



REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO DA SAÚDE

DIRECÇÃO NACIONAL DE SAÚDE PÚBLICA

PROGRAMA NACIONAL DE CONTROLO DA MALÁRIA

Findings from the Digitalization of Multiple Malaria Campaigns with a Common MOH Platform: Impact, Costs and Lessons

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The Malaria Campaign Landscape in Mozambique

Given the epidemiology of malaria in the country a variety control and prevention strategies are implemented at scale through mass campaigns; recent efforts have focused on their digitalization.

Malaria in Mozambique:

3.5 %

Of global malaria cases occur in Mozambique

5th

Place in malaria cases, worldwide

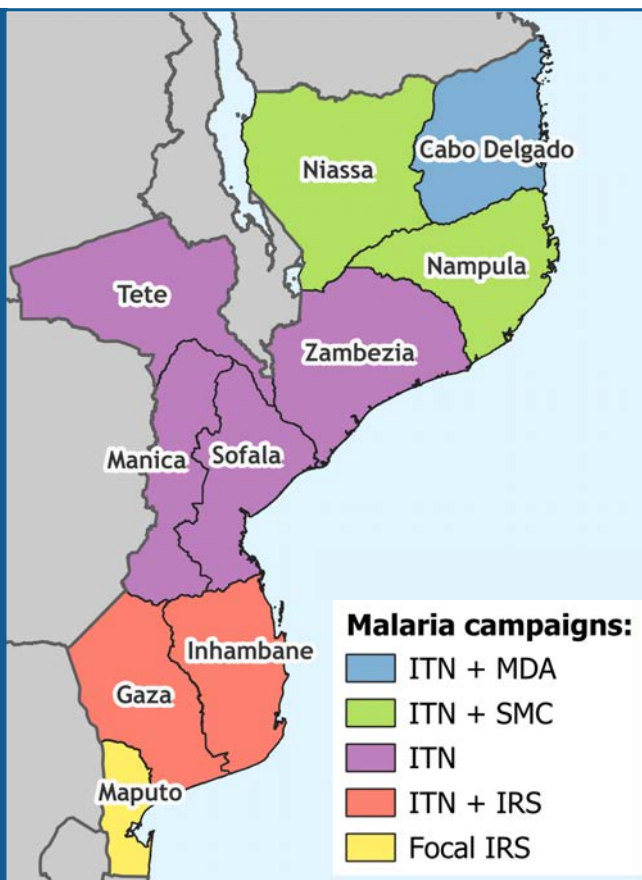
275

Incidence per 1,000

6th

Place in malaria deaths, worldwide

(WMR 2024)



Mass Drug Administration

- Used as an emergency response measure.
- First digitalized in **2020**, through SurveyCTO + PowerBI



Insecticide Treated Nets

- Main prevention strategy in the country.
- First digitalized in **2022-2023**, with:
 - DHIS2 (7 provinces)
 - SALAMA (2 provinces)



Seasonal Malaria Chemoprevention

- Strategy for highly seasonal provinces.
- First digitalized in **2024**, using SALAMA



Indoor Residual Spraying

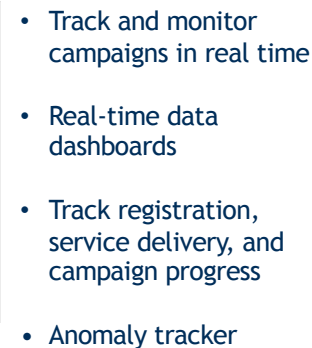
- Used to accelerate reduction of malaria in lower burden areas.
- First digitalized in **2024-2025**, using SALAMA



Mobile data collector

- Easy-to-use mobile app
- Guided user flows and analytics
- Simplified routine tasks with built-in error checks
- Works offline

Dashboard for Data Visualization



Management Tools

- Set up and configure multiple campaigns
- Staff management
- Centralized help desks and complaint management
- Easy integration with DHIS2 and other open-source products

3 Campaign Types (SMC, ITN, IRS)



Interventions Delivered





Ongoing Evaluation of Campaigns & their Digitalization

NMCP and partners have designed mixed-methods evaluations and embedded them onto the campaigns' lifecycles to continuously measure the impact of digitization, implementation strength, and costs.

