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THE SLOW DEATH OF AN ETHIOPIAN LAKE

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I first had the opportunity to visit Lake Ziway when I studied biology as an undergraduate at Addis Ababa University, Ethiopia, in the mid-1990s. Locals fished the lake, and it served as a source of water for the residents of the nearby town, Batu, formerly known as Ziway. Back then, no investment projects had begun in the lake area. The waterfront was covered in acacia vegetation, making it nearly impossible to see from a distance.



Fig. 1. © Hayal Desta. All rights reserved.

When I returned to the area in 2012, the vegetation around the lake had disappeared. The Meki River, which feeds into Lake Ziway, had experienced a drastically reduced flow and occasionally ran dry. The lake had receded from where it was in the 1990s, and the retreated area had been turned into farmland. Fifteen years after my first visit, Ziway was ringed by flower farms, resort hotels, and irrigated land.

Located in the Great East African Rift Valley (also known as the Afro-Arabian rift) region, 160 kilometers south of Addis Ababa and 1636 meters above sea level, Lake Ziway covers an area of 434 square kilometers. Its shoreline is 137 kilometers long within a watershed of 7300 square kilometers. The lake has two feeder rivers—Katar River from the southeastern and Meki from the northwestern direction—and one outlet, the Bulbula River. The five islands in the lake are Tulu Gudo, Tsedecha, Gelila, Funduro, and Debre Sina. On each of them are monasteries of the Ethiopian Orthodox Church. Except for Debre Sina, all are inhabited by the Zay people, believed to have

populated the islands of Lake Ziway between the early fourteenth and the middle of the seventeenth century.¹ The marshes around the lake are also home to several intra-African species of waders as well as cormorants, ducks, herons, cranes, and geese.² In total, the region encompasses about 50 percent of the country's bird species and diverse aquatic species.

The lake benefits the livelihoods of many of the poor local communities—some extremely impoverished households could not survive without Ziway.

The many ecological resources Lake Ziway offers to the local population propel socio-economic development in the region. In 2012-13 and 2014-15, I conducted surveys among heads of households in the communities of Batu and Meki towns. In the 2014-15 survey, all 635 interviewees stated that the lake benefits the livelihoods of many of the poor local communities—some extremely impoverished households could not survive without Ziway. Moreover, some local communities depend on the lake for animal husbandry, grass and reed gathering such as typha and papyrus for mattress making, house thatching, collecting wetland plants for handicraft-making, or small-scale trading of cooked fish and other resources extracted from this body of water.



Fig. 2 and 3: Some of the provisioning services of Lake Ziway to the local communities. © Hayal Desta. All rights reserved.

Other sources of income for the local communities are full-time jobs in the fishing industry and on flower, irrigated crop, or vegetable farms.³ Lake Ziway is one of the main sources of fish supply to the major market centers in the country, Addis Ababa and Adama.⁴ A large number of fishers organized into cooperatives, including women and children, engage in fish processing and marketing in the lake area. The lake also provides a source of water for open and closed farm irrigation in the region. Vegetables, the main local products—tomatoes, peppers, cabbage, and onions—are cultivated and shipped to different parts of the country.

Additionally, Lake Ziway supports various cultural ecosystem services, including aesthetic and spiritual practices as well as educational, recreational, and tourist activities, such as visiting the monasteries on the islands and bird watching. Among the spiritual rituals that local communities perform on the shores of this lake are the annual festival of Epiphany, which is observed on 19 January by Orthodox Church followers, and Irreecha, a thanksgiving holiday celebrated by the Oromo people in September, when the Ethiopian New Year begins. In the local Irreecha tradition, it is customary to scatter freshly cut green grass and flowers in a lake or river and sprinkle them with the lake's water.



Fig. 4: Priests carrying the Ark of the Covenant to celebrate the religious Epiphany ceremony at the shore of Lake Ziway. © Authority for Research and Conservation of Cultural Heritage (ARCCH), Ethiopia, 2018, with the permission of UNESCO.

