

Digital Insecticide-treated nets (ITNs) mass distribution campaign in the particular context of covid-19 pandemic in Benin: lessons learned and challenges

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Abstract

Background

In 2020, Benin has implemented a digital Insecticide-treated nets (ITNs) mass distribution campaign in the particular context of covid-19 pandemic and then, offered important lessons to share. This paper aims to describe the implementation process as well as the lessons learned and challenges from this campaign.

Methods

A descriptive design was used for reporting the planning and implementation process of ITNs campaign. Moreover, the changes and adaptations related to covid-19 pandemic are well described.

Results

A total of 3,175,773 households were registered corresponding to a total of 14,423,998 persons (13.55% more from projection). Moreover, 94.16% (13,581,637 people) of enumerated population were protected. A total of 7,652,166 ITNs were distributed countrywide.

Conclusions

High political commitment, engagement and support add to the financial and technical supports from partners were the essential factors that make 2020 ITNs mass campaign success in Benin despite the particular context of COVID-19 pandemic. It is essential to maintain the prevention activities for malaria and this could substantially reduce the overall impact of the COVID-19 pandemic in the populations at malaria risk.

Background

Malaria remains endemic and a serious threat to development in sub-Saharan Africa, with an estimated 228 million cases and 405,000 deaths in 2018, of which 93% of cases and 94% of deaths occurred in Africa region [1].

Vector control is a key component in malaria prevention strategies and has contributed to a significant decrease in malaria worldwide [2–4]. Insecticide-treated nets (INTs) remain one of the most efficacious vector control measure available against malaria [5, 6] and its use has highly increased in sub-Saharan Africa in the past decade. The World Health Organization (WHO) recommends universal coverage goal in the populations at risk through mass campaign (with one net for every two people) [7]. The big challenge to the National Malaria Control Programs (NMCPs) is to reach and sustain this high coverage rate.

Benin's NMCP has adopted mass distribution policy since 2011 and on a triennial regularity, based on the INTs lifespan evaluation conducted in this country [8] as recommended by WHO [9–12]. The 4th edition of the mass distribution campaign took place in 2020 and has been digitized. Indeed, the purpose of using digital tools for 2020 INTs campaign was to have more accurate data on the size of the population, and speed in data collection during the campaign as far as household enumeration and ITNs distribution phases are concerned.

In addition, during the campaign process, between the enumeration phase and that of the distribution itself, the covid-19 pandemic occurred and Benin also recorded its first cases. Recognizing the heavy toll that malaria exacts on vulnerable populations in Africa region, WHO recommended continuing with the implementation of malaria control interventions such as ITNs and indoor residual spraying campaign. On this basis, the Government of Benin, through the Ministry of Health and the NMCP decided to continue with the implementation of the campaign with the distribution phase which was pending. For this it was necessary to revise the initial distribution protocol and take precautionary measures in order to minimize the risk of transmission of covid-19 during distribution.

This report aims to describe the implementation process of INTs mass distribution campaign in Benin during the covid-19 pandemic. The specific objectives are: (i) to describe the planning process; (ii) to describe the changes and adaptations that occurred during the distribution due to the occurrence of the covid-19 pandemic; (iii) to share outcome, challenges and lessons learned from the mass ITNs distribution campaign.

Methods

Context

Benin's population is estimated at 12,114,193 inhabitants in 2020 [13]. The country is divided into 77 communes grouped into 34 health zones and 12 departments (fig.1). Malaria is endemic in all parts of country with seasonal variations. All of Benin's population is at risk of malaria infection which is the leading cause of morbidity and mortality. The incidence of the disease in 2018 was 18.5% in the general population with 1,755,597 confirmed cases of malaria in public health facilities and almost 2,251 deaths due to malaria, most of which are in children under five years [14].

Digital aspect of the ITNs mass campaign

Catholic Relief Services (CRS), supported the Government of Benin and the National Malaria Control Program in digitizing 2020 ITNs mass campaign. CRS commenced its work with planning and capacity building sessions with NMCP staff. There was training of campaign staff on the use of digital tools and over 27,000 participants at these sessions were digitally tracked using their biometrics as a mean of validating their attendance for each training session attended. The digital platform is the Cash-and-Asset Transfer Platform (CAT). A total of 3,382 smartphones and other technology tools and devices were used to perform a household enumeration to register households within the country to obtain a robust

population database. The same digital platform was used to track distribution of ITNs and verify that all households registered received the correct number of ITNs allocated to them. The data collected on CAT was available through an online dashboard, updated in real time, allowing field supervisors to make important decisions effectively and efficiently tracking household coverage rates as households missed were identified using sequencing and geospatial analytical dashboards easily accessible for field supervisors.