Campaigns:



ITNs



SMC



IRS

Data Sources for 2022-2024 Evaluations:



Programmatic
malaria data



Operational
campaign data



Key informant &
user interviews



Post-campaign
household surveys



The structure for these evaluations was based around the WHO campaign digitization M&E guidance.



Results of the Evaluations of Mozambique's Digitalized Campaigns





Improved coverage through real time data usage

A key decision during the ITN Campaign was whether to prolong the duration of distribution.



Distributions are planned to last 5 days.



As campaign data is collected, it is visible in near **real-time** in the dashboards.



During daily monitoring, staff can identify **areas with poor coverage** and request **informed** campaign extension.

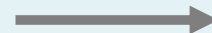


Deployed resources can continue operations in **at-risk areas**, removing the need to plan and execute mop-ups.

National ITN Population Coverage:

79%

Original campaign dates



90 %

With extension days

* Aimed for a coverage of 85%

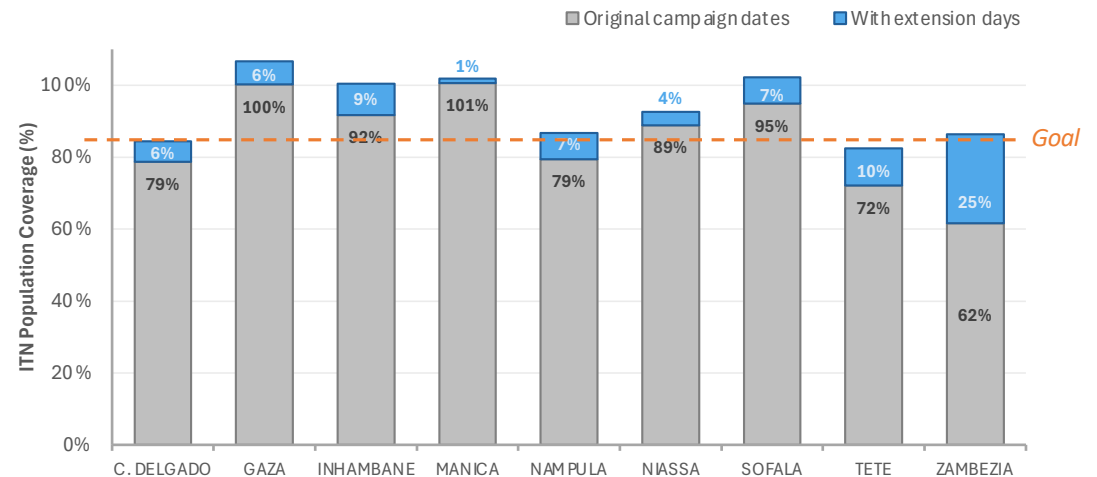
Campaign extensions were needed to reach the target coverage, and delivered:

1,956,786 ITNs

affording additional protection to:

3,522,215 people

Effect of Campaign Extension Days on ITN Population Coverage, by Province:

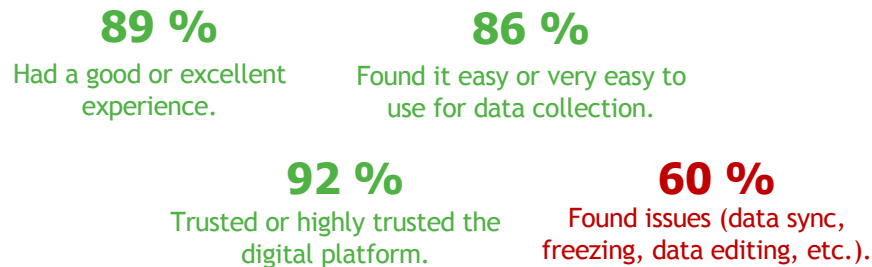




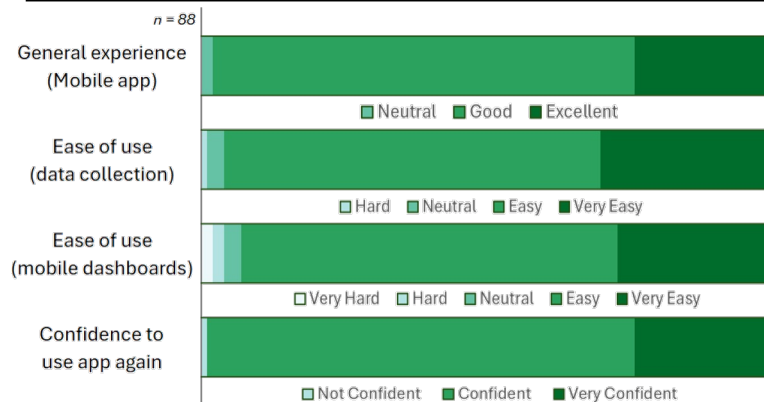
Digitalization was Well-Received by the Users and Staff

