census would be repeated. No such effort was undertaken.**

Local leaders uniformly described to SONT that the census takers:

- (1) Recorded populations only in major centers, avoiding the often more populous outskirts,
- (2) Avoided rural areas near the lake where most Turkana live (all local administrators questioned by SONT attest to the fact that there are often people living between main village complexes than within them),

The GOK Census states that census takers recorded very large areas (often hundreds of square kilometers around towns. All local officials questioned by SONT gave a contrary account: that GOK census did not record populations in lands surrounding the immediate towns/centers.

- (3) Did not request the direct cooperation of local administrators— individuals who are generally knowledgeable about the population sizes of their communities and are also trusted by local residents so that they would be more likely to yield correct information, and
- (4) Recorded information from children and others unlikely to report accurately, rather than from household heads.



- **SONT carried out a preliminary investigation of the village complexes around the northwestern shoreline of Lake Turkana, working closely with local administrators and Council of Elders members.** Even for large and medium village communities alongside the lake, estimates indicate a far higher figure than the GOK's recording. The threatened population is far higher when villagers residing slightly more removed from the lake (Fig. 13), with mixed pastoral/fishing livelihood but no less dependent on lake Turkana for their survival, is taken account of. This population of tens of thousands of Turkana was essentially ignored in the 2009 census. The limited resources of the SONT research team did not permit its survey of this extensive population.
- **The greatest concentration of Turkana fishing population is located around Kalokol/Ferguson's Gulf, where (Fig. 13).**

**Lake retreat caused by the Gibe III's inevitable radical reduction of Omo River inflow, even during presumed reservoir fill, would desiccate Ferguson's Gulf, as indicated in the bathymetric map of Fig. 14.**

**The extreme shallowness and quietude of Ferguson's Gulf (Fig. 14) supports major reproductive habitat for fish species critical to the Turkana, with intensive fishing activity during part of the year. All such habitat and fishing activity would be eliminated by even the first phase of lake retreat.**

- **Turkana fishing villages extend all the way around the (Longech) spit encircling the Gulf, as well as between the Gulf and Kalokol. Nearly all villages located along the Gulf's shoreline are fully engaged in fishing.**

There is an increasing flow of villagers into the region. Many of them bring livestock with them and are part of the pastoral/fishing complexes shown in 13. To the extent possible, many keep their small stock locally (Photo 20). It is common to encounter groups of thousands of small stock moving together for watering at the lake and in search of last option grazing. Camels are generally sent far inland and are only brought to the lake for watering.

- **The sketch map in Fig.16 was drawn by Council of Elder members at Ferguson's Gulf (with writing assistance by a SONT field worker). It is shown alongside a Google Earth image.**

The populations of specific village complexes around the Gulf (Fig. 16), as recorded by SONT, are as follows:

Longech	12000	[Past serious cholera outbreaks with low water]
Jap	2000	
Village (So. of Jap)	1800	[Formerly a GOK fisheries camp]
Wadite	3000	
Lokwar angipirea	1500	

Loporoto	800	
Lokorokor	3000	
Namukuse	10000	
Village-near above	900	
Nawoitorong	1000	
Nawokodu	500	
Lomaret	500	
Losigirigir	200	
Namakat	1000	
Nayanae ekalale	500	
Daraja	650	[Former NORAD project locale]
Karepun	700	
Natirae	1500	
Kura	3500	
Impressa	5000	
Natole	4000	

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**54,050**

Nearly all of these villages are omitted from the GOK's census. Population of the one village included in the census, Namukuse, is vastly under-represented, by about 40 per cent.

For an accurate estimation of the vulnerable Turkana population in the Ferguson's Gulf region, the populations of Kalokol town, its immediate environs, and the area between Kalokol town and Ferguson's Gulf must be added. Estimates from local administrators and Council of Elders members are:

Kalokol town	11500	(GOK census figure; larger environs not recorded)
Kalokol outskirts	4000	(incl. Nakiria – 2300, etc.)

Based on these locally derived estimates, the indigenous population in the immediate Ferguson's Gulf/Kalokol region is at least:

**70,000**

**This estimate excludes other population segments essential to include, but beyond the capabilities of the SONT team to record.** This population includes:

- \* Thousands of pastoral/fishing Turkana with villages slightly further away from Lake Turkana, and
- \* The entire population in villages diffusely located between Kalokol town and Ferguson's Gulf.

- **SONT researchers also gathered population estimates for towns and major village complexes along the lake between Kalokol and Todenyang (Figure 2) located at the Ethiopia/Kenya border.** Estimates were from Local Administrators, Council of Elders members, and Beach Management Units (local residents who are governmental appointed).

As in the Ferguson's Gulf region, SONT data generated from local officials and elders indicated that the GOK census figures vastly under reported the population residing in communities adjacent to Lake Turkana.

Estimates recorded by SONT exclude those villages located diffusely in lands distributed in lands between these main complexes, due to logistical constraints. These villages require inclusion, however, for a fully accurate count, since local officials describe them as frequently having larger human populations than those of some village complexes that were recorded.

These population estimates were recorded for large and medium sized village complexes.

Kangaki	2000	Nasechabuin	3000	Namarotot	500
Lokalale	650	Kalotumukol	1700	Nadoupua	800
Lomekwi	3000	Nalukowoi	350	Lokapetemoi	300
Ngingolekoyo	1200	Nariokotome	5000	Namadak	4000
Nachukwi	5000	Kaitio	200	Todenyang/Arii	10300
Kangatukusio	320	Kokiselei	950	Lowarengak	7000
Kataboi	9000	Kalochoro	290	Lokitonyialla	2300
Kaitengiro	500	Narengewoi	1300		
Katiko	8000	Nayanae engol	800		
Toperenawi	3000				

Based on these locally derived estimates, the indigenous population in the shoreline area between Kalokol and Todenyang (Fig. 2) is:

**71, 460**

**Based on the above estimates, the indigenous population in the shoreline area of Ferguson's Gulf, extending northward Lake Turkana to the Kenya/Ethiopia border (near Todenyang) is at least:**

**141.460**

- **The true population of those Turkana who are immediately vulnerable to destruction of their survival means from the effects of the Gibe III dam on Lake Turkana is far greater.**

This population includes those fishing and mixed pastoral/fishing villagers who reside slightly more removed from Lake Turkana, but who nevertheless depend on it for their survival, through:

- (1) Work as fishers - generally working for boat owners, or in post-catch fisheries related work
- (2) Trading for fish, offering livestock products (meat, milk, skins, live animals), and
- (3) Livestock watering and lakeside grazing.

**While there are no estimates for the population for this wide band of villages and it is ignored in the GOK's census, it undoubtedly numbers in at least the tens of thousands, bringing the total in simply lands closely associated with Lake Turkana to at least 200,000.**

- **A large proportion of the tens of thousands of pastoralists who continue herding their livestock in the dryland plains of the Ilemi region southward to the latitude of Ferguson's**

**Gulf, bring some or all of their livestock to Lake Turkana during certain times of the year, for watering and for whatever graze and browse is available.**

As Photos 8 and 20 indicate, even with the existing level of Lake Turkana and its present day lakeside vegetation, many of these livestock do not survive.

**The unreliability of the GOK's population census does not alter the reality that the total indigenous fishing and pastoral population depending on Lake Turkana for their survival**

**- even excluding the tens of thousands of Dasanech residing in the modern Omo Delta, is greater than:**

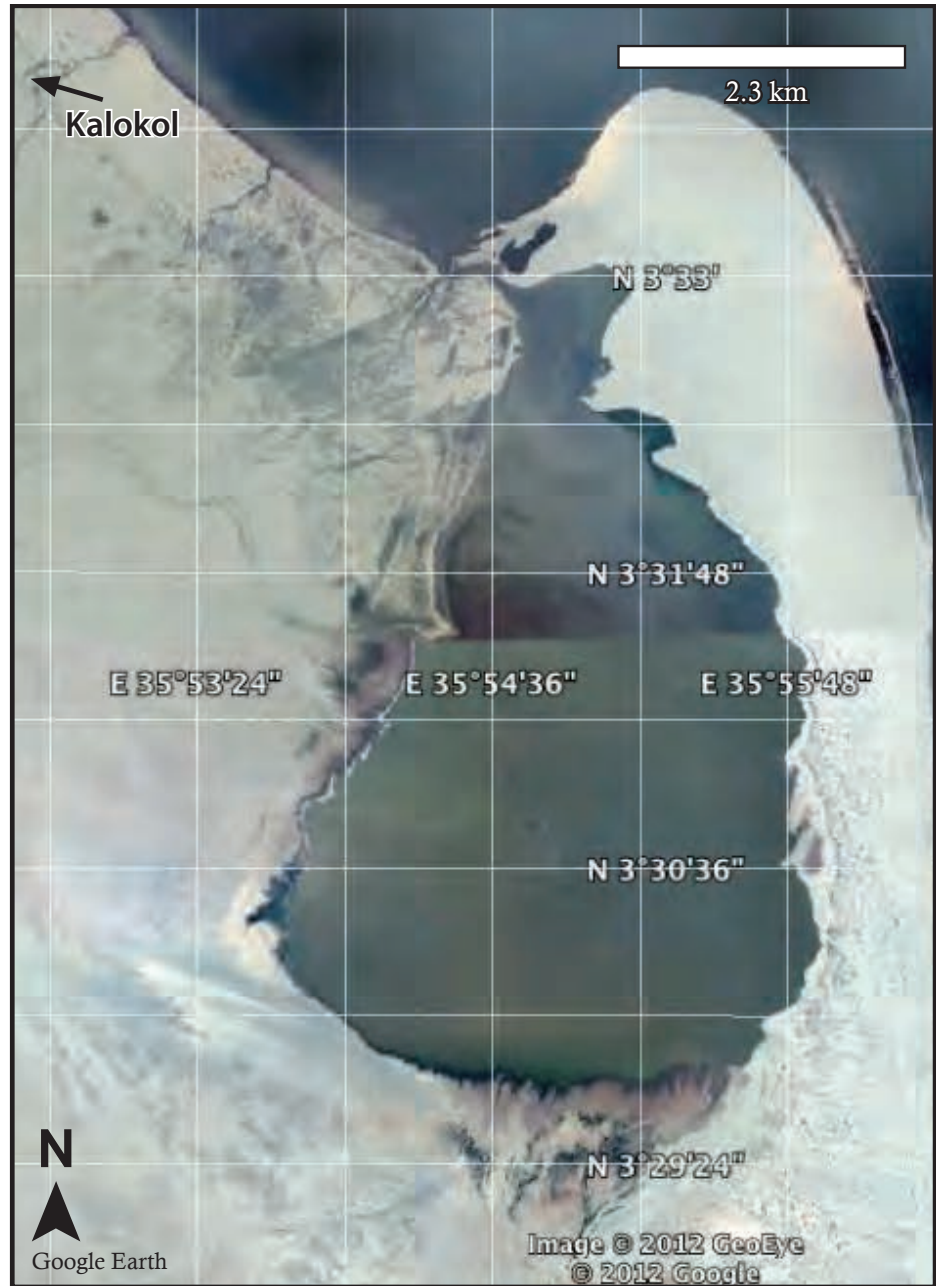
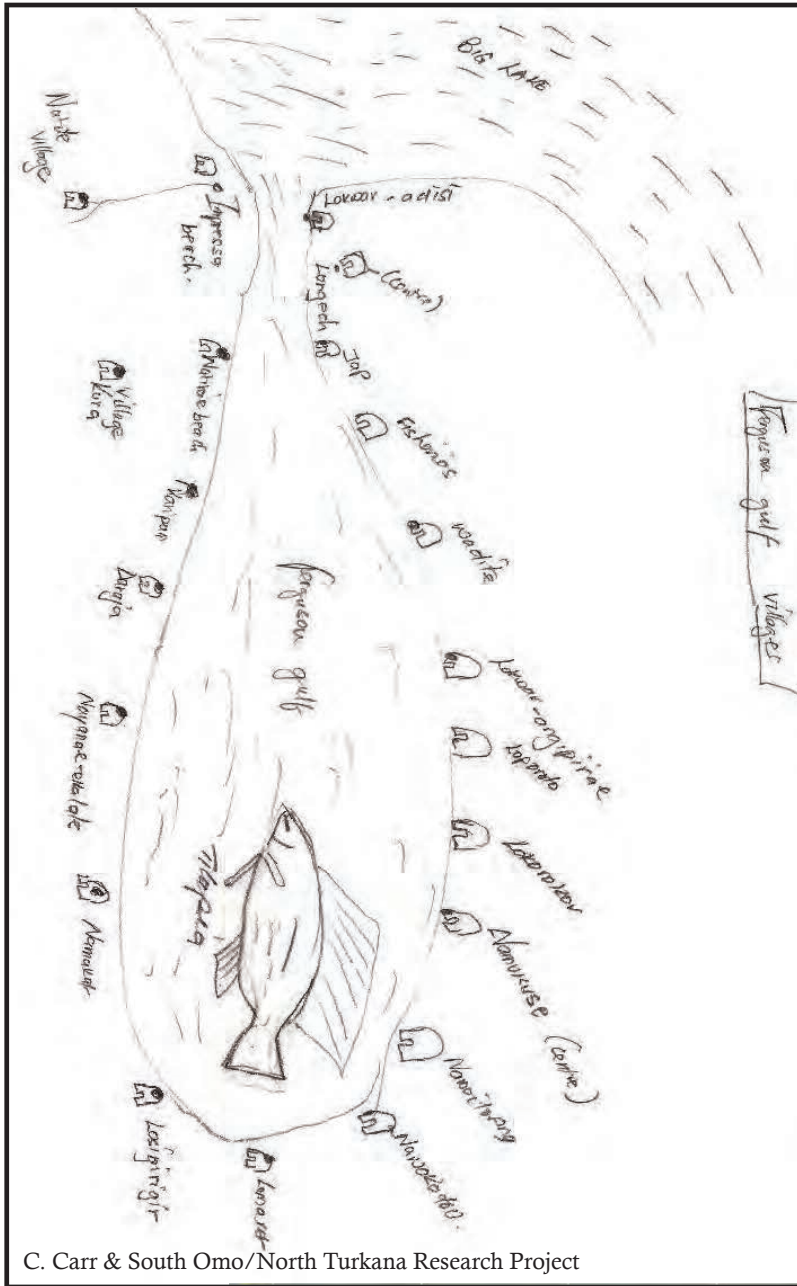
**300,000.**

