



Hydro-diplomacy:

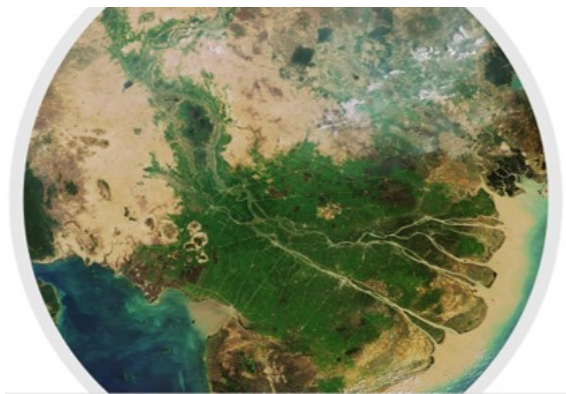
The role of space-derived data in advancing water security

The increasing severity of water scarcity – fuelled by climate change (Intergovernmental Panel on Climate Change 2008) – along with growing recognition of the threat this poses to global peace and human security, has given rise to ‘hydro-diplomacy’ (or ‘water diplomacy’). This important branch of foreign relations can be defined as the use of diplomatic instruments to make shared water sources a domain for peace and cooperation rather than for conflict.

In 2017, UN Secretary-General António Guterres highlighted the importance of hydro-diplomacy in an address to the UN Security Council, stating that “water, peace and security are inextricably linked” and that “water is and should remain a reason for cooperation not conflict”. Moreover, the UN has officially highlighted the need for international cooperation in water management in UN Sustainable Development Goal 6 of “Clean water and sanitation”, for which one target involves implementing “integrated water resources management at all levels, including through transboundary cooperation as appropriate” by 2030.

Achieving cooperative hydro-diplomatic relations depends on access to accurate, timely and reliable information about water resources (European Space Agency). Earth Observation data from satellites has dramatically improved our ability to measure and monitor changes in rivers, lakes and reservoirs, and allows us to more clearly see the effects of climate change which are intensifying our water scarcity challenges. Remotely-sensed data is particularly necessary for water management in regions that do not have well-developed land infrastructure in place to measure changes in bodies of water.

Space-derived data play a crucial role in water diplomacy by providing objective and unbiased information from which knowledge about water resources can be derived. This forms the basis of informed



decision-making regarding water management and is therefore important in the case of managing water resources that are located across national borders. Transboundary water management can be achieved much more efficiently and effectively when riparian states exchange data, as many states differ in their capacity for data collection and analysis, so information-sharing allows for a more complete picture

Improving the capacity of states around the world to access and apply space-derived data to water management will put us on course to strengthen water security and to mitigate the threats posed by water scarcity. . Thanks to the timely and accurate data provided by space technologies, states that share transboundary rivers or basins will be better equipped to implement hydro-diplomacy and use their shared water resource as a tool for cooperation rather than conflict.

10 Oct 2019 , by India Rose Walter

<https://www.space4water.org/s4w/web/news/hydro-diplomacy-role-space-derived-data-advancing-water-security>

Keeping a Satellite Eye on GERD

As the Grand Ethiopian Renaissance Dam (GERD) in Ethiopia nears completion, the giant structure on the main stem of the Blue Nile is expected to bring new electricity, economic activity, and development to Ethiopia. It should help regulate and prevent some destructive flooding in Sudan, while also bringing changes in the timing and volume of water flowing to farmers and others living downstream in Egypt.



Source :<https://earthobservatory.nasa.gov/images/149699/keeping-a-satellite-eye-on-gerd>