Workers reported high satisfaction with SALAMA across campaigns, whereas the leadership of SMC noted SALAMA as a tool superior to paper for management in all examined categories.

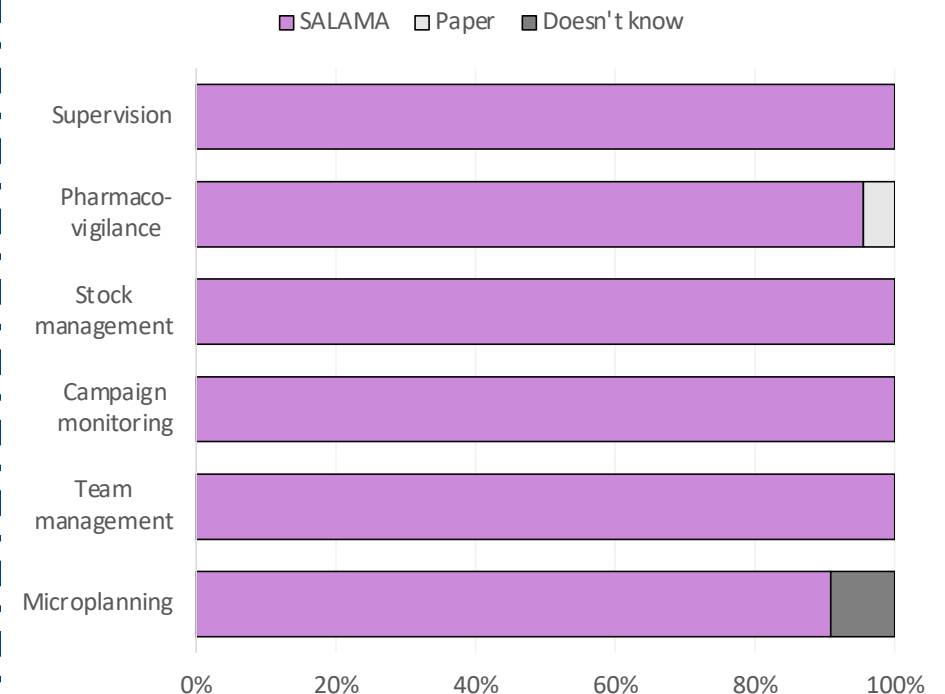
End user opinions of SALAMA for SMC:



ITN and SMC worker satisfaction with SALAMA:



Data system preference of SMC leadership across categories (SALAMA vs paper; n = 24):





Campaigns Struggled with Inexact Population Denominators

In the absence of enumeration activities, population sizes have been estimated but this has led to some unrealistically high coverages. Post-campaign surveys were deployed to validate results.



ITNs: Household ITN coverage estimates, 2023:

Campaign estimate:

Post-distribution survey estimate:

Sofala province:

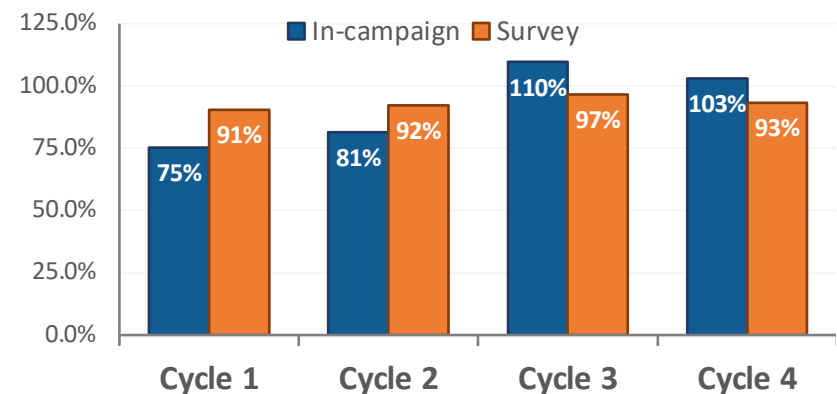
128% → **96 %**

Zambezia province:

106% → **86 %**



SMC: Coverage of children with >1 dose SPAQ per SMC cycle, 2024:



Population and HH estimates are calculated based on census, data from previous campaigns, population growth rates and local knowledge.