**This is a supportable assessment, based on population estimates for the northwestern shoreline locales, with even low estimates for the southwestern and southern portions of shoreline Turkana, along with ethnic groups along the southeastern and eastern portions of the lake are counted - including in Eliye Springs locales, the towns of Loyangalani, Moite and Ileret, and rural regions associated with them.**

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**If the Gibe III dam is completed, the lake level reduction will produce devastation of this livestock population previously unimaginable.**

**Fig. 15. Indigenous Map of Turkana Villages at Ferguson's Gulf**



The estimate of 300,000 Turkana dependent on the lake's resources for their survival is actually a conservative one. It is commonly acknowledged by local Kenyan government officials – individuals who are reticent to go 'on record' with this estimation since all in the region are fully aware of that the issue of such a large population fully marginalized and dependent on Lake Turkana fisheries is regarded as highly sensitive at the national Kenyan government: all evidence to date points to the government's active exclusion of such data from its fisheries, interior and other relevant ministry offices.

### **Fish Species and Lake Habitats Critical to Indigenous Livelihood**

While the SONT project undertook no empirical investigation of the specific biological and ecological characteristics of key fish species in lake Turkana, significant amounts of indigenous knowledge of important catch species were collected and these were integrated with the limited available scientific literature. A major problem with recent literature available is that it has either been directly secured or indirectly funded by the African Development Bank and the Government of Kenya, both of which are essentially committed to the Gibe III development, raising the issue of selective inclusion of available or potentially available information. For this reason, indigenous fishers' accounts clearly provide important information for assessing the vulnerability of the lake to disastrous levels of fish stock decline or collapse, along with vulnerability of the Turkana and other indigenous peoples who depend on these stocks for their survival.

- **The modern Omo delta and northern shoreline of Lake Turkana, as well as major bays (Ferguson's Gulf and Alia Bay) and extensive shallow peripheral reaches of the lake provide fish hatchery and juvenile feeding habitat essential to the sustainment of the lake's fisheries (Fig. 2).**

In the modern Omo delta and northern shoreline waters, the seasonal pulses of fresh water inflow from the Omo River provide nutrients and sediment essential for the lake's ecological systems, including fish reproduction. Spawning migrations of numerous species of fish are coordinated with the Omo River's seasonal flooding. Local fishers carry out intricate patterns of exploitation of particular species in specific seasons.

The critical nature of these environments is conformed by SONT interviews with experienced fishers in the northern lake zone. The two most important catch species, for consumption and for marketing toward purchase of foodstuffs, are Nile perch and Nile tilapia. Tilapia lay their eggs and hatch in the grassy or reed areas along the shoreline, in Ferguson's Gulf and other bay environments. Tilapia fingerlings mature along the lake's muddy shores. Nile perch, on the other hand, lays eggs and hatch in deep water — but juveniles feed on tilapia and other species'

fingerling populations in the delta and along the shoreline. They particularly frequent the northern shoreline and delta area during the Omo River inflow months, which vary between late July and December. Nile perch also migrates upstream in the Omo River.

- Turkana fishers report a larger number of migrating species than are described in the scientific literature. Of the more than 50 fish species recorded for Lake Turkana, at least 12 are of major significance to the Turkana who are dependent on the lake's fisheries for their subsistence - whether through direct consumption or marketing of catch for purchase of food.

Hopson (1982) describes four different fish communities in the lake: a littoral assemblage, an inshore assemblage, an offshore demersal assemblage and a pelagic assemblage. Eleven fish species are endemic to the lake – nearly all of them living in the offshore pelagic or demersal zone (Lowe-McConnell 1987). During the flood time, certain fish migrate up the Omo River and breed for various periods (Hopson, *ibid.*, Beadle 1981, Lévêque 1997): these species include: *Alestes baremoze*, *Hydrocynus forekalii*, *Citharinus citharus*, *Distichodus niloticus* and *Barbus bynni*, among others.<sup>42</sup>

- The hatchery, juvenile and breeding habitats of most of the species critical to indigenous livelihood systems are in the Omo delta, along the northern shoreline of the lake - where the seasonal pulses of fresh water inflow from the Omo River provide nutrients and sediment essential for the lake's ecological systems, or in shallow peripheral reaches of the lake, including Ferguson's Gulf and several bays. These environments are precisely those, which would be destroyed by the Gibe III dam, even in the reservoir impoundment 'phase', as the bathymetric maps in Figures 7 and 14 indicate.
- The situation is even more grave in view of the large scale irrigation agriculture with extraction of Omo River waters that is planned and already underway by the Ethiopian government and its private investors. Descriptions by experienced fishers of these key species, their habitats and their significance to the Turkana were recorded and synthesized by the South Omo/North Turkana Research Project (SONT).

Nile perch and Nile tilapia are generally species most important to the Turkana's survival, although numerous others fish are significant either for consumption or for marketing in order to buy essential foods. Tilapia lay their eggs and hatch in the grassy or reed areas along the shoreline, in Ferguson's Gulf and other bay environments. The fingerlings mature along the lake's muddy shores. Nile perch, on the other hand, lays eggs and hatch in deep water – but juveniles feed on tilapia and other species' fingerling populations in the delta and along the shoreline. They particularly frequent the northern shoreline and delta area during the Omo River inflow months, which vary between late July and December. Nile perch also migrates upstream in the Omo River, where they have provided subsistence to the poorest Dasanech and Nyangatom communities. Three different species of tilapia, *Orochromis niloticus*,

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<sup>42</sup> Turkana fishers report a larger number of migrating species than are described in the scientific literature.

*Sarotherodon galilaeus* and *Tilapia zillii*, are now caught in the Omo River dried and sold to the export oriented fishing corporations enterprises operating from Ethiopia.

Fishing households in all survey areas depend almost entirely on fishing for their livelihoods. A viable alternative means of survival is rare among these households.



**Villagers at Lokitonyella with palette of sundried fish to be sold to fish brokers.**

Fig. 16 below identifies those fish species most important to Turkana fishing communities, along with the relative sensitivity of their reproductive and life cycle habitats due to lake retreat.



