Photo by Francine Munyana, UNDP Burundi, 2025

Examining the Use of Technologies to Facilitate the Distribution of Insecticide-Treated Nets for Vector Control

CASE STUDY: *Tsinda Malariya*—Defeating Malaria—Piloting Burundi's use of the Digital Infrastructure for Governance, Inclusion and Transformation (DIGIT) platform to promote access to insecticide-treated nets (ITN) and campaign effectiveness.

Background

With a population of more than 12.2 million people and a density of 442 people per square kilometer, landlocked Burundi is one of the most densely populated countries in Africa.[1,2] With less than 80% of the population able to access a health facility within a 5 kilometer radius, the health system faces human resource shortages and funding uncertainty, further constraining its ability to provide quality care.[3] In areas where refugee populations fluctuate or increase, health and community systems are further strained.

Malaria remains the leading cause of disease in Burundi, with an incidence of 399.1 per 1,000 inhabitants, according to the 2023 National Health Management Information System, and a prevalence of 27% based on

1 Institut National de la Statistique du Burundi. (2024). Recensement Général de la Population, de l'Habitat, de l'Agriculture et de l'Élevage. (2024).

2 International Organization for Migration. (2024). *Burundi crisis response plan 2024-2026.* https://crisisresponse.iom.int/response/burundi-crisis-response-plan-2024-2026

3 Severe Malaria Observatory. (n.d.). *Burundi's health system. Medicines for Malaria Venture.* https://www.severemalaria.org/countries/burundi/burundis-healthcare-system

the 2016–17 Demographic and Health Survey. Risk stratification based on malaria incidence, testing and parasite prevalence classifies 21 health districts as very vulnerable, 10 as vulnerable or moderately vulnerable, and 15 as very low or low vulnerability.[4]

Several contextual factors contribute to the complex operating environment that affects the distribution of ITNs. Climate-related floods, landslides, strong winds and rising water levels of Lake Tanganyika are responsible for more than 90% of internal displacement in Burundi.[5] Tens of thousands of refugees from the Democratic Republic of the Congo entered Burundi in early 2025 to flee the escalation and prolongation of the armed conflict.[6] These and other internal and external shocks have dampened economic recovery from the COVID-19 pandemic. Fuel shortages are also exacerbating internet connectivity limitations in Burundi, which was recently reported to have one of the lowest levels of connectivity in the world.[7] Although internet access is limited, the mobile penetration rate is about 70% and is provided nationwide by three major telephone companies: Onatel, Econet and Lumitel.[8] Following Organic Law No. 1/05 of March 2023, new administrative divisions reducing provinces from 18 to five and municipalities from 119 to 42[9] were planned for official implementation in 2025 and were incorporated into the operational planning and digitalization of the 2025 ITN campaign.

Introduction

This case study provides an overview of the exploration and scaling up of digital technologies by Burundi's National Integrated Malaria Control Program (*PNILP*) to strengthen ITN monitoring, microplanning, household enumeration, distribution, supervision, monitoring and remuneration of ITN campaign workers, in collaboration with World Vision International Burundi as a community sub-recipient and with support from the United Nations Development Programme (UNDP). As part of a review of the use of technology to facilitate the ITN distribution in complex operational environments, coordinated by the Malaria Prevention Alliance's (AMP) Humanitarian and Displaced Populations Working Group and Catholic Relief Services, this case study presents findings from interviews with PNILP key informants, AMP and partners, as well as from cited sources summarizing the approaches, results and lessons learned during the planning and implementation of the ITN distribution campaign and its digitalization.