Importantly, the lake is a major source of water for profit-driven private companies, especially the flower industry, which started to set up businesses in Ethiopia in the late 1990s. Since that time, foreign investment, mainly from the Netherlands, the United Kingdom, and India, has been growing and currently controls ownership of most of the more than 100 flower companies in the country. The remainder of the industry is financed by domestic and joint investors. Ethiopia has now become one of the main exporters of cut flowers—the second largest in Africa and the sixth in the world. Because of the Rift Valley region’s favorable agroclimatic conditions, vast fertile land, and its freshwater resources, the sector is rapidly developing.

Among the various flower companies in the region, one of the largest rose growers in the world and the biggest supplier to Europe, Sher Ethiopia PLC, was established here in June 2005. The company owns 700 hectares of land on the shores of Lake Ziway. It mainly produces roses and covers 65 percent of the total exports in the sector, especially to the European markets. Besides generating foreign exchange, the flower industry has created employment for more than 12,500 workers, most of whom are women.

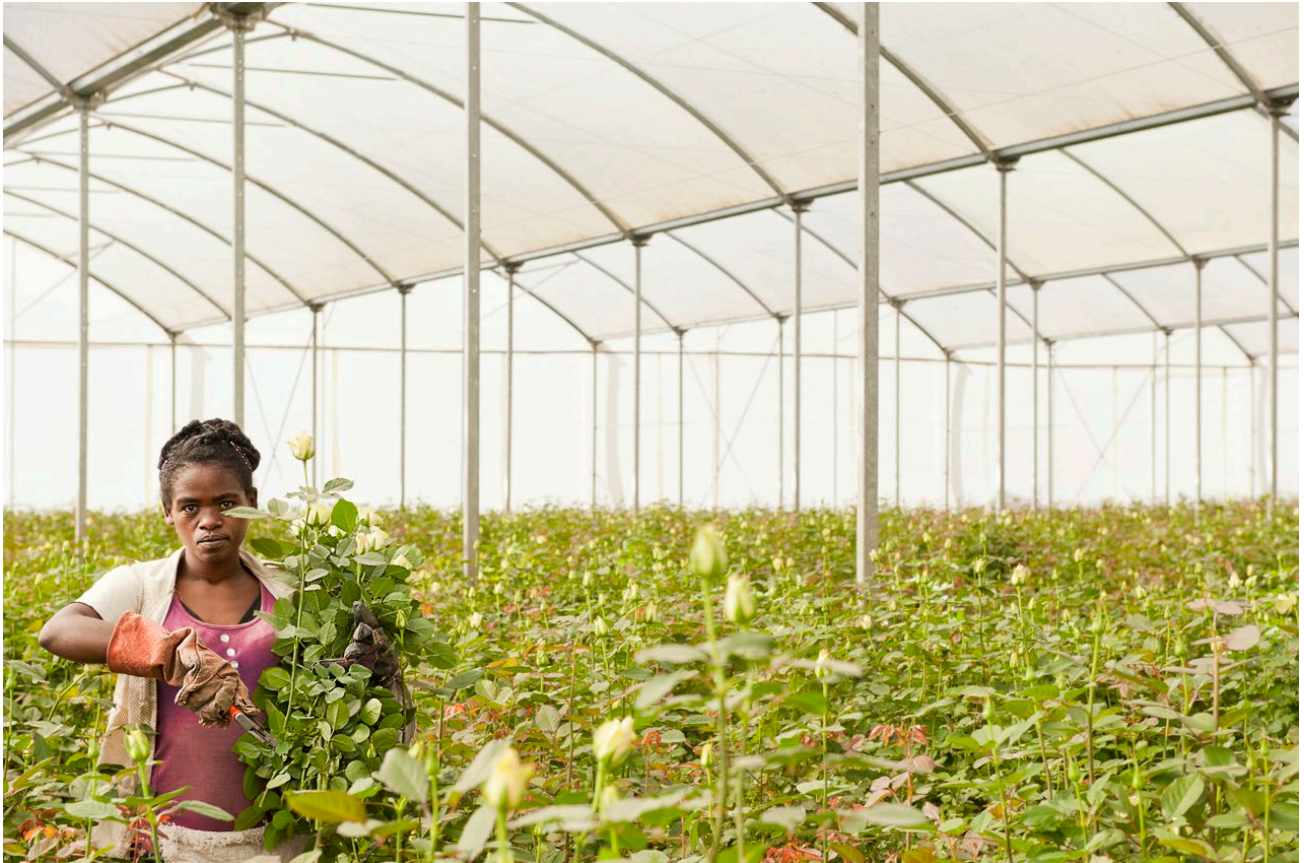


Fig. 5: Worker at Sher Ethiopia PLC. © Adriano Marzi. All rights reserved.