**Fig. 16. Lake Turkana Fish Species: Importance to Turkana Economy & Sensitivity to Lake Retreat**

Scientific/Common Names	Turkana Name	Area most fished by Turkana & Spawning Habitat	Importance to Turkana Survival System	Sensitivity to Lake Retreat
Tilapia spp, including: T. <b>nilotica</b> T. <b>galilaea</b> T. <b>zillii</b> Oreochromis <i>niloticus</i>	Kokine	Delta, near shore, Ferguson's Gulf, bays <i>Spawn:</i> Delta, Ferguson's Gulf, shorelines	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Loss of spawning habitat; desiccation of delta, shoreline, Ferguson's Gulf & bays.
Lates niloticus Nile Perch	Iji	Delta, north shore, North & Central Islands <i>Spawn:</i> Pelagic, but juveniles feeding in delta	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Feeding habitat & catch habitat destruction
Labeo Horrie	Chubule	Delta, nearshore, some throughout lake <i>Spawn:</i> Grassy shore areas	◆◆◆ Critical Consumption Marketing	<b>3 Extreme</b> <b>Loss of spawning habitat &amp; catch habitat destruction</b>
Distichodus niloticus	Golo	Delta, north shore, shorelines <i>Spawn:</i> Delta-Omo R. (grassy shoreline)	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning & catch habitat destruction
Clarias lazera Catfish	Kopito	Delta, north shore, near shore <i>Spawn:</i> Muddy shallow water grassy reeds	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning habitat destruction
Synocelontis sp.	Tir	Shoreline <i>Spawn:</i> Shoreline	◆◆◆ Critical	<b>3 Extreme</b> Spawning/ juvenile habitat loss
Alestes - including: A. dentex A. baremose A. nurse	Juuze	Delta, north shore, Ferguson's Gulf, bays, offshore, flood shallow <i>Spawn:</i> Delta, bays, North Island	◆◆◆ Critical Consumption, Marketing	<b>3 Extreme</b> Spawning/ juvenile habitat Destruction (except North Island)
Citharinus citharus	Gesh	Delta, north shore, near shore, general lake <i>Spawn:</i> Delta	◆ Significant Consumption (limited)	<b>3 Extreme</b> Spawning & feeding habitat destruction
Hydrocynus forkalii Tigerfish	Lokel	Delta, shoreline, offshore <i>Spawn:</i> Delta	◆◆ Major Consumption	<b>3 Extreme</b> Spawning habitat destruction
Barbus turkanae B. bynni	Momwara	Delta, near shore, offshore (schools) <i>Spawn:</i> Delta	◆◆ Major Consumption (limited) Marketing	<b>3 Extreme</b> Spawning habitat
Bagrus spp. Balck Nile Catfish	Loruk	Offshore/ demersal. <i>Spawn:</i> General lake	◆◆◆ Critical Consumption, Marketing	<b>1/2 Moderate/high</b>
Schilbe uranoscopus	Naili	Delta, north shore <i>Spawn:</i> Delta	◆◆ Major Consumption (northern region )	<b>3 Extreme</b> Spawning habitat destruction
<u>Cichlidae</u>	Loroto	Deltas, shallow water	◆ Significant Consumption Marketing	<b>3 Extreme</b>
<u>Bagridae-</u> (giraffe catfish)	bulubuluch	Delta only	◆ Significant Consumption	<b>3 Extreme</b>

**Key:**

- Importance to Turkana Survival System: ◆ = significant. ◆◆ = major, ◆◆◆ = critical
- Sensitivity to Lake Retreat: 1 = moderate, 2 = high, 3 = extreme



Turkana woman in village along northwestern shoreline, sun drying fish.

### Lakeside Communities: Fishing Practices and Outcomes

- **The vulnerability of central and northern Turkana communities to starvation from the Gibe III caused lake withdrawal and fisheries destruction is clear from a household survey conducted by SONT researchers in three major fishing communities between Ferguson’s Gulf and Todenyang (Fig. 2).** Household heads were randomly chosen within the three areas, with widows and others not actively engaged in fishing omitted. Responses to interviews with 36 household heads are summarized in Table 6.

**Table 6. Household Survey in Lake Turkana Fishing Communities: Abbreviated Summary**

Household number*	1	2	3	4	5	6	7	8	9
Village	Todenyang	Lowarengak	Lowarengak	Lowarengak	Nakitoekonon	Nakitoekonon	Nadoupua	Nadoupua	Lorekawotolem
Number years lived at lake	20	10	4	13	3	12	10	20	8
Prior village areas	Lowarengak	Pringan Nakitoekonon	Lochwa Arengan Kachoda	Todenyang, Lokitaung	Lomekwi Kalokol	Lowarengak Kakuma	Lowarengak Kakuma	Todenyang Kakuma	Lokitaung Kaleng
Reason moved to lake	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss
Major household food **	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish
Own boat	Yes	No	Yes	No	Yes	No	No	Yes	No
Boat type	Wood	Wood	Wood	Wood	Wood	Wood	Wood	Wood	Wood
<b>Fishing: Jan to Apr 2011</b>									
Area fished	Kanamukuny	Ileret	Ileret	Kanamukuny	Ileret Kambi	Lowarengak Ileret	Deep water,	Deep water	Deep water
Catch/month: Kg (dried) fish	30	120	200	20	520	40	300	130	230
Fish consumed/ month (kg).	30	30	80-100	14	20	60	180	30	50
<i>Number fish marketed/ month.</i>	<i>70</i>	<i>190</i>	<i>2600</i>	<i>23</i>	<i>300</i>	<i>300</i>	<i>100</i>	<i>80</i>	<i>180</i>
Other areas fished	None	Selicho	Selicho Delta	Ileret, Delta	Ileret	Ileret	Lowarengak	Kanamukuny	Ileret Kanamukuny
Main target fish	Labelo, Tilapia	Labeo, Tilapia, Nile perch	Nile perch,	Nile perch	Labelo N. perch	Labelo	Labelo	Tilapia	Tilapia
Fish prep. for market	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)
Market destination	Kalokol Kisumu	Kalokol Kisumu	Kalokol Kisumu	Kalokol Kisumu	Kalokol Kisumu	Kalokol	Lowarengak	Lowarengak	Lowarengak
Dinking/cooking water	Lake	Lake	Well	Lake	Lake	Lake	Lake	Lake	Lake
<b>Own livestock</b>	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cattle	0	3	8	5	0	0	0	0	0
Small stock	0	10	5	3	27	5	14	33	5
Camels	0	2	4	0	0	0	0	0	0
Other food sources	No	No	No	No	No	No	No	No	No
Household commodity sale	No	No	No	No	Mats	No	Firewood	No	Charcoal
Relief aid	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom

\* Household head interviewed

\*\* Occasional maize meal from food aid organizations

*Cont'd. Household Survey in Lake Turkana Fishing Communities: Abbreviated Summary.*

<b>Household number*</b>	10	11	12	13	14	15	16	17	18
<b>Village</b>	Nadoupua	Nadoupua	Nadoupua	Nadoupua	Nadoupua	Nariokotome	Nariokotome	Nariokotome	Nariokotome
Number years lived at lake	30	40	5	3	22	8	13	23	9
Prior village areas	Lowarengak Kakuma	Born	Lowarengak Todenyang	Lowarengak Todenyang	Lowarengak Turkwel	Lowarengak Kakuma	Todenyang	Lowarengak Kakuma	Lowarengak Todenyang
Reason moved to lake	Livestock loss	N/a	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss
Major household food **	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish
Own boat	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Boat type	Wood	Wood	Wood	Wood	Wood	Wood	Wood	Wood	Wood
<b>Fishing: Jan to Apr 2011</b>									
Area fished	Deep water	Deep water	Deep water	Ileret	Ileret	Choro	Deep water	Ileret Choro	Ileret Choro
Catch/month: Kg (dried) fish	210	300	25	170	300	100	27	305	160
Fish consumed/ month (kg).	50	140	15	90	140	47	52	30	80
<i>Number fish marketed/ month.</i>	<i>160</i>	<i>220</i>	<i>50</i>	<i>210</i>	<i>430</i>	<i>203</i>	<i>50</i>	<i>490</i>	<i>190</i>
Other areas fished	Ileret	Ileret	Ileret	Kanamukuny	Kanamukuny	Choro	Ileret	Choro, Ileret	Choro, Ileret
Main target fish	Tilapia, Labeo	Nile perch Tilapia, Labeo	Nile perch Tilapia, Labeo	Nile perch Tilapia, Labeo	Nile perch Tilapia, Labeo	Nile perch	Labeo	Nile perch Distichodus	Nile perch Labeo
Fish prep. for market	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)
Market destination	Lowarengak	Lowarengak	Lowarengak	Lowarengak	Lowarengak	Kakuma	-	-	-
Dinking/cooking water	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
<b>Own livestock</b>	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Cattle	0	0	0	0	2	0	0	0	0
Small stock	38	8	3	0	43	5	12	26	8
Camels	0	0	0	0	2	0	0	2	0
Other food sources	No	No	No	No	No	Work in mission	Work in mission	Work in mission	No
Household commodity sale	No	No	No	No	No	No	No	No	No
Relief aid	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom

*Cont'd. Household Survey in Lake Turkana Fishing Communities: Abbreviated Summary.*

<b>Household number*</b>	19	20	21	22	23	24	25	26	27
<b>Village</b>	Nariokotome	Nariokotome	Nachukui	Nachukui	Nachukui	Nachukui	Nachukui	Nachukui	Kalochoro
Number years lived at lake	5	30	18	10	9	18	10	24	8
Prior village areas	Lowarengak Kalokol	Lowarengak Ngomeris	Lowarengak Todenyang	Lowarengak Todenyang	Lowarengak	Kakuma	Kataboi Kalokol	Kalokol Lobolo	Kalokol Lodwar
Reason moved to lake	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss
Major household food **	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish
Own boat	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Boat type	Wood	Wood	Wood	Wood	-	Wood	Wood	Wood	Wood
<b>Fishing: Jan to Apr 2011</b>									
Area fished	Nariokotome	Nariokotome	Choro	Ileret	-	Choro	Ileret	Ileret	Deep water, Kalochoro
Catch/month: Kg (dried) fish	250	430	30	202	-	68	30	42	145
Fish consumed/ month (kg).	60	80	20	30	-	30	60	220	90
<i>Number fish marketed/ month.</i>	<i>370</i>	<i>620</i>	<i>84</i>	<i>120</i>	-	<i>90</i>	<i>310</i>	<i>400</i>	<i>300</i>
Other areas fished	Choro, Ileret	Choro, Ileret	Choro, Ileret	Choro, Ileret	-	Choro	Choro	-	Kerio
Main target fish	Nile perch Labeo	Nile perch	Nile perch Labeo	Nile perch Labeo	-	Nile perch Labeo	Nile perch Labeo	Tilapia, Labeo	Distichodus, Labeo
Fish prep. for market	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	-	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)
Market destination	-	-	Kalokol Kakuma	Kalokol Kakuma	-	Kalokol Kakuma	Kalokol Kakuma	Kalokol Kakuma	Kalokol
Dinking/cooking water	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
<b>Own livestock</b>	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cattle	0	0	0	0	0	0	0	0	0
Small stock	8	8	8	3	10	8	3	9	10
Camels	0	0	3	8	9	3	2	6	0
Other food sources	No	No	No	No	Work in mission	No	No	No	No
Household commodity sale	No	No	No	No	No	No	No	No	Sell mats baskets
Relief aid	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom

*Cont'd. Household Survey in Lake Turkana Fishing Communities: Abbreviated Summary.*

