El Niño: From Threat to Opportunity

Nyla Mohammed Dewji

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As the peak of El Niño approaches in the coming months, forecasts of heavy rainfall in parts of Eastern Africa have raised serious concern. Tanzania is in line to bear these effects, as the government prepares for what is expected to be devastating flooding. Flooding of this severity is classified as a climate risk, with the potential to cause death and injury, displacement, destruction of infrastructure, disruption of livelihoods, crop and livestock losses, contamination of water, and an increased risk of disease. These risks will be particularly severe for poorer communities, who face greater vulnerability to climate crises like these, with fewer resources to protect themselves from the immediate impacts of heavy flooding and to recover from the aftermath. There is no doubt that this El Niño will bring a significant threat to the country. However, with great threat comes great opportunity. Water that may seem excessive today could be desperately needed tomorrow. Could this period of excess rainfall present an opportunity for Tanzania to save water for the future?

While excessive rainfall creates flood risk, it also represents periods where unusually large volumes of fresh water become available within a short time frame, granting us the opportunity to save water. This opportunity is especially important given the ongoing threat of human-induced climate change and Tanzania's susceptibility to drought and water scarcity. Much of Tanzania’s environment is encompassed by semi-arid and arid drylands, where the inability to rely on surface water makes groundwater especially crucial. Underground aquifers are able to store water for long periods of time, providing a crucial source during periods of drought. The global depletion of groundwater has recently been classified by the United Nations as “water bankruptcy”, superseding long-term claims of water crises(Madani, 2026). Madani, the director of the UN’s University of Water, Environment and Health, defines the term as the “insolvency and irreversibility” of the natural water system, created through long-term human withdrawal of surface and groundwater to the extent that withdrawal exceeds the system's renewable inflows(Madani, 2026, p. 21). Madani further conceptualizes the term through a common bank analogy that views groundwater extraction as bank withdrawals and natural recharge as deposits(Madani, 2026, p. 40). When withdrawals exceed deposits, the bank inevitably declines. By seizing the opportunity of excess water through events such as El Niño, we can begin to aid the process of reversing this decline, or at least try to.

The question then remains: if rainfall naturally recharges these aquifers, then why has this decline occurred in the first place? In reality, research shows that recharge does not merely occur from regular or even consistent rainfall, but occurs during periods that are described as “episodic” rainfall(Seddon et al., 2021). Evidence from a study that observed groundwater sources in Matukapora, a semi-arid area located in central Tanzania, observes that “Recharge is biased to seasons of intensive rainfall, predominantly above the 80th percentile, that are associated with the El Niño Southern Oscillation (ENSO) (Maurice et al., 2019, p. 465)." The study not only attributes ENSO rainfall to aquifer recharge but affirms that these periods occur rarely, yet can be powerful enough to interrupt long periods of decline in groundwater sources. The study states that "Borehole hydrographs show long periods of decline interspersed with sudden substantial rises in groundwater levels that occur, on average, two to three times each decade(Maurice et al., 2019, p. 465)." The observed groundwater rises in the Makutapora water source coincided with El Niño years, including 2006–07, 2009–10, and 2015–16, with the 2015-2016 period causing recharge sufficient to reverse a long-term decline(Kolusu et al., 2019, pp. 1758–1759).

Although previous El Niño years have been associated with an upsurge in groundwater, El Niño patterns do not produce the same results each period, or even the same rainfall levels. Other factors also shape the oscillation's outcomes, such as the Indian Ocean Dipole (IOD), which, when strongly positive, is associated with heavier rainfall. Research shows that in East Africa specifically, a "mutual reinforcement" of El Niño combined with a positive IOD can produce intense rainfall (Preethi et al., 2015, p. 10). Observations from past El Niño periods support this reinforcement, with the highest levels of recharge in Makutapora coinciding not only with El Niño years but also with positive IOD events. Given the positive IOD associated with this year's El Niño, wetter rainfall can create particularly favourable conditions for groundwater recharge(World Meteorological Organization, 2026).

Even during these intense periods of rainfall that Tanzania is predicted to experience with El Niño climate patterns, there is no guarantee that the rainwater will enter underground aquifers. In reality, during intense rainfall, large volumes of water rapidly become surface runoff, which either flows downstream, evaporates, or contributes to destructive flooding. This is because rainwater does not infiltrate evenly across landscapes, and recharge potential depends on factors such as soil, geology, and slope(Mseli et al., 2021). Although evidence suggests that groundwater recharge can and does occur naturally during El Niño events, the opportunity lies in how we can maximize infiltration by placing interventions where the landscape allows for the greatest potential for recharge. This can be done through multiple methods of natural infrastructure, such as check dams, gabions, and leaky weirs, all of which serve to either "increase water residence time, rebuild alluvial storage, or expand infiltration capacity.(Norman et al., 2026, p. 4)"

Given the historical evidence of the correlation between groundwater recharge and El Niño events, Tanzania can use this year's rainfall to begin reversing groundwater depletion. Through efficient water capture and infiltration, we can maximize recharge during periods of heavy rainfall and flooding, both this year and in the uncertain near future. This brings forth the importance of not just managing flood risk, but looking to the future: how can the excessive water we have now prepare us for periods when there is not enough? This understanding of the water system as one is the main pillar of the Mo Dewji Foundation's newly founded One Water Strategy(Mo Dewji Foundation, 2026a). The strategy recognizes the need to look at the whole water cycle, connecting water through lives, livelihoods, and ecosystems rather than treating access, flooding, groundwater, and the environment as separate challenges. Water access alone is simply not enough; the wider system providing this water must also be sustained to ensure long-term water and climate resilience. This is particularly relevant as MDF begins the rehabilitation process of boreholes across Singida and Tabora(Mo Dewji Foundation, 2026b). While the program aims to restore access to clean and safe groundwater for underserved Tanzanians, the success of these boreholes ultimately depends on the aquifers that supply them. By connecting flood management, water quality, and community access as part of the same water system, the One Water Strategy looks beyond immediate access towards water security, turning Tanzania's vulnerability into strength by preparing for droughts before they even arrive.

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