ITN Campaigns in Burundi

Since 2009, the PNILP has carried out six national campaigns for the mass distribution of ITNs, with technical support from AMP and UNDP. Burundi's first ITN distribution campaign in 2009 prioritized pregnant women and children under age 5 as part of a measles vaccination campaign. Since then, ITNs have been distributed through a targeted mass campaign in 2011 and universal coverage campaigns in 2014, 2017, 2019-2020 and 2022. In April and May 2025, the PNILP and its partners conducted a pilot digitalization campaign in two districts in Kirundo province, Busoni and Mukenke, to inform and refine ITN distribution planning for 2025. The strategy adopted for the pilot and scale-up phases was door-to-door enumeration followed by distribution at fixed sites four to six weeks later, covering all health districts in the country except Ngozi and Giteranyi districts, which benefitted from ongoing community ITN distribution. Enumeration and ITN distribution in the remaining provinces were implemented after the pilot phase and following elections. Campaign coordination in Burundi is led by a national campaign steering committee, known as COPIL, appointed by the minister of public health.

4 Ministry of Public Health and the Fight against AIDS. (2021). *National strategic plan for malaria control 2021-2027: Result of the NSP update 2018-2023. Government of Burundi.*

5 International Organization for Migration. (2024). *Burundi crisis response plan 2024-2026.* https://crisisresponse.iom.int/response/burundi-crisis-response-plan-2024-2026

6 LePoidevin, O. (2024, February 21). The influx of 40,000 people fleeing the Congo war is worsening the humanitarian situation in Burundi, according to the UN. *Reuters.*

7 Frackiewicz, M. (2025, June 2). Behind the scenes of the digital fight in Burundi: the truth about Internet access and the satellite solution. *TS2.* https://ts2.tech/en/inside-burundis-digital-struggle-the-truth-about-internet-access-and-the-satellite-solution/

8 Programme National Intégré de Lutte contre la Paludisme. (2025). *Action plan for the digitalization of the campaign.*

9 Republic of Burundi, Office of the President. (2023). *Organic Law No. 1/05.* https://www.ceniburundi.bi/wp-content/uploads/2024/06/LOI-n%C2%B05-du-16-mars-2023DETERMINATION-ET-DELIMITATION-DES-PROVINCES-COMMUNES-ZONES-ET-QUARTIERS.pdf

In the complex environment described above, the PNILP campaign planning and ITN procurement teams developed effective systems to manage and track large volumes of ITNs and their distribution, ensuring they are ready to respond quickly and effectively in densely populated areas. Campaign teams worked closely with refugee camp leaders to conduct a census the day before ITN distribution, using specialized microplanning to identify the camps' ITN needs in advance. The teams also worked closely with leaders of special groups, including orphanages, boarding schools, military and police camps, convents and other vulnerable populations, to strengthen distribution in line with the standard of one ITN per sleeping space. Information on special groups was collected during microplanning. Fuel for all campaign activities has been pre-purchased and was pre-positioned, stored, guarded and carefully managed throughout the campaign.

Digitalization of ITN Campaigns in Burundi

Since 2019, the PNILP has implemented several innovative digitalization initiatives in Burundi, summarized below. These efforts align with the National Health Informatics Development Plan 2020–2024 and the digitalization of the Burundian health system. In Burundi, more than 82% of public hospitals, 31% of faith-based hospitals and 40% of private hospitals have digitized recordkeeping.[10]

The history of ITN campaign digitalization initiatives to date in Burundi includes the following:

- ***Barcodes and quick response (QR) codes:*** In response to the challenges identified by the PNILP and the Global Fund during the 2019 and 2022 campaigns related to tracking and accounting for ITNs during transport and distribution, the PNILP piloted the scanning of ITNs and bales during the 2025 campaign. The approach used manufacturers' barcodes and QR codes to account for individual ITNs in the supply chain, as well as for households receiving ITNs. During the 2025 ITN pilot campaign in Kirundo, barcodes were scanned to track ITN bales and QR codes were used to track individual ITNs using the eGovernments Foundation's (eGov) DIGIT health campaign management (HCM) platform. Lessons learned from the pilot in Kirundo provide operational recommendations to reduce delays in ITN campaigns and ensure that QR codes and barcodes are properly affixed for scanning; that adequate lighting and tablet positioning are used during scanning; and that staff listen for the confirmation sound indicating that the scan has been recorded.
- ***ITN campaign payments:*** When planning for the 2019–2020 ITN campaign, the PNILP used a hybrid payment system, including physical cash and electronic payments, for the ITN campaign. This included using banks to transfer funds to selected national-level campaign workers and to selected certain suppliers, such as warehouse owners. Cash payments were made directly to campaign actors, including human resources for health (HRH) staff, ITN distributors and training participants, through bank agents using a point-of-sale system. Under this system, the names of campaign actors submitted by their supervisors were verified and validated before payments were issued. The introduction of the point-of-sale system generated several recommendations to further test electronic payment systems in Burundi. Digital payment mechanisms continue to be explored using the DIGIT HCM platform for the 2025 campaign, following the challenges faced during the Kirundo pilot project.
- ***Geo-enabled microplanning for ITN distribution in Bujumbura:*** As part of the 2022 ITN campaign, the PNILP, together with its partners, piloted the use of geographic information system (GIS) tools to digitalize microplanning and produced digital maps for the health districts of Bujumbura-Mairie Sud (urban) and Kabezi (rural). This included cascade training workshops to familiarize health districts and areas of responsibility with geospatial technologies such as open-source GIS software. In 2025, the use of GIS for microplanning was extended to all of Bujumbura-Mairie and Gitega.

10 Ministry of Health & Alliance for Malaria Prevention. (2024). *Action plan for the digitalization of the campaign (DPoA): Organization of the national campaign distribution of insecticide-treated mosquito nets.*

During programmatic reviews of the 2022 ITN campaign, the PNILP, the Global Fund, UNDP and the National Health Information System Directorate identified several gaps. These included delayed data analysis and reporting; a lack of real-time data to inform supervision; and limited monitoring of ITN distribution to end-users, including ad hoc groups, remaining ITNs at the end of the season, and inter-site transfer of ITNs.

Digitalization for the 2025 ITN Mass Campaign

To address these identified gaps, the Ministry of Health and UNDP as Principal Recipients of the Global Fund grant, decided to digitize the 2025 campaign using *Tsinda Malariya* (Defeat Malaria). The digital application uses DIGIT, an open-source and interoperable digital HCM platform developed by eGov with funding from the Gates Foundation.

DIGIT supports real-time monitoring of ITN campaign activities, allowing campaign teams at all levels to review and analyze progress and identify areas that need further reinforcement. At the central level, a dashboard and a dedicated monitoring room were established, where data was analyzed daily. Terms of reference were developed for the supervisory team and included continuous monitoring with national supervisory authorities, both directly and via WhatsApp, to monitor progress and quickly address gaps in coverage and other operational challenges.

The DIGIT platform allowed the collection of household data to be configured using digital tools in an environment where the Internet is not always available, allowing the data collected to be synchronized directly on the server when the network is available.

A digitalization sub-committee developed the 2025 ITN campaign digitalization action plan, budget and timetable. Key digitalization partners, under the leadership of the PNILP, include the *Health Sector Information Management Program*; the National Health Information System Directorate; the *Executive Secretariat of Information and Communication Technologies*; eGov; the Gates Foundation, as an eGov donor; UNDP; AMP; Bluesquare; and World Vision International.

About 11,000 of the 22,401 tablets and power banks available from the *National Institute of Statistics of Burundi* (INSBU) were used for the campaign, based on technical specifications that met the needs of both campaign activities and the DIGIT HCM platform.

Figure 1: INSBU tablets used for the digitalization of the 2025 ITN campaign.

Campaign staff included 11,485 trained community health workers connected to 773 health centers. During enumeration, community health workers were paired with INSBU digitalization officers who supported Burundi's recent general census for HRH activities, for periods of up to 10 days. For ITN distribution, teams of four people per site planned to work over six days.

Each ITN distribution team consisted of an agent responsible for scanning vouchers (QR code) and ITNs; an agent responsible for delivering ITNs to household representatives, a crowd management officer; and a communication officer who were responsible for demonstrating proper ITN use and delivering awareness messages to households.

Each ITN QR code assigned to a household were be scanned by the distribution team agent using a smartphone when the head of household or representative presented the voucher to facilitate the tracking of ITNs distributed to each household.