There is room for improvement in the approach.

Though coverages were found to remain generally high, post-campaign validation surveys (like through LQAS) were a reliable system for determining the reach of mass health campaigns.



Population was Scant in Areas Missed by the ITN Campaign

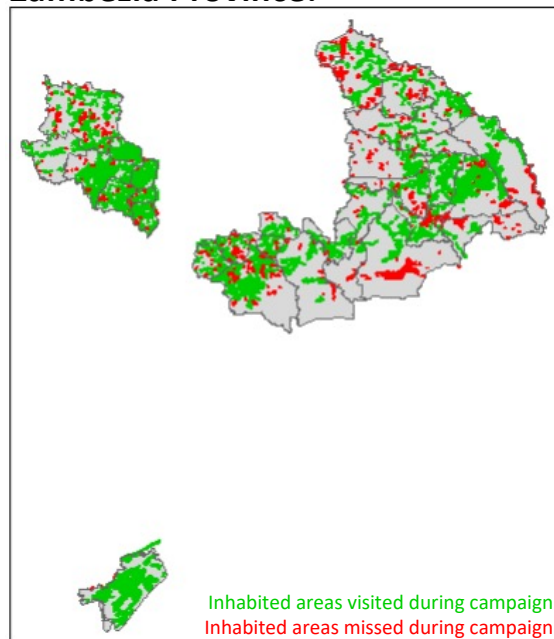
By relying on GRID3's satellite settlement data, a methodology was developed to identify potentially inhabited areas, which was then contrasted to the ITN campaign's household GPS points.

In the eight study districts, a total of 1,571 potentially inhabited areas were defined.

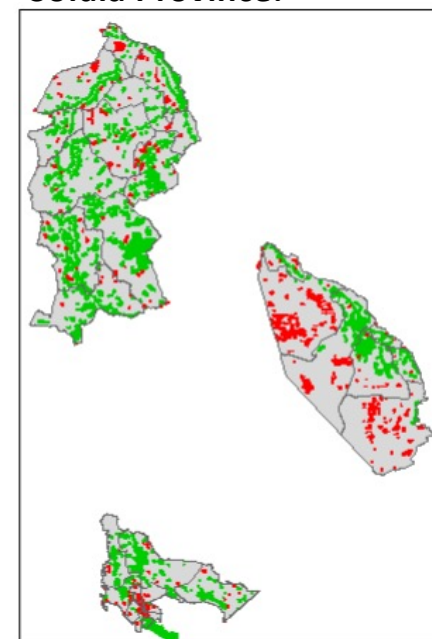
After comparing to campaign geodata, **667 of these areas (42%) were found to not have been visited during the ITN campaign.**

However, a comparison with a population layer revealed that **only 4% of the population mapped to these inhabited areas**. This suggested that missed areas may not have contributed as much to reduced coverages as missed households in visited areas.

Zambezia Province:



Sofala Province:



The methodology is being examined to determine how it will be used in the upcoming campaign (i.e. support microplanning or monitoring the reach of distribution).

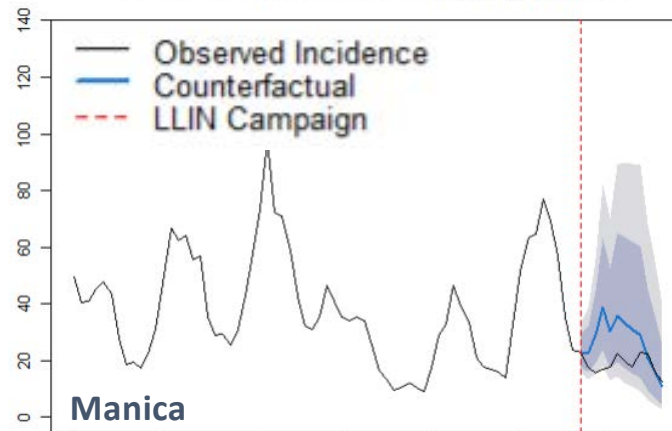


The Impact of the ITN Campaign

The effect of the ITN distribution campaign on malaria incidence was assessed through ARIMA modelling

Malaria incidence was modelled alongside environmental and ITN covariates to understand what incidence would have looked like in the absence of the ITN campaign.