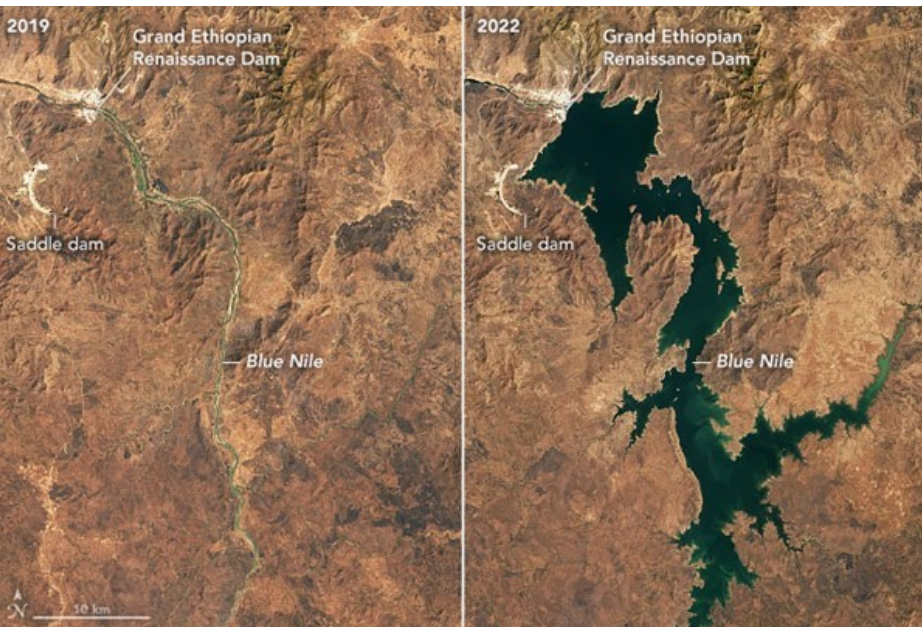


Source :<https://earthobservatory.nasa.gov/images/149699/keeping-a-satellite-eye-on-gerd>

NASA-funded researchers are developing satellite-based tools and techniques to make it easier to monitor and manage the new dam. Their goal is to help minimize ecological impacts and maximize economic benefits to the countries and people across the watershed. Satellites offer one of the best ways to assess what is happening in real time.

Hisham Eldardiry, a research associate at the Pacific Northwest National Laboratory (PNNL), is one of the scientists examining the dam from a distance. With support from NASA's Applied Sciences program, Eldardiry authored multiple studies on whether satellites can be used to monitor reservoir height and discharge rates from dams like GERD. His research also examined how water managers could manage the rate of filling the GERD reservoir to minimize downstream effects on the High Aswan Dam in Egypt. He also investigated whether the Blue Nile has enough water for GERD's 13 turbines to generate electricity to their full capacity.

In one of Eldardiry's projects (conducted when he was a research assistant at the University of Washington), he developed a web tool called the Nile Basin River Advisory System (NiBRAS); in Arabic, the word nibras means "light." The system draws together data from several satellites and models to provide near real-time information about key variables—such as water depth, temperature, and sediment—at points along the Nile, including the GERD reservoir and Lake Nasser. NiBRAS also includes a suite of forecasting tools that ingest recent weather data to predict reservoir outflows and storage. It also assesses how changes to land cover, climate change, or the management of other dams could affect dam operations.



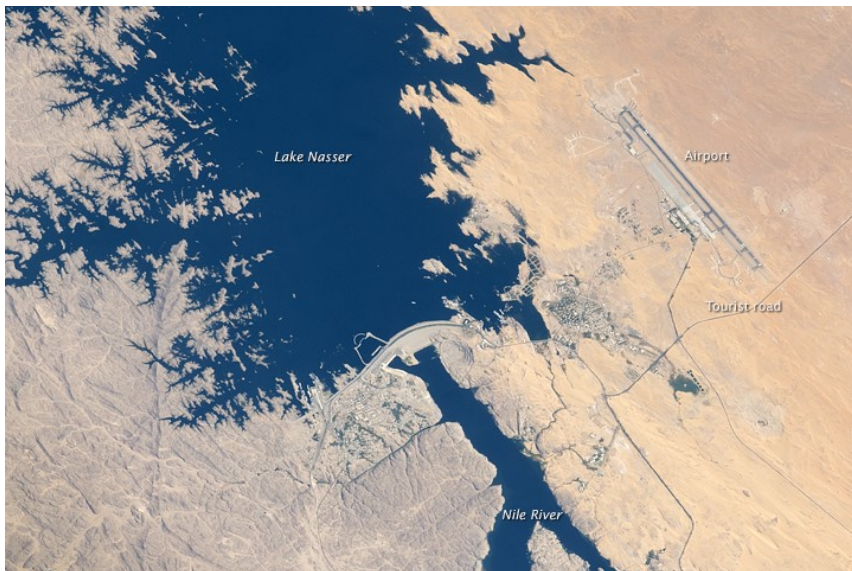
"There is a huge opportunity and need for the remote sensing community to provide reliable, transparent data to all stakeholders," said Eldardiry. "The output from tools like NiBRAS should be able to help with situational awareness and reservoir management during droughts and floods. Perhaps it can even benefit multilateral negotiations and help turn conflict into cooperation."