Although the growth of the cut-flower sector provides numerous employment opportunities and demonstrates the lake's overall value to the local economy, this benefit comes with a cost: one of the major environmental concerns of the cut-flower industry is its enormous consumption of water from Lake Ziway and the corresponding deterioration of the water quality. The industry extracts 115,517 liters of water per day from the lake using electric pumps.⁵ Compared to an average daily per capita water consumption of 40 liters in Addis Ababa,⁶ this amount could cover the water needs of 2,888 individuals.

Ethiopia is one of the most land- and water-grabbed countries in the world, with more than one million hectares of land seized underhandedly (2.13 percent of the global grabbed land and 0.91 percent of the country's area) and 15.74 billion cubic meters of water grabbed, mainly by foreign investment.⁷ Flower companies are a major contributor to this problem.



Fig. 6: Employee transporting freshly cut roses to processing room at AQ Roses PLC farm near Ziway, Ethiopia. Photo by Apollo Habtamu/IWMI, 2015. [CC BY-NC-ND 2.0](https://creativecommons.org/licenses/by-nc-nd/2.0/).

Agrarian practices are expanding significantly in the area due to infrastructure improvements, an increase in population, and an investment policy that encourages foreign capital outlay in agriculture through incentives such as exemptions from customs duty and income tax.⁸ All of this means the number of water users of the lake is increasing. The commercial flower farms, various agricultural cooperatives, the drinks industry, and fishermen's associations are all located 10 to 300 meters from the lakeshore—among them, Sher Ethiopia PLC, Ziway Rose, BGI Ethiopia (Castel Winery/Ziway), a subsidiary company of BGI (Brasseries et Glaciers Internationals), and Batu Fishery Research Center. Due to the lack of regulation efforts to control and monitor water extraction, all of them excessively use the water of the lake and its feeder rivers for irrigation.

In all probability, such uncontrolled water extraction will continue to increase in the years to come. If such excessive water extraction and usage persist, it is estimated that the water level of Lake Ziway may be used up within seven decades.⁹ The lake's disappearance would have major repercussions for the local residents. In my 2012-13 survey, members of the local communities stated that the human pressure on Lake Ziway was higher than on any other lake in the Ethiopian Central Rift Valley.¹⁰

If the excessive water extraction and usage persist, it is estimated that the water level of Lake Ziway may be used up within seven decades.

As a result of reduced rainfall and rising temperatures, the lake's watershed is already one of the areas in the country most vulnerable to climate change. The impact of global warming further leads

to declining fish catches, which are again propelled by uncontrolled and excessive fishing practices and water-quality degradation.¹¹ As is the case with water extraction, there is no control of overfishing. In my interviews, local fishermen said that the number of fish in the lake is steadily decreasing, and fish farming is no longer a reliable source of income, prompting the local population to look at other sources of livelihood to compensate for the loss.

Compared to other Ethiopian lakes, human-caused pollution is disproportionately high in Lake Ziway. When studying the ecosystem of the lake in 2013, I was an eyewitness to the effects of the flower industry, which drew freshwater from the lake and discharged untreated wastewater directly back into it (Figure 8). The agrochemical runoff from flower farms all around the watershed is one of the main causes of water-quality deterioration in the lake.¹² The presence of water hyacinth infestation along the western shoreline indicates eutrophication, which occurs when agricultural development activities increase surrounding a lake.¹³



Fig. 7 and 8: Electric pumps to remove water from the lake and wastewater discharge to Lake Ziway from floriculture industries. © Hayal Desta. All rights reserved.

Until quite recently, Lake Ziway was the only source of water for Batu residents. In 2018, when the Batu municipality realized that the water quality was deteriorating,¹⁴ they stopped supplying water from the lake to the residents. This has created a scarcity of water in the town, with the municipality spending more to supply water from remote areas. Yet everyone in the area—companies and individuals—still has free and unlimited access to the lake and its water for various economic activities.