<b>Household number*</b>	28	29	30	31	32	33	34	35
<b>Village</b>	Kalochoro	Kalochoro	Kura	Kura	Kura	Kura	Namadak	Namadak
Number years lived at lake	13	6	4	7	12	8	20	13
Prior village areas	Kataboi Kalokol	Namadak Kalokol	Lodwar	Lodwar Kataboi	Todenyang	Todenyang	Eliye Springs Kerio	Lobolo, Eliye Springs
Reason moved to lake	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss	Livestock loss
Major household food **	Fish	Fish	Fish	Fish	Fish	Fish	Fish	Fish
Own boat	No	No	No	No	Yes	No	No	No
Boat type	Wood	Wood	Raft	Raft	Wood	Wood	Raft	Raft
<b>Fishing: Jan to Apr 2011</b>								
Area fished	Deep water, Kalochoro	Deep water, Kalochoro	Kura, Karipun Longech	Kura Longech	Kura Longech	Kura Longech	Namadak Namukuse	Namadak Namukuse
Catch/month: Kg (dried) fish	240	170	400	370	3,000	4'000	2,000	1,500
Fish consumed/ month (kg).	50	78	50	70	40	400	200	50
<i>Number fish marketed/ month.</i>	<i>120</i>	<i>320</i>	<i>2,000 fingerlings</i>	<i>2,400 fingerlings</i>	<i>2,100 fingerlings</i>	<i>16,000 fingerlings</i>	<i>9,000 fingerlings</i>	<i>7,000 fingerlings</i>
Other areas fished	Nariokotome	Kalochoro Nariokotome	Ekwar Adisi (Ferg. Gulf)	Ekwar Adisi (Ferg. Gulf)	Ekwar Adisi (Ferg. Gulf)	Ekwar Adisi (Ferg. Gulf)	Namukuse Ferg. Gulf	Lokoro Ferg. Gulf
Main target fish	Distichodus Labeo	Distichodus Labeo	Tilapia Clarias	Tilapia Clarias	Tilapia Clarias	Tilapia Clarias	Tilapia	Tilapia
Fish prep. for market	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)	Sundry (salt)
Market destination	Kalokol	Kalokol	Kalokol	Kalokol	Kalokol	Kalokol	Kalokol	Kalokol
Dinking/cooking water	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
<b>Own livestock</b>	Yes	Yes	No	No	No	Yes	Yes	Yes
Cattle	0	0	0	0	0	0	0	0
Small stock	8	12	0	0	0	10	13	7
Camels	0	0	0	0	0	5	0	0
Other food sources	No	No	No	No	No	No	No	No
Household commodity sale	Sell mats baskets	Sell mats baskets	No	No	No	No	No	No
Relief aid	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom	Seldom

The following are some major patterns emerging from the SONT household survey in Turkana fishing communities and interviews associated with it:

- The amount of variation in all major dimensions of the survey was limited in all three survey areas – including variation in types of household production, fishing locations and specifics of consumption and marketing.
- Over one half of all households have been settled along the lake for less than ten years, 25 per cent for twenty to forty years, and only 2.8 per cent for more than forty years (their families having remained after settling as part of aid sponsored development projects that had failed).
- Villagers from the northern area (Todenyang, Lowarengak) were from ‘inland’ pastoral areas such as Lokitaung (Fig. 2) or toward the Ilemi pastoral areas. Many from the Kalokol village region have arrived from Eliye Springs or lands toward Lodwar and north of there, though others have arrived from villages further north along the lake.  
All households settled along the lake for last resort survival activities after the loss of all, or nearly all of their livestock, from some combination of starvation and disease, drought and raiding by adjacent ethnic groups. (See Photo 20 for livestock at the lake, where sufficient browse and grazing is a crisis level problem).
- All households took up fishing immediately (mostly on others’ boats) after settling by the lake. Of the 35 fisher household heads surveyed, twelve owned (or co-owned) a boat; all of them were wooden vessels. A number of fishers in the Kalokol/Ferguson’s Gulf area use rafts of lashed together doum palms. Nachukui (north of Kalokol, along the shoreline) was the only locality where a large number of fishers owned their boats, and a number of these individuals had migrated from fishing villages further north.
- The January to April season (Turkana named season, ‘*Aleles ngaitia*’) - with relatively navigable currents from the North (Omo River inflow) so that both eastern shoreline and Omo delta/northern shoreline areas are accessible – provides a good measure of fish catch and its utilization by fishers along the lake’s western shoreline.

The multiple variables of amount of fish catch per household clearly come into play in interpreting survey data for catch. Catch values (in kilograms per month in the January to early April season, or *Aleles ngaitia*) range from about 30 to 4,000 kg.

Determinants of catch include ownership of boat vs. leasing or laboring, number and length of fishing expeditions, gear available, current and wind condition, conditions of target fish species habitats (hatchery, nursery, feeding) among

others. Values of 1,000-4,000 kg catch were recorded only for fishers from the Ferguson's Gulf/Kalokol village area who possessed sailboats with engines.

- Food for household consumption consists primarily of fish, with occasional meat (from purchase with fish marketing proceeds from barter with nearby pastoral households). International agency food aid, primarily in the form of maize meal or powdered milk, provides occasional temporary relief for households in some locales.
- Specific localities and seasonality of fishing generally conform to the patterns described above (Figures 6 and 7) for seasonal movements and critical fish reproductive habitat locations) and the brief overview of species habitat (below).
- Most fishing households engage in regular exchange (both barter and sale/purchase) with nearby pastoral or mixed pastoral/fishing villagers.
  - Thousands among these nearby pastoral people also depend on the lake's fish catch for their survival; most are exceedingly poor in terms of livestock numbers.
  - All households are compelled to market a relatively high proportion of their fish catch. The prices paid by merchants for sundried (and salted) fish picked up at roadside are quite uniform throughout lakeside villages. Villagers uniformly complain that they are powerless in this regard and must simply take whatever the trucker agents of fish merchants are instructed to pay. At the time of the SONT survey in 2011, Nile perch clearly brought the highest return (about 150 Kenya shillings/kg), except for fish 'maws' (entrails).<sup>43</sup>
  - The more typical form of marketed fish, however, is a large palette of mixed species sundried fish that brings the least amount of return: approximately 30 shillings/kg. Since palettes of dried fish may remain along the roadside next to fishing villages for anywhere from days to weeks, households are vulnerable to low prices paid to them by merchants.
- Very few fishing households (approximately 17%) are able to do some type of household based commodity production, such as preparation and marketing of charcoal, grass mats and chickens, in order to purchase additional food.

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<sup>43</sup> At the time of survey, 80 Kenya shillings was equivalent to \$ 1 US.



## Livestock Dependence on Lake Turkana



**Photo page 20. Livestock Dependence on Lake Turkana.** Top left: Large camel herd making monthly watering trek to Lake Turkana. Top right: Goats watering with water birds at NW lakeshore. Bottom photos: Shoats (sheep/goats) and donkeys dead from depleted vegetation along long trek for watering at Lake Turkana.

- **Ferguson’s Gulf is already threatened with full scale elimination within months or a year or two, based on recent losses of its waters – indicated both by depth throughout its most frequented areas and the decrease in width of its mouth.** Current depth is 2-3 meters in reaches of the Gulf measuring 5-6 meters as recently as 2005, according to local fisheries officers. The mouth of Ferguson’s Gulf – once more than 1800 meters (McConnel, 1963, as quoted in East African Common Services Organization, 1962/63) – is now so close to closed and so shallow that even small wooden vessels typically cannot pass and remain in the main lake waters (Photos 21 and 22).

Local fishers and villagers universally state that the Gulf (like the shoreline more generally) has been retreating since about 2006 – raising the specter of a combination of climate change, or reduced rainfall, along with the more recent impacts of upstream development on the Omo River and the recent major draw off of Omo River waters for the large-scale irrigation schemes and canal system being constructed by the GOE and its private contractors and investors.

**Significant decrease in inflow from the Omo River would guarantee the desiccation of Ferguson’s Gulf – a critical fish reproductive habitat and fishing area during part of year, and catastrophic levels of hunger for well over a hundred thousand Turkana.**

Epidemic level disease, especially and diarrhea and cholera – already known to the area, would accompany devastating starvation conditions.

The survival of Turkana fishing livelihood is already in extreme danger. Kenya government officials and scientists operating within the area, while undoubtedly aware of these conditions, have not raised clear concern over this emerging crisis.

- **The extremely large number of Turkana now depending on Lake Turkana fisheries for their survival are under increasing stress, primarily due to:**
- (1) The gradual retreat of Lake Turkana in recent years (the reasons for which remain unsubstantiated),
  - (2) The decline of fish species already underway,
  - (3) The reduction of Omo River inflow into Lake Turkana due to the Ethiopian government’s development of large-scale government and private commercial irrigation schemes and canals along the Lower Omo River, and
  - (4) Piracy of Lake Turkana and Omo delta fish stocks by Ethiopia based commercial fishing fleet.

## Turkana people and Livelihood at Ferguson's Gulf



**Photo Page 21. People and Livelihood at Ferguson's Gulf shallow Shoreline Waters.** Top left: Fishing boats with and without sails. Top right: Luo built fishing boat with Turkana fashioned sails, in the Gulf. Bottom left: Traditional rafts of lashed together doum palms, with nets. Bottom right: Close-up of doum palm raft with fishers along Gulf shoreline.

## Turkana people and Livelihood at Ferguson's Gulf



**Photo Page 22. Environment and Fishing Villagers at Ferguson's Gulf.**

Top left: Sandy shoreline of Gulf, with remaining doum palms & wrecked ship from 1970s fisheries 'development'. Top right: Turkana girl washing clothes from doum palm raft. Bottom left: Boys water-getting for village nearby Gulf.

- The Ethiopian government's impact assessment of the Gibe III project is invalidated by its omission the extensive irrigation and canal development that it has initiated with private contractors and investors, and the impact of these commercial developments on the entire indigenous population of the Lower Omo River Basin and Lake Turkana, as well as on the lake in general.
- The AFDB assessment of Gibe III impacts on Lake Turkana states that 'if irrigation agriculture were to be developed to any significant extent, a new environmental impact assessment would be necessitated. Yet the AFDB institution has taken no note of its own consultant's point. Since the consultant clearly did basic reconnaissance of the northern extent of Lake Turkana, with view of the modern Omo Delta, where large farm development has been underway since 2009, the exclusion of any description of this major change in the AFDB report is inexplicable.
- The Kenyan government has made no overt objection to this major crisis unfolding, and in fact has been in negotiation with major private investments to develop irrigation agriculture schemes of its own – in the Ethiopian/Kenya border area at the northwest extreme of the lake, with planned canal construction that will further destroy its own lake resources, not to mention the lake's waters and fisheries essential to the survival of its own indigenous population.

No significant Kenya government assistance for artisanal fishing, including for fish preparation (cleaning, filleting and drying), storage or marketing has been forthcoming for Turkana lakeside villages.

## **EXPANDING ARMED CONFLICT IN THE ILEMI TRIANGLE AND THE BROADER REGION**

- **Conflicts between Turkana and Dasanech fishers competing for the same fish resources are rapidly escalating in both frequency and intensity.** The Omo delta area and northern shoreline waters is already a zone of intense and growing conflict between Dasanech and Turkana fishers. Conflicts center on access to fishing areas, especially fish breeding areas, and frequently involve gear and vessel theft and violence, sometimes with killings.

While the Turkana and the Dasanech have long conflicted over access to fishing areas — areas that have greatly expanded since the delta's expansion to its present area of more than 500 square kilometers, these conflicts have intensified exponentially as both groups have become more

desperate in economic survival terms. This desperation sparks frequent theft of nets between the two ethnic groups and there are increasing instances of violence.