At the end of each day, distribution agents were able to synchronize data collected using the DIGIT platform when operating in areas with mobile network and internet coverage. In areas not covered by the mobile network, UNDP planned to provide satellite internet devices to facilitate data synchronization.

Because the eGov team did not have local representation in Burundi, UNDP mandated Bluesquare to provide technical support for deployment of the platform. Bluesquare's responsibilities included platform configuration, user training, data collection and analysis, and monitoring support. Bluesquare also provided ongoing technical support to resolve issues as they arise, with support from information and communication technology for development (ICT4D) officers recruited to provide closer technical assistance to digitalization agents and other actors involved in the process. These officers were recruited at a ratio of one per health district and two per health centers.

In Burundi, DIGIT was used to digitize the following components of the 2025 ITN mass campaign:[11]

- Household registration, including GPS-based household location, QR code scanning of vouchers and a visual dashboard to monitor the performance of campaign staff.
- Fixed site ITN distribution, with QR codes scanned from household vouchers to confirm automatic ITN allocation in line with the national ITN mass distribution strategy and to track ITNs distributed to each household.
- Logistics, including barcode scanning to track each ITN bale, strengthening warehouse inventory management and reconciliation.
- Attendance and payment list, to monitor the performance of campaign staff and facilitate payments.
- Supervision, enabling supervisors to report daily updates on campaign activities to the central level through the digitalization of the supervisory checklist.

During the pilot project in Kirundo province, *Tsinda Malariya* was tested in near-real operational conditions, including limited connectivity, remote implementation sites, diverse user profiles, and the linkage of ITNs to households. The pilot included digitized household enumeration; delivery of digital eligibility vouchers; ITN distribution at fixed sites; and digital monitoring of inventory management, along with real-time analysis of operational data. Campaign staff were trained at all levels, including ICT4D officers, health workers and stock managers.

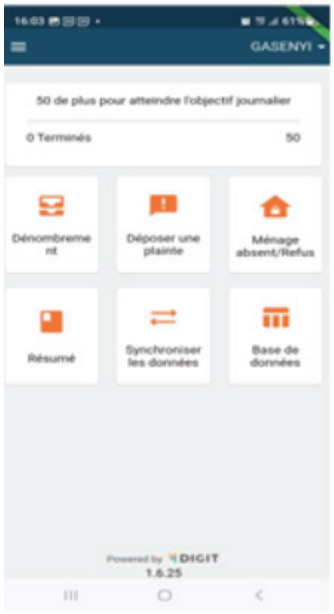

Figure 2: Application of Tsinda Malariya household registration

Leveraging Digital Technology to Address Identified Challenges

Planning for the digitalization of the 2025 ITN campaign reflects the complex operational context of Burundi. To mitigate the high staff turnover rate in critical Ministry of Health positions and address capacity constraints, additional training was provided on use of the new digital platform. INSBU-trained census workers were paired with community health workers to support capacity building and ensure quality implementation. An additional day of training was added to ensure that HRH teams are introduced to new administrative information. Updated training materials were prepared within a few days of the start of household registration activities.

To provide details on the number of people living in refugee camps and the names listed for these individuals, a tailored DIGIT data collection interface will facilitated refugee data collection based on microplanning data. Since the 2024 microplanning phase, the security crisis in the Democratic Republic of the Congo has resulted in daily refugee movements into

11 Ministry of Health & Alliance for Malaria Prevention AMP. (2024). *Action plan for the digitalization of the campaign (DPoA): Organization of the national campaign distribution of insecticide-treated mosquito nets.*

Burundi and the establishment of new camps. Refugees were enumerated to determine population size; however, ITN distribution in new camps was based on ITN availability following the campaign.

To support daily data synchronization despite fuel shortages and limited network connectivity, a dedicated budget was allocated for satellite internet access to maintain campaign team connectivity. Campaign and digitalization planning teams also compared the mapped 2024 microplanning data with the new administrative divisions. In response to administrative reforms reducing provinces from 18 to five and communities from 119 to 42,[12] planning for enumeration, ITN distribution, and logistics were updated to reflect finalized administrative decisions. To operationalize these changes, the 11,000 tablets designated for ITN campaign data collection were reset updated, with pre-programmed lists reinstalled using the new administrative information. Android package kits were reintegrated into the mobile applications.