Besides other causes, the deterioration of the lake also comes from a lack of awareness of sustainable resource utilization and protection. In my interviews, a small percentage of the local residents expressed their fear of the lake running dry. The great majority did not seem to realize the consequences of uncontrolled water extraction on the lake's sustainability; 20 percent did not fully understand, and 47 percent could not make any predictions about the future of the lake.¹⁵ The local population is not hostile to the lake, but their livelihood-based activities have an impact. There is a need to raise awareness among these communities so that they can better understand the problems the lake is facing, and then work to create community-based solutions that would alleviate the unwanted action imposed on Ziway and its vital natural resources.



Fig. 9: Lake Ziway, Ethiopia. © Hayal Desta. All rights reserved.

Overexploitation, pollution in the lake, population growth, urbanization, and increased water extraction threaten Ziway's existence.¹⁶ Recognizing the problems, the Batu city municipality conducted a study in 2014 through a consulting firm with funding from the Horn of Africa Regional Environment Centre and Network.¹⁷ The study advised the municipality to implement a buffer zone on the eastern side of the lake, which suffers from high human activity, but nothing has come to fruition so far.

Governmental bodies should play a meaningful role, and they should attempt to involve all stakeholders in implementing the principles of lake sustainability.

To prevent further degradation and to promote the sustainable use of the lake within the framework of environmental justice, it is necessary to allow local actors to participate in the shared responsibilities. Governmental bodies should play a meaningful role, and they should attempt to involve all stakeholders—most importantly, profit-based private companies, and the local communities who use the lake's resources to meet the demands of their livelihoods, as well as farmers cooperatives, non-governmental organizations, and key informants—in implementing the principles of lake sustainability.¹⁸ As stated in Principles 1 and 6 of the *World Lakes Vision* by the International Lake Environment Committee Foundation and the United Nations Environment Programme, "a harmonious relationship between humans and nature is essential for the sustainable use of lakes,"

and “citizens and other stakeholders should be encouraged to participate meaningfully in identifying and resolving critical lake problems.”¹⁹ Regarding the future use and management of Lake Ziway, it is first necessary to identify the impact of investment projects around the lake on its ecological balance. All parties, especially for-profit investment companies, should adhere to water-use standards. Those who make short-term profits by using the lake’s resources should consider the long-term environmental costs. Otherwise, Lake Ziway will soon be history.