Violence between the Turkana and Dasanech over remaining fish stocks that are essential to the survival of both groups is greatly exacerbated by the motorized Ethiopia-based commercial fishing interests, as well as the expanding Ethiopian irrigation schemes reducing river flow and the character of inflow waters to the lake. (On the eastern shores, Turkana fishers must also contend with Gabbra herders at the lake, with whom they have long conflicted. There is no conflict between the Turkana and the El Molo, however).

- The Ilemi Triangle (Fig. 3) is a large triangular piece of land (approximately 14,000 square kilometers) located at the junction of Kenya, Sudan and Ethiopia. While generally mapped as part of the new nation of South Sudan, it is claimed by each of the three nations. Since the land was first claimed by Ethiopia's Menelik and the British response with the 'Maud Line,' giving the Triangle to Sudan, and then Anglo-Ethiopian agreement of 1907 when Ethiopia gained most of it. Multiple shifts in unofficial control over the Triangle occurred in subsequent decades, both in terms of its border designation (mostly, its southern border) and military occupation. The Kenyan government has actively policed the area since 1914, with new boundary demarcations set out in 1914, 1924, and in several other agreements.

All of these agreements were viewed by the region's indigenous groups, who were not part of any negotiations as highly destructive of their longstanding survival patterns, based largely on high mobility, access to widely varying natural habitats, and intricate interethnic exchange relations.

- For many decades, at least five different ethnic groups have utilized the Ilemi Triangle lands, establishing settlements and economic activities ranging from livestock herding, opportunistic cultivation (for example, in open basin pans with water collection) and hunting, to engaging in trade and, at times, political conflict with one another. These include the Toposa, Nyangatom (two highly friendly groups that live side by side in one area), Surma, Dasanech and Turkana. This long-standing presence of these groups in the Ilemi, with numerous neighboring peoples, has established a web of relationships with areas deep inside Sudan, much of the Lake Turkana region, and the entire Lower Omo River Basin, thus, joining this tri-country region into a single system of resource utilization. Although now formally closed to use by the region's indigenous groups, by inter-governmental agreement they apparently continue to use it whenever possible (and are considered 'poachers' by authorities). The close connections among groups along the Omo River (including the Delta) in northwestern Kenya, and well into the 'Sudanese' Ilemi, continue.

Little systematic investigation has been carried out regarding the indigenous peoples and economies of the Ilemi region. An early Kenyan government document that includes a map of ethnic movements in the area is sufficient to demonstrate the complexity of ethnic groups' (mostly pastoral) settlement, herding and other livelihood activities (planting, trading, etc.).

# GRAZING IN ILEMI TRIANGLE



Figure 1. Source: Public Records Office MPK1/359  
 N/B Some names have been realigned by the author.



Young cattle herder in Ilemi Triangle with cattle in relatively undisturbed grassland (on sandy beach Ridge). Termite mounds are numerous in well-drained grassland soils, until overgrazing conditions set in.

- The Ilemi Triangle has never been adequately surveyed to delineate national jurisdiction, at least to the satisfaction of the three countries involved. It remains a contested area by Kenya, Ethiopia and Sudan. Until very recently, the Ilemi was considered to be essentially 'empty,' or 'wasteland'. This situation has now dramatically changed. The Ilemi's proximity to the lengthy war in Sudan, along with the intensive extractive industry development in southern and south central Sudan, have led to major new linkages between South Sudan and Kenya. Road development and major travel and interchange related to extractive industries, other industrial and agricultural development, physical infrastructure construction and all sorts of political and economic exchanges now dominate the relationship.
- A recent surge in oil and gas exploration in the region has awakened interest in the Ilemi, as well. Sudan, Kenya, and Ethiopia are all making new agreements with international energy corporations and there are new concessions for exploration in the Ilemi itself, in the extreme northwest of Kenya, and most recently, in the Lower Omo Basin of Ethiopia. Numerous oil corporations are active in the region, although oil exploration has been conducted in the region for decades (Carr, C. and J. Dimon, forthcoming). Already, protests by between indigenous communities and organizations have occurred in Turkana territory, and the awareness of problems associated with oil exploration is spreading rapidly throughout the region.



- Arms trafficking is pervasive amidst all these economic changes so that weapons are now readily available to all indigenous groups in the region. There are consistent reports in both Ethiopia and Kenya of ethnic groups being supplied with firearms by their own governments, either directly or with tacit approval. To a degree, these indigenous militia may be viewed as proxy defenders of their respective home country borders.

Numerous peace initiatives have been taken, including by the United Nations, the Kenyan government, U.S. Agency for International Development, and several churches with interests in the region. None of these efforts have been successful, however. Any traveler in the region is fully aware that most adolescent and adult men have access to automatic weapons or rifles, and this situation is intensifying. Presently, a most fragile peace is maintained in the region. Raids and reprisals for raids among equally disenfranchised ethnic groups have unquestionably worsened, with increasing frequency and elevated levels of killings reported throughout most of the region.

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**Fig. 8 (reinserted below) identifies the major points of conflict in this (and nearby regions), based on SONT interviews in much of the region and information from local officials.<sup>44</sup>**

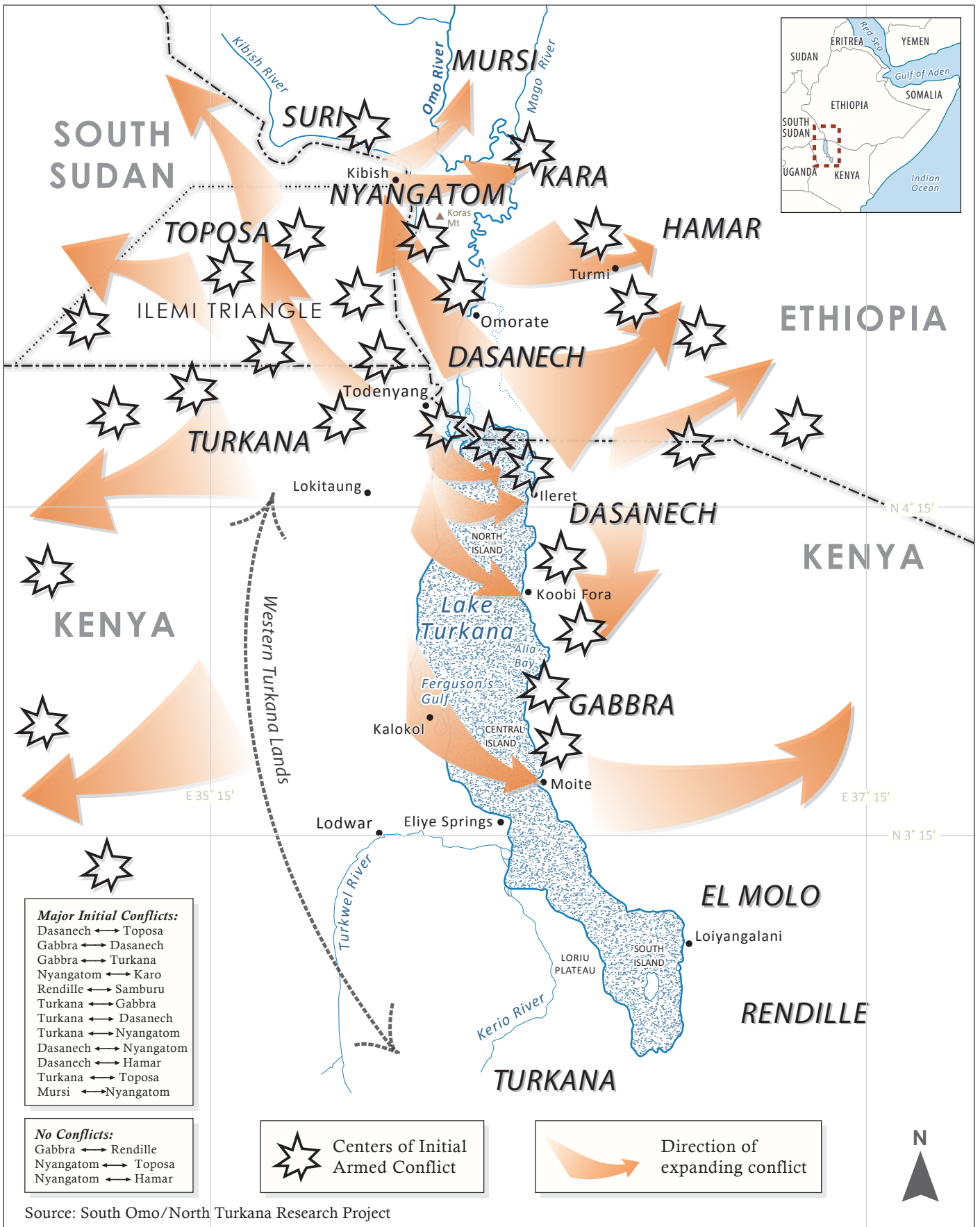
**Major losses of indigenous groups' cultivation lands and dry season grazing for livestock along the Omo River, in the Omo delta region and around Lake Turkana would undoubtedly cause virtual waves of expanding armed conflict throughout consequences for livelihood and ecological conditions in the Ilemi region.**

**These conflicts would be difficult, if not impossible, to contain - particularly in light of the struggles already underway in southern Sudan.**