Forecasts are limited to the 12 months following the intervention, and in **three out of nine provinces, no effect was detected.**



For example, in Manica, the **observed incidence** remains within the area of uncertainty for the **counterfactual**.

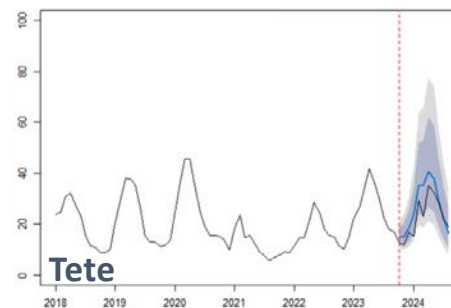
While no statistical impact was detected, cases remained very low, even during usual high-burden months.

Other provinces without a detected effect:



Humanitarian emergencies in Cabo Delgado have disrupted access to care, intervention coverage and reporting.

ITN coverage: 84%



While no statistical impact was detected in Tete, cases post CCU were lower than the previous year.

ITN coverage: 82%



The Impact of the ITN Campaign

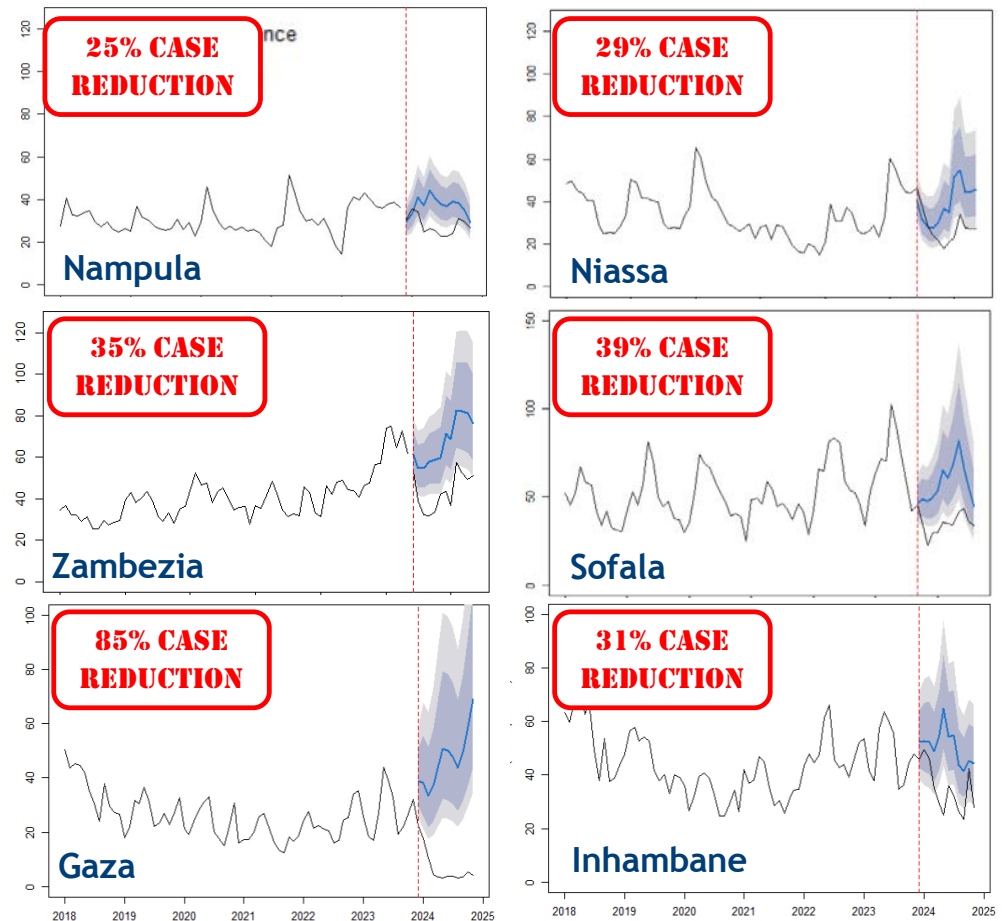
The effect of the ITN distribution campaign on malaria incidence was assessed through ARIMA modelling

But in six provinces, modelling did note that ITN distribution had a significant effect on incidence.