Notes

- ¹ Giday Mirutse, Zemedede Asfaw, Thomas Elmqvist, and Zerihun Woldu, “An Ethnobotanical Study of Medicinal Plants Used by the Zay People in Ethiopia,” *Journal of Ethnopharmacology* 85, no. 1 (March 2003): 43–52, [https://doi.org/10.1016/S0378-8741\(02\)00359-8](https://doi.org/10.1016/S0378-8741(02)00359-8).
- ² Petra Spliethoff, Tesfaye Wudneh, Eskedar Tariku, and Getachew Senbeta, *Past, Current and Potential Production of Fish in Lake Ziway: Central Rift Valley in Ethiopia* (Wageningen: Wageningen University, 2009).
- ³ Hayal Desta, Brook Lemma, Gerhard Albert, and Till Stellmacher, “Degradation of Lake Ziway, Ethiopia: A Study of the Environmental Perceptions of School Students,” *Lakes and Reservoirs: Research and Management* 20, no. 4 (December 2015): 243–55, <https://doi.org/10.1111/lre.12111>.
- ⁴ Tenalem Ayenew and Dagnachew Legesse, “The Changing Face of the Ethiopian Rift Lakes and Their Environs: Call of the Time,” *Lakes and Reservoirs: Research and Management* 12, no. 3 (September 2007): 149–65, <https://doi.org/10.1111/j.1440-1770.2007.00332.x>.
- ⁵ Hayal Desta, Brook Lemma, and Ephrem Gebremariam, “Identifying Sustainability Challenges on Land and Water Uses: The Case of Lake Ziway Watershed, Ethiopia,” *Applied Geography* 88 (2017): 130–43, <https://doi.org/10.1016/j.apgeog.2017.09.005>.
- ⁶ ARUP, *City Characterisation Report: Addis Ababa*, <https://www.arup.com/perspectives/publications/research/section/city-characterisation-report-amman>.
- ⁷ Maria C. Rullia, Antonio Savioli, and Paolo D’Odorico, “Global Land and Water Grabbing,” *PNAS* 110, no. 3 (January 2013): 892–97, <https://doi.org/10.1073/pnas.1213163110>.
- ⁸ Ethiopian Investment Commission, *Ethiopia Investment Policies and Incentives and Opportunities*, <http://www.unido.or.jp/files/Ethiopia-Investment-Policies-and-Incentives-and-Opportunities.pdf>.
- ⁹ Hayal Desta and Brook Lemma, “SWAT Based Hydrological Assessment and Characterization of Lake Ziway Sub-Watersheds, Ethiopia,” *Journal of Hydrology: Regional Studies* 13 (2017): 122–37, <http://dx.doi.org/10.1016/j.ejrh.2017.08.002>.
- ¹⁰ Hayal Desta, Brook Lemma, Till Stellmacher, and Ephrem Gebremariam, “Water Use and Management of Lake Ziway and Its Watershed, Ethiopia: The Perception of Experts Vis-à-Vis the Latest State of Research,” *Environment, Development and Sustainability* 22 (2020): 3621–40, <https://doi.org/10.1007/s10668-019-00359-8>.
- ¹¹ Edward H. Allison, Allison L. Perry, Marie-Caroline Badjeck, W. Neil Adger, Katrina Brown, Declan Conway, Ashley S. Halls, Graham M. Pilling, John D. Reynolds, Neil L. Andrew, and Nicholas K. Dulvy, “Vulnerability of National Economies to the Impact of Climate Change on Fisheries,” *Fish and Fisheries* 10, no. 2 (June 2009): 173–96, <https://doi.org/10.1111/j.1467-2979.2008.00310.x>.
- ¹² Jordi Pascual-Ferrer, Agustí Pérez-Foguet, Jordi Codony, Ester Raventós, and Lucila Candela, “Assessment of Water Resources Management in the Ethiopian Central Rift Valley: Environmental Conservation and Poverty Reduction,” *International Journal of Water Resources Development* 30, no. 3 (2014): 572–87, <https://doi.org/10.1080/07900627.2013.843410>.
- ¹³ Nicholas B. Edgar, “Icon Lakes in New Zealand: Managing the Tension between Land Development and Water Resource Protection,” *Society & Natural Resources: An International Journal* 22, no. 1 (2008): 1–11, <https://doi.org/10.1080/08941920802223325>.
- ¹⁴ Personal communication with an expert from the Environmental Protection Team of the Batu/Ziway municipality, May 2019.
- ¹⁵ Hayal Desta, Brook Lemma, and Till Stellmacher, “Farmers’ Awareness and Perception of Lake Ziway (Ethiopia) and Its Watershed Management,” *Limnologica: Ecology and Management of Inland Waters* 65 (July 2017): 61–75, <https://doi.org/10.1016/j.limno.2017.07.005>.
- ¹⁶ Julia Martin-Ortega, Robert C. Ferrier, Iain J. Gordon, and Shahbaz Khan, eds., *Water Ecosystem Services: A Global Perspective*, International Hydrology Series (Cambridge: Cambridge University Press, 2015).

¹⁷ Personal communication with an expert.

¹⁸ Eric O. Odada, Japheth O. Onyando, and Peninah A. Obudho, "Lake Baringo: Addressing Threatened Biodiversity and Livelihoods," *Lakes & Reservoirs: Science, Policy and Management for Sustainable Use* 11, no. 4 (December 2006): 287-99, <https://doi.org/10.1111/j.1440-1770.2006.00309.x>.

¹⁹ World Lake Vision Committee, *World Lake Vision: A Call to Action* (Kusatsu: International Lake Environment Committee Foundation and United Nations Environment Programme, 2003), 22, 24, <https://www.riob.org/sites/default/files/IMG/pdf/WLV-Final.pdf>; see also International Lake Environment Committee (ILEC), *Managing Lakes and Their Basins for Sustainable Use: A Report for Lake Basin Managers and Stakeholders* (Kusatsu: International Lake Environment Committee Foundation, 2005).



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