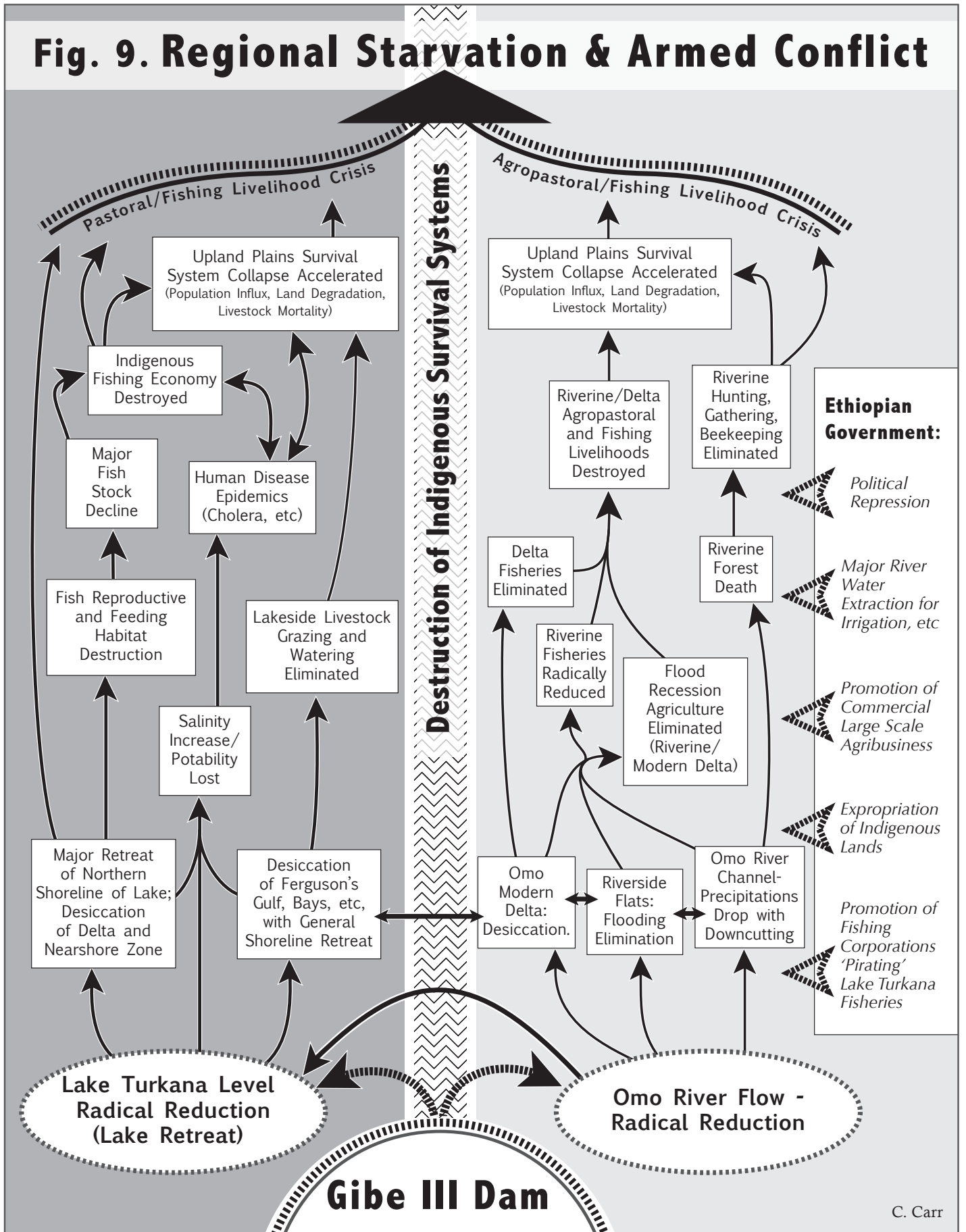
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<sup>44</sup> For the internet reader's convenience, Fig. 9 – summarizing the Lower Omo River Basin and Lake Turkana Region changes emanating from the Gibe III dam, is also reinserted.

**Fig. 8. Expanding Armed Conflict From Proposed Gibe III Dam**



# Fig. 9. Regional Starvation & Armed Conflict



## THE POLICY CHOICE

An ongoing alliance of an ever-changing Ethiopian state and commercial interests, as well as international finance and development agencies, spans the time from monarchy to the present day authoritarian government, which together have fixed on the construction of the Gibe III hydrodam on the Omo River. This massive project has advanced through the decades with no voice from the people who live in the region and who will be profoundly and catastrophically impacted by the dam.

If policy for development to improve the lives of the region's 500,000 indigenous population were to be taken as genuine, then the needs of this population would be first ascertained and then addressed. The most urgent need of the transborder indigenous population is not electricity, but rather access to the last remaining lands, waters and biological resources from the Omo River and Lake Turkana.

It must be acknowledged that there has been no environmental impact analysis, nor a socioeconomic one, of the actual region of impact. The region involves a transborder, or international river that originates in Ethiopia and terminates in Kenya. The immediate impact area crosses the boundaries of Ethiopia, Kenya and the Ilemi Triangle, a region that remains in dispute among Ethiopia, Kenya and South Sudan. This failure to address the most fundamental cross-border nature of the Gibe III's impacts on a vast human population and the resources of several nations is paramount to the recognition that the justifications for the project provided by the dam's proponents are invalid.

The fact that the indigenous population in this region is already subject to Africa's worst levels of malnutrition, periodic famine and epidemics of cholera and other diseases underscores the gravity of this challenge to policy makers now underwriting or considering financing the Gibe III hydrodam.

As this report has made clear, completion of the Gibe III project will trigger humanitarian catastrophe in the form of mass starvation, disease and regional war through destruction of last-option survival for the indigenous population. Added to the certain catastrophe is the potential for the historically unprecedented disaster that would accompany the highly plausible threat of dam failure due to seismicity and related factors.

The brewing regional catastrophe assumes global significance due to the extreme political instability of the region, particularly given the ongoing conflict in South Sudan and ever-increasing regional arms trafficking.

Major oil and gas resources are identified within the tri-nation border region, with numerous international petroleum corporations actively engaged in exploration activities. The shift from the region being considered 'marginal', yet contested, to one of importance – both for the three nation states involved and for the international oil industry, has clearly altered the nature of the policy choices at hand. From the perspective of the oil industry, the generation of mass starvation

and armed conflict among ethnic groups desperate for the region's last remaining resources as they confront the destruction of their families and social units, would prohibit further active exploration in the area. Widespread repressive political measures and denial of human rights to the region's ethnic minorities - already pervasive in Ethiopia's southwestern region - would spread quickly throughout the transborder region as national governments mobilize to protect foreign corporate interests.



A stark choice remains for policy makers. Completion of Gibe III presents the formula for a perfect storm of human catastrophe, setting the stage for mass starvation, regional armed conflict, irreversible destruction of natural resources of several nations, and political collapse. The alternative is an approach that embraces everything ignored by policy makers to date - namely, the protection of the lives of the region's half million indigenous peoples, the promotion of regional peace, and the sustainment of critical natural resources of the three nations states.

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## ANNEX A

### **BIOGRAPHICAL INFORMATION FOR CLAUDIA CARR: EAST AFRICA RELATED EXPERIENCE**

**Claudia J. Carr, Associate Professor**  
**Department of Environmental Science, Policy and Management**  
**College of Natural Resources**  
**The University of California at Berkeley.**

Ph.D., University of Chicago (Geography); M.S., University of Oklahoma (Ecology).

Field-based research, consulting and development policy related efforts in the Horn of Africa, including in Ethiopia (most prominently), Somalia, Kenya and Tanzania: 1969 – present. Field work in Ethiopia including several years of ecological and sociological research among the Dasanech and neighboring peoples of extreme southwestern region of Ethiopia (lower Omo Valley), the Middle Awash Valley (Ittu and Kerreyu Oromo), and several localities in southern Ethiopia. Other field-based research and consulting in Somalia (e.g., National Range Agency; Ministry of Agriculture); Kenya (e.g., Turkana pastoralist development issues; National Park development in Marsabit region; geothermal development in Maasai areas in the Rift Valley). Co-director, Joint African/American Research Group for Refugees in the Horn of Africa (Ford Foundation); Member of National Academy of Sciences (USA) Board of Directors, Board on Science and Technology for International Development; National Academy of Sciences Panel Member concerning the Juba River Basin Development in Somalia; National Academy Consultative Group on Appropriate Technology Development. Consulting including for: Land Reform Ministry and Awash Valley Authority (Ethiopia); Ministries of Agriculture (Eritrea - Evaluation of National Environmental Plan; Somalia - Rural Development and Refugee Problems), National Range Agency (Somalia); Oxfam America-Somalia; Kenya Power and Light Co. Delegate to WSSD (World Summit on Sustainable Development), 2002; IUCN Delegate, WSSD Summit, Johannesburg. Relevant reports and publications include: *Pastoralism in Crisis: The Dasanetch of Southwest Ethiopia*; *Transformation of Pastoral Socioeconomy in Ethiopia: The Ittu Oromo of the Awash Valley (monograph)*; "Riverine vegetational development: the Omo River of Southwest Ethiopia." (*Plant Ecology*); "*Pastoral cooperatives in NE Somalia: implementation and design problems*"; Evaluation of the Juba River Basin Baseline Studies (NAS); *Evaluation of the National Environmental Management Plan for Eritrea* (Ministry of Agriculture); Co-Coordinator of non-governmental/professional workshop on oil and gas exploration and development in eastern Africa, Durban, South Africa, September 2008; Grantee for research on socioeconomic and ecological change in southwestern Ethiopia" - 2008-2009, a private foundation; Director, South Omo/North Turkana Research Project; Co-founder, Africa Resources Working Group. Recent professional papers and lectures regarding the planned Gibe III Dam, oil and gas development in eastern Africa, U.S. foreign policy and development mega-developments in the Horn of Africa at American Association for the Advancement of Science and American Association of Geographers, New York University Wagner School of Public Policy.

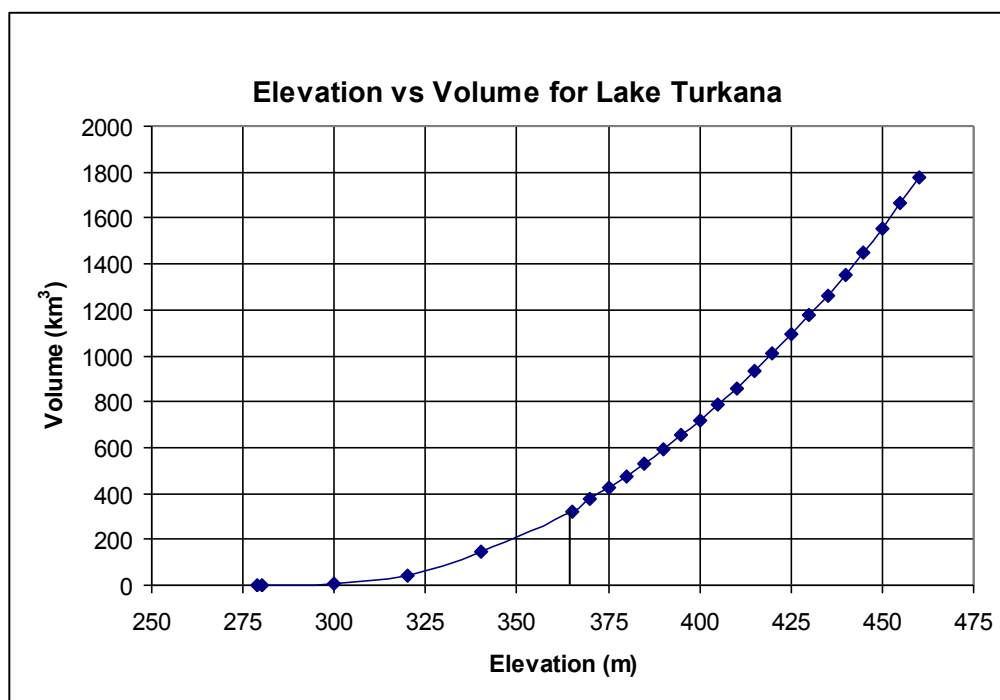
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## ANNEX B

### PROBABLE EFFECTS OF THE GIBE III DAM ON LAKE TURKANA (KENYA)

Calculations by ARWG Physical Scientist

We begin with a graph of elevation (m) vs. water volume (km<sup>3</sup>) in Lake Turkana so that if we can estimate the probable amount of water lost during filling of the reservoir behind Gibe III dam, we can estimate the effect on the lake. All numbers are approximate; most are estimates; the computations and data can be refined, but the general effect is known beforehand—the lake will fall in level simply because less water is being put into it, while at the same time loss due to evaporation remains more or less constant. What is attempted here is to gauge the magnitude of the effects.



