RENU LAYS UGANDA'S FIRST SUBMARINE INTERNET FIBRE CABLE IN LAKE VICTORIA, CONNECTING KALANGALA'S SSESE ISLANDS TO THE WORLD

With funding from the Internet Society Foundation, RENU has laid 80 kilometres (km) of Uganda's first submarine Internet fibre cable beneath Lake Victoria, opening new opportunities for digital education, healthcare and economic development on Bugala Island.

For generations, Lake Victoria has been both a source of livelihood and a barrier separating the people of Kalangala from essential services and opportunities on the mainland, including access to quality education, specialised healthcare, and economic opportunities. Today, for the first time, an Internet fibre cable runs beneath those same waters, connecting Uganda's mainland to Bugala Island and opening a new chapter for Kalangala's schools, health facilities, Other Tertiary Institutions (OTIs) and the wider community.

This historic milestone has been achieved through the Kalangala Connect Project, implemented by the Research and Education Network for Uganda (RENU) with funding support from the Internet Society Foundation. For a learner seeking knowledge beyond the classroom, a health worker accessing information to support patient care or an institution striving to better serve its community, this connection brings new possibilities within reach. It also marks an important step towards ensuring that the waters surrounding Kalangala District no longer limit its access to digital opportunities.

AN ISLAND OF BEAUTY, OPPORTUNITY AND CHALLENGES

Kalangala District is one of Uganda's most distinctive destinations. Located within the Ssese archipelago, it comprises 84 islands, 64 of which are reported to be permanently inhabited. Its sandy beaches, tropical forests and expansive views of Lake Victoria attract visitors, while fishing, agriculture and tourism sustain livelihoods across the district.

According to the Uganda Bureau of Statistics (UBOS), Kalangala had a population of 74,411 people in 2024, up from 54,293 in 2014. This represents growth of approximately 37% over the decade, highlighting the importance of expanding essential services to meet the needs of a growing island population.

Yet behind this natural beauty lies a challenge familiar to many island communities: accessing essential services such as quality education, healthcare, government services and reliable communication. For institutions that increasingly depend on digital systems, the island's geographical isolation has made these challenges even more pronounced.

The situation reflects a wider digital divide across Uganda. According to the 2024 census, only 4.3% of rural residents aged 10 and above reported using the Internet, compared with 16.6% in urban areas. Although these figures represent national trends rather than Kalangala-specific usage, they illustrate the inequalities that infrastructure initiatives such as Kalangala Connect Project seek to address.

For schools, unreliable connectivity has restricted access to digital learning materials and online research, often leaving teachers and students dependent on personal mobile data. Health facilities have faced similar challenges, with activities such as submitting reports, retrieving laboratory results and communicating with medical professionals relying on costly data bundles or connections with limited capacity.

FROM WIRELESS CONNECTIONS TO FIBRE BENEATH THE LAKE

RENU's journey towards connecting Kalangala began in 2021, when we supported the provision of Internet connectivity to 150 health facilities across the Greater Masaka region, including those on the islands, under the Rakai Health Sciences Program (RHSP).By early 2022, RENU had extended wireless connectivity to 14 health facilities in Kalangala, improving access to online systems, laboratory results and communication between healthcare workers.

However, reaching some of these facilities was far from straightforward.

Patience Nagaba, the Project Manager, and Head of Network Operations at RENU explained:

"We completed this assignment around early 2022, but given the geography of Kalangala District, extending connectivity to these health centres was far from straightforward. And in fact, we got to some health centres where no one believed that we could actually extend connectivity there because of the previous experience they had had. Healthcare workers used to buy Internet bundles on their mobile devices to download results from different portals, submit their periodical reports such as monthly, weekly, and quarterly reports, and exchange information with other healthcare providers in different facilities. This used to be so costly and the connectivity was poor. So, we had to think beyond the conventional last-mile solution or technologies".



The submarine fibre cable being delivered to the barge.



The technical team preparing the submarine fibre cable for deployment.

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Although these initial connections improved service delivery, some facilities could access speeds of only about 20 Megabits per second (Mbps), while growing demand for digital services required greater capacity and reliability.

Recognising the need for a more sustainable solution, RENU secured funding through the Internet Society Foundation's Resilience Grant Programme in 2023 to establish fibre-optic infrastructure connecting Bugala Island to the mainland. The funding paved the way for an investment designed to strengthen network resilience and provide a more reliable foundation for the island's digital future.