Eldardiry sees remote sensing tools like NiBRAS playing a particularly important role if drought returns to the Nile River Basin. The past few years

have been quite wet—making it fairly easy to start filling the reservoir without causing serious impacts to water users downstream, he said. However, a severe drought like the one that afflicted the region in the 1970s and 1980s could make it more difficult to strike the right balance.

Even an average year for rainfall could cause problems downstream. “We had extremely high rainfall in 2019 and 2020—nearly 1.8 standard deviations above the norm,” said Hesham El-Askary, a professor of remote sensing and earth system science at Chapman University. “If you remove that positive anomaly and replace it with a normal amount of rain, you see that even the amount of filling that happened in those two years would have been enough to reduce water levels downstream in Lake Nasser. If we had been in a drought, we would have seen drastic drops in water levels.”

Essam Heggy, a scientist at NASA’s Jet Propulsion Laboratory and the University of Southern California, agrees that satellites and remote sensing have a key role to play in monitoring how major dams might alter Nile River ecosystems. After the Aswan High Dam was built in the 1970s, satellites like Landsat helped track declines in the devastating floods that once routinely swamped the region.



“On the other hand, we have also seen the tip of the Nile River Delta disappearing year by year because of the reduction in sediment that came down the river after the Aswan High Dam was built,” Heggy said. The pair of Landsat images at the top of the page, from 1984 and 2021, shows this loss of land.

“Over the long term, there’s still a lot we don’t know about how GERD might contribute to changes in the river dynamics, sediment flows, and precipitation patterns in the Nile Basin in ways that can affect the ecosystem, soil fertility, and other environmental factors,” added Heggy. “While we already have some powerful satellites and sensors for monitoring changes, there are other tools we still need. We desperately need a satellite with a radar that is capable of detecting shallow aquifers—something we have on the Mars Reconnaissance Orbiter but not yet for Earth.”

He is working to change that as principal investigator for a proposed mission called Orbiting Arid Subsurfaces and Ice Sheet Sounder (OASIS). The sensor would map shallow aquifers much more effectively than any other satellite in NASA’s Earth science fleet.

“We can expect to see conflicts and tensions over water rights in the future as climate changes, and as desert regions expand and become drier, less hospitable places for people,” Heggy said. “We need to be ready to confront all the changes that are coming with the best possible tools and science.”

NASA Earth Observatory images by Lauren Dauphin, using Landsat data from the U.S. Geological Survey. Story by Adam Voiland.

Source :<https://earthobservatory.nasa.gov/images/149699/keeping-a-satellite-eye-on-gerd>



Ethiopia says willing to resume dam talks with Egypt, Sudan

June 10, 2022



Ethiopians protest against international pressure on the government over the conflict in Tigray, below a banner referring to The Grand Ethiopian Renaissance Dam, at a demonstration organised by the city mayor's office held at a stadium in the capital Addis Ababa, Ethiopia on May 30, 2021. A senior Ethiopian official said Friday, June 10, 2022 his country is interested in resuming talks with Egypt and Sudan on the huge and controversial Blue Nile dam that will be Africa's largest hydroelectric power plant. (AP Photo/Mulugeta Ayene, File)

NAIROBI, Kenya — A senior Ethiopian official says his country is interested in resuming talks with Egypt and Sudan on a huge and controversial Blue Nile dam that will be Africa's largest hydroelectric power plant.

The comment by Sileshi Bekele, Ethiopia's former negotiator on the dam and now the country's ambassador to the United States, came during a meeting with the new U.S. special envoy to the Horn of Africa, Mike Hammer.

A statement by Ethiopia's foreign ministry on Friday cited the ambassador as highlighting "Ethiopia's interest to resume the African Union-led trilateral negotiation over the GERD," or Grand Ethiopian Renaissance Dam.

The multi-billion-dollar project is expected to bring electricity to millions of off-grid Ethiopians, but Sudan and Egypt fear it will reduce the amount of water they receive from the Nile River.

Several past rounds of negotiations among Ethiopia, Egypt and Sudan have failed. Egypt fears a quick filling of the dam will reduce its share of Nile waters and seeks a binding legal agreement in case of a dispute.

In February, Ethiopia said it had begun producing power from one unit of the dam.

Earlier on Friday, the foreign ministry spokesman Dina Mufti told reporters the third filling of the dam is on schedule this year. "We have been saying since the start of the dam's construction that tripartite talks will continue," he added.

Source : https://www.washingtonpost.com/world/ethiopia-says-willing-to-resume-dam-talks-with-egypt-sudan/2022/06/10/709b17aa-e8d3-11ec-a422-11bbb91db30b_story.html

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