Results and Achievements

Results from the ITN campaign and the digitalization pilot project highlight many successes in ITN planning and implementation. Campaign strategies enumerated more than 97% of households across the two health districts between April 2 and April 12, 2025. In addition, more than 97% of households that received vouchers redeemed them for ITNs at a fixed distribution site between May 5 and May 10, 2025.[13]

Lessons Learned

The pilot identified several key lessons, which were documented in a detailed lessons-learned report and used to inform updates and areas for strengthening across the full campaign.[14] Key lessons include the following:

Figure 3: DIGIT Dashboard

- Application readiness: The application's Android package kit was finalized and shared only one day before the training began. On the first day of household registration, the application did not recognize the ITN voucher QR codes, requiring an immediate update. This resulted in a delay of approximately one and a half days. Despite this setback, more than 97% of households in the two pilot districts were enumerated within the remaining 8.5 days, demonstrating that digitalization can reduce the time and effort required for enumeration.
- Digital payments: Implementation of the digital payment mechanism encountered initial challenges. The payment module has since been finalized and was deployed during the campaign's expansion phase. Attendance was recorded through DIGIT, which will generate payment reports for mobile payment partners. Validated data still needed to be integrated as denominators in ITN distribution data.
- Barcode placement: To ensure fast and accurate scanning, barcodes must be properly affixed to ITN bales by stretching them flat for reading.
- Connectivity: Portable satellite connectivity kits are essential in areas with weak network connectivity. In several pilot locations, data synchronization was delayed by up to four days before the satellite network was used.
- Logistics training duration: Logistics training requires more than a half-day session for ITN product management.

12 Republic of Burundi, Office of the President. (2023). *Organic Law No. 1/05.* https://www.ceniburundi.bi/wp-content/uploads/2024/06/LOI-n%C2%B05-du-16-mars-2023DETERMINATION-ET-DELIMITATION-DES-PROVINCES-COMMUNES-ZONES-ET-QUARTIERS.pdf

13 Programme National Intégré de Lutte contre le Paludisme. (2025). *Action plan for the digitalization of the campaign.*

14 Programme National Intégré de Lutte contre le Paludisme, & Alliance for Malaria Prevention. (2025). *Lessons learned from the digitalized distribution of ITNs in two pilot districts (detailed version): Busoni and Mukenke.*

Photo by Daniella Ninteretse, UNDP Burundi, 2025

- Training approach: The training materials provided more theoretical than practical information, for example by testing the reading of barcodes printed on sheets of paper rather than fixed to ITN bales. The training results highlighted the need to strengthen and test campaign staff knowledge of the *Tsinda Malariya* application, as well as their ability to use the dashboard and dashboard data for decision-making.
- Population discrepancies: The pilot identified a gap of approximately 10% between the registered population and the microplanned population, and a gap of about 20% between registered households and microplanning estimates across the two health districts.

Way Forward

One of the key factors in the success of the pilot project was the establishment of a monitoring team. At the World Vision International office in Kirundo, the PNILP, UNDP, Bluesquare and World Vision International held daily meetings to review the *Tsinda Malariya application dashboard* and to monitor and analyze campaign performance data in real time, taking corrective action as needed. This operational experience with a monitoring room enabled data-driving decision-making and rapid responses to challenges, strengthening overall distribution performance in the two pilot districts.

With support from the Global Fund, UNDP will continue to support the PNILP in using DIGIT during the scale-up phase of the 2025 ITN distribution campaign, following the success of the pilot phase, as part of efforts to advance the delivery of essential health services and strengthen health systems. eGov will provide knowledge resources, training and advisory services to build digital health capacity and to upload campaign data into an interoperable national database at the conclusion of all campaign phases.

The PNILP will continue to collaborate with partners to monitor and strengthen ITN campaign activities and leverage DIGIT to support continuous improvement.