The basic approach relies heavily on a paper by T. Cerling (Palaeogeography, Palaeoclimatology, Palaeoecology, 54, p. 63-86 (1986)) titled “A mass-balance approach to basin sedimentation: constraints on the recent history of the Turkana basin.”

His equation 5, for water balance in the basin is:

$$F_w = Q_{Ri} + P_L A_L + S_i - Q_{Ro} - S_o - E_L A_L$$

The net gain or loss of water per annum ( $F_w$ ) in m<sup>3</sup>/yr is the sum of all river inflows ( $Q_{Ri}$ ), direct precipitation onto the lake multiplied by the area of the lake ( $P_L A_L$ ), and any subsurface inflow ( $S_i$ ), less river outflow ( $Q_{Ro} = 0$  because the basin is closed), less subsurface outflow ( $S_o$ ), less evaporation

times the area of the lake ( $E_L A_L$ ). Cerling assumed, as we do here, that subsurface inflow less subsurface outflow would balance, as we do here, so the basic equation reduces to:

$F_w = Q_{Omo} + Q_{KT} + P_L A_L - E_L A_L$ , where  $Q_{Omo}$  is inflow from the Omo River and  $Q_{KT}$  is inflow from the Kerio and Turkwel rivers.

What we need to see what may happen are estimates for each of the terms. The area of the lake ( $A_L$ ) is taken as  $7500 \text{ km}^2$  at an elevation of 365 m asl (above sea level; determined from satellite imagery).

Cerling uses a value for  $Q_{KT}$  of  $2 \times 10^9 \text{ m}^3/\text{yr}$ , which we use.

For the Omo River, we need to find the relative amounts of water that derive from above and below the Gibe III dam. These were estimated as follows:

**1:** Flow data are available for the Gibe River at Abalti (see Tables), so one measured number is available ( $6.16 \times 10^9 \text{ m}^3/\text{yr}$ ).

**2:** Areas of sub-basins above the Gibe III dam were measured from satellite imagery, and the precipitation in each was estimated from available maps; these values are given in the tables. Given that the Gibe above Abalti makes up ~46% of the total area above the Gibe III dam, we can calculate the amount of water that would be provided if it made up all of the drainage area by simple division, finding ( $1.32 \times 10^{10} \text{ m}^3/\text{yr}$ ). From this, we can estimate the amount of water contributed by the Gojeb River and by the Gibe River between Abalti and Gibe III. This is done by multiplying ( $1.32 \times 10^{10} \text{ m}^3/\text{yr}$ ) by the fraction of the area of each basin, and by the ratio of precipitation in each basin to that in the Gibe above Abalti. In this way, we find that the total flow at the dam should be on the order of  $1.13 \times 10^{10} \text{ m}^3/\text{yr}$  (see Tables).

**3:** For the regions below the dam (for which flow will not be affected), we made a similar calculation, arriving at a value of  $6.72 \times 10^9 \text{ m}^3/\text{yr}$ . This water will continue to reach the lake. We did not include water from the Hamer range or the Omo Basin lowland, because most of this water does not reach the Omo River; instead it evaporates in floodbasins and seasonally inundated pans, and does not reach the lake—its effect is, at best, minor. The total input from the Omo River is simply the sum of the two numbers above ( $1.80 \times 10^{10} \text{ m}^3/\text{yr}$ ), a number also given by Butzer (1971), but distinctly higher than that given by Cerling (1986).

Because of this discrepancy, we must reevaluate evaporation, which was given by Cerling as 2.3 m/y. In order for the lake to remain at relatively constant level (which it has for many years), the inflow must balance loss by evaporation; recalculating evaporation to account for our larger value of Omo inflow, we find that evaporation must be on the order of 2.85 m/y.

Now we have all the numbers we need to see the effect on Lake Turkana. During filling of the Gibe III reservoir, we understand that flow at the damsite will be maintained at that of the lowest month of the year— $5 \times 10^8 \text{ m}^3/\text{yr}$ . To this we add the flow from parts of the drainage basin below the dam estimated at of  $6.72 \times 10^9 \text{ m}^3/\text{yr}$ , for a total inflow from the Omo during filling of  $7.32 \times 10^9 \text{ m}^3/\text{yr}$ . Over five years this will lead to a loss of about  $53.5 \text{ km}^3$  of water from the lake, corresponding to a drop of about 7 m. Concentration of ions in the lake will increase from about 2330 to ~2800 mg/liter. The effect of this increased concentration on fish populations, and on the usefulness of the lake for watering livestock, and for human consumption will need to be determined.

## ANNEX C

### Species collected in the Lower Omo River Basin and Tranborder Region.

Collection by C. J. Carr

#### PTERIDOPHYTA POLYPODIACEAE

*Actiniopteris radiata* (Swartz) Link

#### ANGIOSPERMAE: DICOTYLEDONES

##### ACANTHACEAE

*Barieria acanthoides* Vahl

*B. eranthemoides* C.B.Cl. *Blepharis linariifolia* Pers. B. *persica* (Burm.f.) Kuntze

*Crossandra nilotica* Oliv.

*Ectolium anisacanthus* (Schweinf.) C.B.Cl. var. nov.

*E. revolutum* (L.) C.B.Cl. ( Carr 543)

*Hypoestes verticillaris* (L.f.) Schult. Roem. & Schult.

*Justicia anselliana* (Nees) T. Anders.

*J. caerulea* Forsk.

*J. flava* (Vahl) Vahl

*J. odora* (forsk.) Lam.

*J. striata* (Klotzsch.) Bullock

*J. sp.* ( Carr 255)

*Peristrophe bicalyculata* (Retz.)

Nees *Ruellia patula* Jacq.

##### AIZOACEAE

*Corbichonia decumbens* (Forsk.)

Exell *Trianthema triquetra* Willd.

*Zaleya pentandra* (L.) Jeffrey

##### AGAVACEAE

*Sansevieria ehrenbergii* Bak.

##### AMARANTHACEAE

*Achyranthes aspera* L.

*Aerva persica* (Burm.f.) Merr.

*Celosia argentea* L. *C. populifolia* Moq.

*C. schweinfurthiana* Schinz

*Cyathula orthacantha* (Hochst.)

Schinz *Dasysphaera prostrata* (Gilg)

Cavaco *Digeria muricata* (L.)

Mart. *Psilotrichum elliotii* Bak.

*P. ghaphalobryum* (Hochst.)

Schinz *Pupalia lappacea* (L.)

Juss. *lappacea* (L.)

Juss. var. *orbiculata* Schinz

*Sericocomopsis pallida* (S. Moore) Schinz

##### ANACARDIACEAE

*Heeria reticulata* (Bak.f.) Engl.

*Lannea floccosa* Jacl.

*Rhus natalensis* Bernh. ex Krauss

##### ANNONACEAE

*Uvaria leptocladon* Oliv.

##### APOCYNACEAE

*Adenium obesum* (Forsk.)

Roem. & Saba *florida* (Benth.) Bullock

#### ASCLEPIADACEAE

*Calotropis procera* (L.)

Ait *Caralluma russelliana* (Brongn.) Cuf.

*C. somalia* N.E.Br.

*Curroria volubilis* (Schlecht.) Bullock

*Gomphocarpus fruticosus* (L.)

Ait *Leptadenia hastata* (Pers.)

Decne *Pergularia daemia* (Forsk.) Chiov. *Sarcostemma*

*viminale* (L.) R.Br.

*Taczazea apiculata* Oliv. S. Iat.

#### BALANITACEAE

*Balanites aegyptiaca* (L.) Del.

*B. orbicularis* Sprague

*B. sp.* (Carr 859)

#### BORAGINACEAE

*Cordia crenata* Del.

*C. sinensis* Lam. (*C. gharaf*)

*Heliotropium indicum* L.

*H. ovalifolium* Forsk.

*H. somalense* Vatke

*H. steudneri* Vatke

*H. supinum*

*Trichodesma zeylanicum* (L.) R.Br.

#### BURSERACEAE

*Boswellia hildebrandtii* Engl.

*Commiphora africana* (A. Rich.) Engl.

*C. boiviniana* Engl.

*C. madaga scariensis* Jacq.

*C. sp.* (Carr 227)

#### CAPPARACEAE

*Boscia angustifolia* A. Rich. var.

*angustifolia* vel sp. aff.

*B. coriacea*

Pax *Cadaba farinosa* Forsk. ssp. *farinosa*

*C. gilettii* R.A. Grath.

*C. glandulosa* Forsk.

*C. rotundifolia* Forsk.

*Capparis bslcularis* DC. var.

*eiacaagnoides* (Gilg) De Wolf

*C. fascicularis* DC. var. *fascicularis*

*C. tomentosa* Lam. *Cleome brachycarpa* DC.

*C. parvipetala* R.A. Grah. *Crateva adansonii* DC. *Maerua*

*crassa* Nolia Forsk.

*M. oblongifolia* (Forsk.) A. Rich.

*M. subcordata* (Gilg) De Wolf

#### CELASTRACEAE

*Hippocratea africana* (Willd.) Loes.

*Maytenus senegalensis* (Lam.) Exell

#### CERATOPHYLLACEAE

*Ceratophyllum demersum* L. 159160

#### CHENOPODIACEAE

*Suaeda monoica* J.F. Gmel.

COMBRETACEAE

Combretum aculeatum Vent.  
Terminalia brevipes Pampan Hoffm.

COMPOSITAE

Delamerea procumbens S. Moore  
Helichrysum glumaceum DC.  
Kleinia kleinioides (Sch. Bip.) M.R.F. Taylor K. longiflora  
Oliv. & Hiern  
Pluchea dioscoridis DC. P. ovalis (Pers.) DC. Sphaeranthus  
ukambensis Vatke & O. Hoffm. Vernonia cinerascens Sch.  
Bip. V. sp. (Carr 333)

CONVOLVULACEAE

Hildebrandtia obcordata S. Moore  
Ipomoea aquatica Forsk.  
blepharosepala (A. Rich) Meeuse  
O. kilimandscharicum Guerke  
Orthosiphon somalensis Vatke  
Plectranthus sp.(Carr 739)  
1. sp. ( Carr 728)  
Seddera hirsuta Hall.f. var. hirsuta

CUCURBITACEAE

Coccinia grandis (L.) Voigt  
Cucumis dipsaceus Spach  
C. flgarel Naud.  
Kecirostis gijef (Gmel.) Jeffr.  
K. foetidissima (Jacq.) Cogn.  
Luffa ?echlnata Roxb.  
Momorcilca rostrata A. Zimm.

DICHAPETALACEAE

Tapura flscheri Engl.