Cases averted in the 12 months following ITN distribution:

Province	Cases averted
Nampula	624,184
Niassa	260,543
Zambezia	1,740,748
Sofala	529,327
Gaza	637,611
Inhambane	289,793
Total:	4,082,206

Models suggest that **over 4 million malaria cases** were averted through the mass distribution of ITNs in the year following the campaigns.

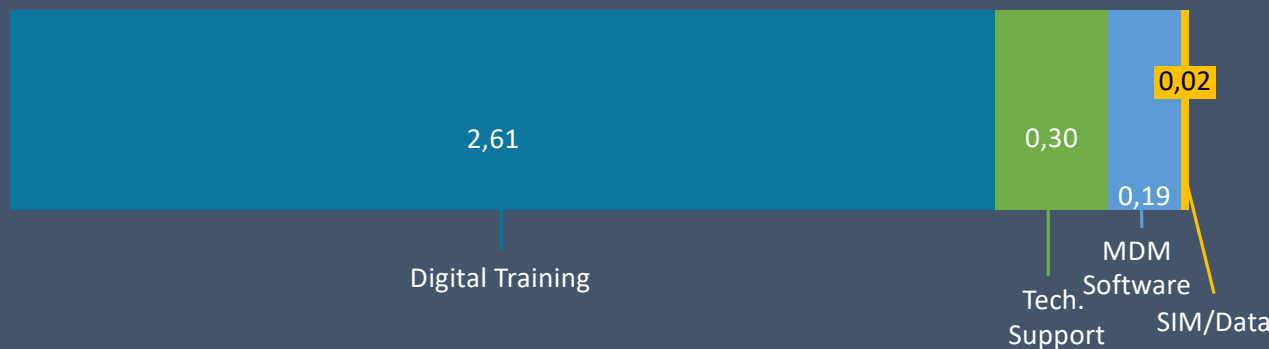




The Costs of Implementing Digitalization

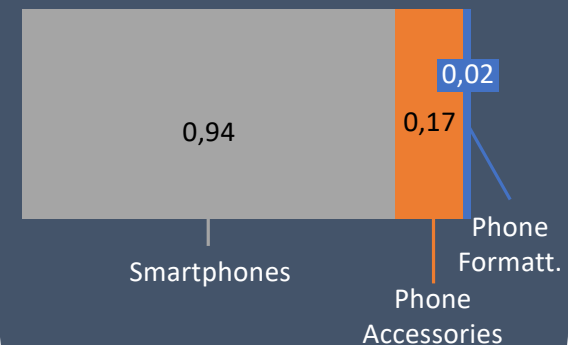
Transitioning from paper to digital campaigns required initial capital investment, but an integrated approach means that some assets are re-used and shared across multiple campaigns.

Recurring Digitization Costs (ITN Campaign)



\$3.12M

Capital Costs



\$1.12M

Initial investment (ITN campaign) = **\$4.25M**

Final, Estimated ITN Digitization Costs

\$3.12M + [**\$1.12M** x **19%**]

=

\$3.35M

But based on a forecast of device usage until the end of their useful lives, estimated percentage asset costs can be distributed across campaigns

Campaign	Device Usage
ITN	19 %
SMC	38 %
IRS	43 %





The Costs of Implementing Digitalization

The recurrent costs incurred as a part of digitalization will reduce with the usage of the same platform across several campaigns

Factors that will influence the decrease of the cost over time:



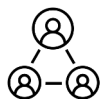
Reduced Training Time: Fewer days are required for Master ToT and Provincial ToT training, optimizing campaign preparation. As an example, for the ITN Cabo Delgado and SMC Niassa campaigns a Master ToT was not required.



Increased Efficiency: Field teams familiar with previous campaigns need less training due to a consistent user experience with the platform.