PHASE ONE: LAYING THE CABLE BENEATH LAKE VICTORIA

The first phase involved laying a submarine fibre-optic cable beneath Lake Victoria, connecting Bukakata landing site (Masaka District) to Bugala Island (Kalangala District).

Reflecting on the challenges encountered, Patience Nagaba, explained:

"During phase one, we faced significant delays. Obtaining the environmental and social impact assessment permit from the National Environment Management Authority (NEMA) took longer than anticipated. Also, securing the barge for the deployment of the submarine cable was equally challenging. These challenges had significant impact on the project schedule. The project started with building the submarine cable which was laid from Bukakata landing site on the mainland, to the Bugoma landing site on Bugala island, which was completed in 2025".

Despite these challenges, the submarine connection was successfully completed in January 2025, marking a major milestone in the effort to extend reliable, high-speed Internet connectivity to Kalangala.

PHASE TWO: EXTENDING FIBRE CONNECTIVITY TO INSTITUTIONS ON THE ISLAND

With the underwater connection established, RENU embarked on the second and final phase of the project, comprising two key segments.

The first segment involved extending fibre from Masaka city, where RENU has its nearest Point of Presence (PoP), to Bukakata on the mainland, where it connects to the submarine cable. The second segment involved extending fibre from the cable landing point on Bugala Island to Kalangala Town, where RENU established another PoP to distribute connectivity to the project's beneficiary institutions.

A Point of Presence is a central network location from which Internet connectivity can be extended to institutions and other users. Establishing this infrastructure in Kalangala Town is therefore an important step in ensuring that the underwater connection translates into reliable Internet access for schools, health facilities and other business establishments.

In 2026, RENU partnered with Kalangala Infrastructure Services (KIS), using the company's existing electricity distribution infrastructure to carry fibre across Bugala Island. This approach reduced the need to construct entirely new pole infrastructure, providing a practical and cost-effective route for extending the network.

Beyond laying fibre, RENU has installed Local Area Network (LAN) equipment, including switches and wireless Access Points (APs), to enable institutions to distribute connectivity within their facilities. These installations are particularly important in computer laboratories, libraries, classrooms, administration blocks and health facilities, where multiple users require reliable access to digital services.

Together, the two phases have established an interconnected network that carries high-speed Internet from the mainland, beneath Lake Victoria and across Bugala Island to the institutions it is intended to serve.

EXTENDING CONNECTIVITY TO THESE HEALTH CENTRES

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The submarine fibre cable being deployed on one of the electricity distribution infrastructure in Kalangala.

FROM SHARING A MIFI DEVICE TO EXPANDING LEARNING OPPORTUNITIES

At Ssese Farm Institute in Kalangala, accessing the Internet once meant moving a MiFi device between buildings. When administrators needed to process online transactions, the device was taken to the administration block. When students needed Internet access in the computer laboratory, it was moved again.

Even then, the number of connected devices was limited, and speeds deteriorated as more users connected to the device. A school representative from the institute recalled how slow connectivity sometimes prolonged student registration exercises from morning until midnight.

The need for improved educational connectivity is particularly significant in Kalangala. According to the 2024 census, 27,092 District residents were below 18 years of age, representing 36% of the population. While not all are enrolled in school, the figure highlights the substantially younger population that could benefit from continued investment in educational infrastructure. Nationally, the same census found that only 16% of the people who reported using the Internet used it for academic work, reinforcing the importance of making digital resources more accessible for learning.

At Ssese Farm Institute, the new fibre Internet infrastructure is already making a difference. According to Ms. Nambi Doreen, the Institute's ICT Head, teachers now have better access to resources for lesson preparation, while students carry out research online, explore agricultural innovations and communicate more easily with one another. Previously, the cost of purchasing data bundles made online research difficult for many students. With the new fibre connection, learners can explore subjects beyond their textbooks and access information that complements their practical agricultural training.

At Serwanga Lwanga Memorial Secondary School, the school's ICT Head, Mr. Isaac Kagera, shared that improved Internet connectivity is supporting research and access to educational materials while creating opportunities for virtual seminars and online learning.

For Kalangala Infrastructure Services (KIS), the partnership has also brought operational benefits. The organisation has reported improvements in network speed, reliability and connectivity between its facilities, making it easier to access information across different locations.