EBENACEAE

Diospyros scabra (Chiov.) Cuf. D. sp. (Carr 578)

ELATINACEAE

Bergia suffruticosa (Del.) Fenzl

EUPHORBIACEAE

Acalypha fruticosa Forsk.  
A. indica L.  
Euphorbia grandicornis Goebel  
E. heterochroma Pax  
E. hypericHolia L.  
E. tirucalli L.  
E. triaculeata Forsk.  
Jatropha fissispina Pax  
Phyllanthus amarus Schumach. & Thonn.  
P. maderaspatensis L.  
P. reticulatus Poir.  
P. sp. ( Carr 411)  
Ricinus communis L.  
Securinega virosa (Willd.) Pax & K.  
Tragia hildebrandtii Muell. Arg.

GENTIANACEAE

Enicostema hyssopifolium (Willd.) Verdoorn

LABIATAE

Basilicum polystachyon (L.) Moench.  
Hyptis pectinata (L.) Poit.  
Leonotis nepetifolia (L.) Ait.f.  
Leucas ?glabrata R.Br.  
L. nubica benth.  
Ocimum americanum L.  
O. hadiense Forsk.  
I. sinensis (Desv.) Choisy spp.

LEGUMINOSAE: CAESALPINIOIDEAE

Cassia didymobotrya Fres.  
C. italica (Mill.) F.W. Andr.  
pubescens Bak.  
ssp. micrantha Brenan  
C. nigricans Vahl  
C. occidentalis L.  
Delonix elata (L.) Gamble  
Tamardindus indica L.  
T. uniflora Pers. ssp. uniflora  
Vigna luteola (Jacq.) Benth.  
V. radiata (L.) Wllezek. var.  
sublobata (Roxb.) Verdc.  
V. unguiculata (L.) Walp. ssp.  
culindrica (L.) Van Eselt

LEGUMINOSAE: MIMOSOIDEAE

Acacia brevlspica Harms  
A. drepanoblum SJoestedt  
A. horrida (L.) Willd. ssp. benadirensis Chiov.) Hillcoat &  
Brenan  
A. mellifera (Vahl) Benth ssp. mellifera Medic.  
A. mubica Benth.  
A. paolii Chiov.  
A. reficiens Wawra spp. misera (Vatke)  
Brenan  
A. senegal (L.) Willd. A. seyal Del.  
A. sieberana DC.  
A. tortilis (Forsk.) Hayne ssp. spirocarpa Chiov. (Hochst.  
ex A. Rich.) Brenan  
Dichrostachys cinerea (L.) Wight & Arn.  
Mimosa pigra L.

LEGUMINOSAE: PAPILIONOIDEAE

Canavalia cathartica Thou.  
C. virosa (Roxb.) Weight & Arn.  
Crotalaria polysperma Kotschy  
C. pycnostachya Benth. Indigofera arrecta A. Rich  
I. ciferrii Chiov.  
I. coerulea Roxb. var. occidentalis Gill. & Ali I.  
hochstetteri Bak.  
I. oblongifolia Forsk.  
I. SchImperi Jaub. & Spach.  
I. spicata Forsk. Standl.  
I. spinosa Forsk.  
I. tinctoria L.  
I. volkensis Taub.  
C. sp. (Carr 618)

LORANTHACEAE

Loranthus sp. (Carr 880)  
Plicosepalus sagittifolius (Sprague)

Danser  
*Taphinanthus aurantiacus* (Engl.) Danser

#### MALVACEAE

*Abelmoschus esculentus* (L.)  
*Abutilon figarianum* Webb  
*A. fruticosum* Guill. & Perr.  
*A. graveolens* W. & A.  
*A. hirtum* (Lam.) Sweet  
*A. pannosum* (Forsk.f.) Schlecht.  
*Hibiscus micranthus* L.f. H. sp. (Carr 857)  
*Pavonia patens* (Andr.)  
*P. zeylanica* (L.) Cav.  
*Senra incana* Cav.  
*Sida rhombifolia* L.

#### MELIACEAE

*Trichilia roka* (Forsk.) Chiov.

#### MENISPERMACEAE

*Cissampelos mucronata* A. Rich.  
*Cocculus hirsutus* (L.) Diels

#### MORACEAE

*Ficus Sycomorus* L.

#### NYCTAGINACEAE

*Boerhavla erecta* L.  
*Commicarpus plumbagineus* (Cav.)  
*C. stellatus* (Wight) Berhaut

#### NYMPHAECEAE

*Nymphaea lotus* L.

#### OLACACEAE

*Ximenia americana* L.  
*X. caffra* Sond.

#### OLEACEAE

*Jasminum abyssinicum* DC.

#### ONAGRACEAE

*Ludwigia leptocarpa* (Nutt.) Hara  
*L. stolonifera* (Gulll. & Perr.) Raven

#### PASSIFLORACEAE

*Adenia venenata* Forsk.

#### PEDALIACEAE

*Sesamothamnus busseanus* Engl.  
*Sesamum latifolium* Gillett

#### PISTACEAE

*Pistia stratiotes* L.

#### POLYGALACEAE

*Polygala erioptera* DC.

#### POLYGONACEAE

*Polygonum senegalense* Meisn. forma  
*albotomentosa* R. A. Grath.

#### PORTULACACEAE

*Portulaca foliosa* Ker. Gawl.  
*P. oleracea* L.  
*P. quadrifida* L.  
*Talinum portulacifolium* (forsk.) Schweinf.

#### RHAMNACEAE

*Ziziphus mauritiana* Lam.  
*Z. mucronata* Willd.  
*Z. pubescens* Oliv.

#### RUBIACEAE

*Kohautia casepitosa* Schnizl.  
*Tarenna graveolens* (S. Moore) Brem.

#### RUTACEAE

*Fagara chalybea* (Engl.) Engl.

#### SALVADORACEAE

*Dobera glabra* (Forsk.) Poir.  
*Salvadora persica* L. var. *persica*

#### SAPINDACEAE

*Allophylus macrobotrys* Gilg  
*Aphanb senegalensis* (Juss.) Radlk.  
*Cardiospermum helicacabum* L. var. *halicacabum*  
*Haplocoelum foliolosum* (Hiern) Bullock  
*Lepisanthes senegalensis* (Polr.) Leeuh. *Melanodiscus oblongus* Taub.

#### SCROPHULARIACEAE

*Striga hermonthica* (Del.) Benth.  
*Stemodia serrata* Benth.

#### SIMAROUBACEAE

*Harrisonia abyssinica* Oliv.

#### SOLANACEAE

*Lycium* sp. (Carr 225)  
*Nicotiana tabacum* L.  
*Solanum hastifolium* Dunal  
*S. incanum* L.  
*S. sp. aff. longestamineum* Dammer  
*S. nigrum* L. *S. sepicula* Dunal  
*Withania somnifera* (L.) Dunal

#### STERCULIACEAE

*Melochia corchorifolia* L.  
*Sterculia* sp. ( Carr 340)

#### TILIACEAE

*Corchorus olitorius* L.  
*C. trilobularis* L.  
*Grewia bicolor* Juss.  
*G. fallax* K. Sch.  
*G. tenax* (Forsk.) Fiori  
*G. villosa* Willd.

#### ULMACEAE

*Celtis integrifolia* Lam.

#### VAHLIACEAE

*Vahlb goddingii* E.A. Bruce



VERBENACEAE

Phyla nodiflora (L.) Greene  
 Premna resinosa Schauer  
 Priva adhaerens (Forsk.) Chiov.  
 Svensonia laeta (Fanzl. ex Walp.)  
 Moldenke

VITACEAE

Cayratia ibuensis (Hook. f.) Suesseng.  
 Cissus cactiformis Gilg  
 C. quadrangularis L.  
 C. rotundifolia (Forsk.) Vahl  
 Cyphostemma sp.

ZYGOPHYLLACEAE

Tribulus cistoides L.  
 . terrestris L.  
 Zygophyllum simplex L.

ANGIOSPERMAE:MONOCOTYLEDONES

AGAVACEAE

Sansevieria ehrenbergii Bak.

ARACEAE

Pistia stratiotes L.

COMMELINACEAE

Commelina benghalensis L. C. forskaolaei Vahl

CYPERACEAE

Cyperus alopecuroides Rottb.  
 C. articulatus L.  
 C. laevigatus L.  
 C. longus L.  
 C. martimus L.  
 C. rotundus L.  
 C. teneriffae Poir.  
 Scirpus maritimus L.

GRAMINEAE

Aristida adscensionis L.  
 Clayton  
 A. keniensis Henr.  
 A. mutabilis Trin. & Rupr.  
 Cenchrus ciliaris L.  
 C. setigerus Vahl  
 Chloris roxburghiana Schult.  
 C. virgata Sw.  
 Chrysopogon aucherl (Boiss.) Stapf  
 var. aucheri  
 Cymbopogon schoenanthus (L.) Spreng. var. proximus  
 Cynodon dactylon (L.) Pers.  
 Dactyloctenium giganteum Fischer & Schweickt.  
 D. sp. nov.  
 Digitaria macroblephara (Hack.) Stapf  
 Dinebra retroflexa (Vahl) Panzer  
 Echinochloa haploclada (Stapf) Stapf  
 Enneapogon brachystachyus (Jaub. & Spach) Stapf E.  
 cenchroides (Roem & Schult.) C.E. Hubb Enteropogon  
 macrostachyus (A. Rich.) Benth. Eragrostis cilianensis  
 (All.) Lutati

E. namaquensis Nees var. diplachnoides (Steud.) Clayton  
 E. namaquensis Schrad. var. diplachnoides (Steud.) Clayton  
 Eriochloa nubica (Steud.) Thell.  
 Heteropogon contortus (L.) Roem. & Schult.  
 Lintonia nutans Stapf  
 Loudetia phragmitoides (Peter) C.E. Hubb  
 Panicum coloratum L. P. maximum Jacq.  
 P. meyeranum Nees  
 P. poaeoides Stapf  
 Perotis patens Gand. var. parvispicula  
 Robyns  
 Phragmites australis (Cav.) Steud.  
 P. karka (Retz.) Steud.  
 Schoenefeldb transiens (Pilg.) Chiov.  
 Sehima nervosum (Wild.) Stapf  
 Setaria acromelaena (Hochst.) Dur. & Schlnz Sorghum  
 verticilliflorum (Steud.) Stapf  
 S. virgatum (Hack.) Stapf  
 Sporobolus consimilis Fres.  
 S. fimbriatus Nees var. latifolius  
 S. helvolus (Trin.) Dur. & Schinz  
 S. marginatus A. Rich.  
 S. pellucidus Hochst. S. pyramidalis Beauv.  
 S. spicatus (Vahl) Kunth  
 Stipagrostis hirtigluma (Trin. & Rupr.)  
 Tetrapogon cenchriformis (A. Rich)  
 T. tenellus (Roxb.) Chiov.  
 Tragus berteronianus Schult.  
 Urochloa setigera (Retz.) Stapf  
 Vossia cuspidata (Roxb.) Griff.

LILIACEAE

Urginea indica (Roxb.) Kunth  
 Asparagus sp.

PALMAE

Hyphaene thebaica (L.) Mart.

TYPHACEAE

Typha sp.



Nyangatom family with the household granary, in a large village along the west bank of the Lower Omo River, north of Omorate.