Cost Savings in Microplanning: Digitalization enables data capture and validation through the SALAMA microplan module, reducing in-person meetings/workshop costs.



Optimized Resource Use: Potential for integrated and co-delivery campaigns, leveraging shared resources to minimize expenses.



Reduced Technical Support Needs: As local teams gain expertise, reliance on technical support from the national team decreases.



Worker Compensation: Digitalization of Payments

The payment module was developed in SALAMA but has yet to be used in a campaign. However, field attendance data has already started being captured through the attendance module and user activity logs in the system.

Attendance Module

The module to capture field worker attendance was deployed in the IRS, SMC and ITN campaigns, forming the basis for payments.

A new module was developed that serve as Payment Advisor, the intent is to involve this module enabling seamless payment completion through integration with a mobile payment portal.

Marcar Presença
02 Feb 2023 - Sessão da Manhã

Pesquisa pelo nome ou pelo ID

Nome	Presença	ID
Piyush HarjitPal	Meio dia	ID8498598
Chandra	Ausente	ID8498598
Antriksh	Presente	ID8498598
Piyush	Presente	ID8498598
Chandra	Presente	ID8498598
Kishore	Presente	ID8498598
Nawal		ID8498598
Kishore		ID8498598
Kumar		ID8498598
Nawal		ID8498598
Nawal		ID8498598
Nawal		ID8498598
Nawal		ID8498598

Module to Manage the attendance logs and payment

MBADI HIGHLANDS UPGRADE KEY

Campaign worker	User name	Role	Number of days worked
David Davis	DAVID-1001	Coordinator	9
David Smith	DAVID-1002	Health Facility Worker	10
David Williams	DAVID-1003	Coordinator	9
Emily Jones	DAVID-1004	Coordinator	6
Emily Smith	DAVID-1005	Health Facility Worker	6
Jane Davis	DAVID-1006	Coordinator	10
Michael Jones	DAVID-1007	Coordinator	9
Sam Smith	DAVID-1008	Coordinator	9

Bill Inbox

Info: Bill is already generated for this location.

SMC Campaign Payments

Approved registers (2) Pending registers (2)

Attendance ID	Boundary	Approved by	Number of attendees
1001-2023-02-02-001	Thelin	Michael Davis	8
1001-2023-02-02-002	Thelin	Michael Davis	4

Bill generation is initiated. Please wait for sometime. You will be able to find your bill in 'My Bills'.



Challenges, Lessons Learned & Recommendations





Tracking of Commodities across the Supply Chain was a Challenge

A proposed benefit of digitalization was the improvement of data completeness across the campaign supply chain, but during the first ITN digitalized experience tracking of ITNs was suboptimal.

ITN Supply Chain:



Based on the number of ITNs shipped out of district warehouses, between **21% to 44%** of ITNs were unreported in downstream logistics forms, a **significant blind spot** to tracking resources, and an important hurdle regarding **data completeness**.

Campaign Groups 2-5:

RED: ITNs that were not tracked at each step of the supply chain.

ITN Supply Chain Step	ITNs	ITNs (%)
District warehouse (intake)	18,990,196	100%
District warehouse (delivered)	17,923,719	94%
Satellite warehouse (intake)	13,801,075	73%
Satellite warehouse (delivered)	12,249,044	65%
Team leader (intake)	10,010,873	53%
Team leader (passed on)	10,776,517	57%
Teams (distributed to houses)	15,599,079	82%

Planned Improvements in the digital tool regarding stock tracking:

- **Scanning Functionality:** Enables tracking of bales across warehouses and bed net scanning to track net distributions to beneficiaries.
- **Stock Auto-Populate Functionality:** Allows stock data to sync down to lower levels, where teams can validate received quantities and report discrepancies.