These experiences demonstrate how reliable Internet connectivity can reduce dependence on individually purchased data and support Uganda's competence-based approach to education, which emphasises research, inquiry



Students from Serwanga Lwanga Memorial Secondary School participating in an S.4 Mathematics seminar.

and practical learning.

A STRONGER CONNECTION FOR BETTER HEALTHCARE

At Kalangala Health Centre IV, reliable Internet connectivity is supporting essential healthcare activities, including submitting reports, retrieving laboratory results, participating in online meetings and communicating with other healthcare providers.

Before the fibre connection, limited bandwidth and unstable connectivity often delayed these tasks. Following the new installation, staff have reported improvements in speed, stability and reliability, making it easier to access online systems and complete routine work more efficiently.

The benefits also extend to healthcare training. Ms. Shanitah Kateme, a student from Kampala Institute of Health Professionals undertaking practical training at Kalangala Health Centre IV, explained that improved Internet access enables her to research medical equipment encountered during her placement, including patient monitors and X-ray equipment. While the full impact on healthcare outcomes has yet to be quantified, improved connectivity provides a foundation for more efficient information-sharing, professional collaboration and the future expansion of digital health services.

Beyond installing the network, RENU has conducted technical workshops to equip participants from beneficiary institutions with practical networking and cybersecurity skills. These sessions help institutions understand how to manage and make effective use of their connectivity, recognising that meaningful digital transformation requires both infrastructure and the skills to sustain its benefits.

PARTNERSHIPS THAT MAKE A DIFFERENCE

The Kalangala Connect Project demonstrates what can be achieved when organisations bring together funding, technical expertise and existing infrastructure to address a shared challenge.

The Internet Society Foundation provided the financial support needed to undertake a project that faced significant commercial and technical barriers. RENU contributed its technical expertise, network infrastructure and experience in connecting Uganda's research and education institutions, while Kalangala Infrastructure Services (KIS) supported island fibre deployment through its electricity distribution infrastructure.The collaboration illustrates how sharing existing infrastructure can help extend essential services to communities that might otherwise remain difficult and costly to reach.

CONNECTING KALANGALA TO UGANDA'S DEVELOPMENT AMBITIONS

The significance of the Kalangala Connect Project extends beyond Bugala Island. It represents a practical contribution to Uganda's efforts to expand digital infrastructure, strengthen essential services and ensure that geographically isolated communities can participate in national development.

According to the Uganda Communications Commission (UCC), Uganda had approximately 17 million mobile Internet subscriptions by September 2025. While this reflects the country's growing digital communications sector, subscription growth alone does not guarantee reliable, affordable and meaningful connectivity for institutions in underserved areas. Targeted investments such as Kalangala Connect therefore have an important role in addressing persistent geographical inequalities by extending high-speed Internet connectivity to underserved regions.

On 7th October 2026, all the schools on Bugala Island participated in an S.4 Mathematics seminar led by instructors from the mainland. The seminar brought together over 900 students from 150 schools across Uganda, demonstrating how connectivity can expand access to teaching and learning opportunities across geographical barriers. A video capturing participation at Serwanga Lwanga Memorial Secondary School, one of the schools on Bugala Island, has since attracted 7,000 views, drawing wider attention to how island schools are benefiting from connectivity. Together, these developments highlight the potential of digital technology to connect learners and teachers and bring more educational opportunities to island communities.

In healthcare, improved connectivity is supporting more efficient service delivery. At Kalangala Health Centre IV, health workers can more easily access online systems, submit reports, retrieve laboratory results and communicate with colleagues, strengthening the facility's capacity to deliver essential services.

The project also offers valuable lessons in infrastructure development and sharing. By partnering with Kalangala Infrastructure Services (KIS) to utilise existing electricity distribution infrastructure, RENU has demonstrated how resource sharing can support the expansion of digital services while reducing the need for entirely new infrastructure. This approach provides a practical benchmark for connecting other underserved communities across Uganda.

Beyond its immediate beneficiaries, the fibre network establishes a foundation for additional digital services, research activities and economic opportunities as connectivity expands across the island. It creates possibilities for institutions, businesses and communities to strengthen productivity and participate more meaningfully in Uganda's digital economy.

Ultimately, Uganda's digital transformation should be measured not only by the infrastructure established in major towns and cities, but also by the opportunities extended to communities that have historically been difficult and costly to connect. Through the Kalangala Connect Project, RENU and the Internet Society Foundation are demonstrating that geographical isolation need not determine who benefits from technological progress.