SMC - tracking Individuals adds a Layer of Complexity

Inclusion of a unique identifier of individuals can increase the longitudinal tracking of the same

SMC 2023/2024

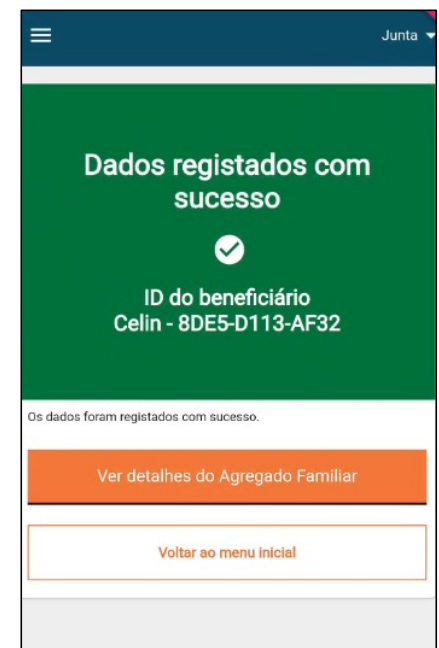
- Only 7% of children were successfully tracked throughout the four cycles of SMC.

Main Challenges :

- Lack of knowledge on how to search for and find the correct household and children in the application to reuse the record/data.
- Failure to download the data for reuse in the field.

Improvements to help track children:

- **Use of unique identifiers.** Written in the child's card, which is kept by the caregiver. ID is used to search and identify the child throughout cycles. The generation of unique identifier can be used across all Malaria campaign types.
- **Approximate search functionality** that allows searching for registered individuals within a 3 km radius.
- Focus on the reuse of data in the **refreshment training** between the cycles.





Toward the Consolidation of Master Datasets

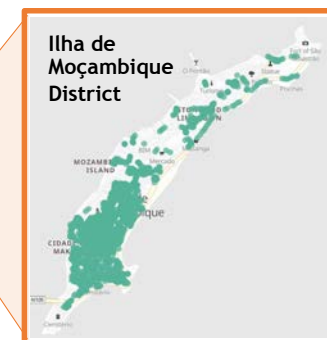
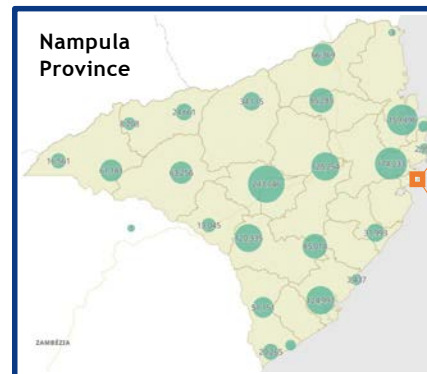
There is an ample need for updated, granular & accurate data common goods (population denominators, geolocated village lists) to support campaign planning and M&E.

Currently, an inter-institutional taskforce is now aiming to triangulate data to store in a CGR that will be fed into the campaigns' platform.



- NMCP & MOH
- Natl. Geospatial Agency
- Natl. Statistics Institute

Geolocation of HHs Registered during the '24 SMC campaign:



In addition to census and satellite data, previous campaign data will feed the development of these master datasets, which will enable more accurate and cost-efficient microplanning processes, and will serve the needs of other campaign-implementing programs

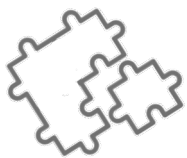


Optimizing Management of the Digital Tool

Incorporating an iterative development process alongside the purposeful and targeted capacity strengthening of staff within the MOH are meant to ensure long-term sustainability of the digital tool.

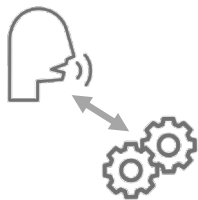
Iteration on design and operations is fundamental to maximize system usefulness and usability.

Iteration has been informed by...



Inclusion of new data sources and modules

Trial and error of system processes



Post-implementation user feedback

Strengthening of data use



Developing the skills of MOH staff beyond programmatic staff benefits multiple departments beyond NMCP.

Training is being focused on...

NMCP and M&E staff

Ongoing activities seek to foster a culture of data use and linking dashboards to action plans.

IT specialists at DIS and DTIC:

NMCP and Partners are working to upskill staff in Project Management, Helpdesk and SALAMA Management.



Thank you to the partners who supported the development, implementation and continued strengthening of digitalization

Donors...



Tech & Operational support...



Campaign Implementers....



And cross-cutting departments in the MoH:

Programa Nacional do Controlo da Malária

- Departamento de Informação para a Saúde (DIS)
- Departamento de Tecnologia, Informação e Comunicação (DTIC)

OBRIGADO !