ITNs campaign implementation process

Figure 2 shows the different sections and the implementation process of ITNs mass distribution campaign.

a. Macro-planning

Macro-planning consisted in quantifying the number of ITNs required to achieve universal coverage according to the 2020 population projection data. In addition, the strategies for the household enumeration as well as for the ITNs distribution are designed.

b. Drafting of the campaign protocol

After the macro, the protocol of the campaign was written in great detail. This protocol was then validated by all stakeholders and consisted henceforth the campaign roadmap.

c. Micro-planning

Here it developed a comprehensive micro-plan for the 2020 mass distribution which contains a rigorous gap analysis and the procurement plans as well as all details on campaign processes and a roadmap. The roles and responsibilities of actors at different levels of the health pyramid

(central, department, health zone (HZ), and commune) have been clearly described.

d. Procurement and supply

A total of 8,609,873 ITNs were procured for this campaign for the whole country. ITNs were received in-country (without passing through central storage) and transported as planned from central level to department level and then to sub-division level. From there, they were transported to village level storage.

At the department warehouses, quality assurance was conducted prior to distribution. Samples of ITNs from different batches were sent to Centre de Recherche Entomologique de Cotonou, to assess physical and chemical analyses such as stress analysis, insecticide content, fabric weight, netting, mesh size. A total of 837 ITNs are tested. All the samples conformed to the WHO procurement and use of ITN for malaria control requirements. Two days before the distribution phase, net are convoyed to each village leader.

e. Trainings

In order to create equal understanding among actors at different levels of the health pyramid on the campaign implementation strategies, trainings in a cascade manner were organized at central, department and district levels [15]. In each department, separate micro-planning workshops and training of trainers (ToT) sessions on implementation took place to train the HZ and district coordination groups. Significant adaptations were required for the training of the distribution supervisors and teams in light of the covid-19 pandemic and the urgency to get ITNs into households through the revised distribution strategy. Therefore, the following precautions have been taken:

- Training was adapted to take place over three hours with a maximum of 18 people per class
- Hygiene and safety measures were put in place (handwashing facilities, physical distancing, scanning of trainees' badges rather than fingerprinting, health check, etc).
- Rooms were cleaned thoroughly before and after every session
- Content for the shortened training sessions is revised included door-to-door distribution techniques with the use of smartphones and hygiene measures and the importance of keeping at least one meter physical distance from any other person
- Audiovisual files and the electronic version of the distribution guide are shared with the distributors at the end of the training to enable them to review the content of the training once at home
- Whatsapp groups have been created between trainers and distributors to facilitate exchanges after training

f. Households enumeration

Household enumeration was conducted by volunteers whom had at least a grade 7 level of education. Each enumerator team is made up of two people. The first person is equipped with smartphone in which he records the household's informations. The second person delivers to the household a voucher for ITNs in the form of coupon with a Quick Response (QR) code (fig. 3) which is the unique identifier of the household. The coupon is then later exchanged for the corresponding number of ITNs in the distribution phase during which, the coupon once scanned, generates all the household informations and display the accurate number of nets to be redeemed based on the applied distribution key (1-2 persons = 1 ITN; 3-4 persons = 2 ITNs; 5-6 persons = 3 ITNs;19-20 persons= 10 and more than 20 persons = 10 ITNs). The enumerator teams finally delivered key messages on malaria and the importance of sleeping under a ITN. The teams progress from house to house so as to cover all the households in the geographical area assigned to them and had to register 60 households in rural areas against 70 in urban areas per day over a period of 16 days.

g. Mass distribution

The campaign was spread out in two phases. As it was the first time that Benin implemented a digital ITNs campaign, a pilot phase at the scale of a HZ was organized as a prelude to the national phase in order to understand the difficulties and constraints related to the use of digital tools.

- *Pilot phase: Fixed distribution strategy*

The initial approach was fixed distribution strategy. During the pilot phase which has implemented in one HZ (Abomey-Calavi/Sô-Ava) in Atlantic department, ITNs distribution was done at fixed sites at the village level at a public place chosen for this purpose. Each household presented their coupon in exchange for ITNs. The number of ITNs to be allocated per household is displayed by the smartphone once the coupon has been scanned.

The distribution teams involved in the distribution phase (planned for 4 continuous days, with 2 days extra) were composed of four fixed agents (fig. 4)

- *National Phase: Door-to-door distribution*

During the nationwide phase, between the enumeration phase and the distribution phase, covid-19 outbreak occurred. Fixed distribution approach was not suited to this context. It has therefore become necessary to revise the distribution approach. Thus, the distribution protocol was revised into a door-to-door distribution approach. By this approach, a distribution team directly delivered ITNs to recipients at their homes. The number of distribution team members has remained the same, however their roles have been revised to adapt to the new distribution approach (Fig. 5)

Monitoring of household enumeration coverage

External monitoring was carried out by an external firm during the household enumeration. A rapid monitoring was carried out using Lot Quality Assurance Sampling (LQAS).

All of 77 communes were monitored. Monitoring results were shared at time with the actors and supervisors, in order to return to complete enumeration in low coverage areas.

Supervision and coordination

At the national monitor and district supervisor levels, planned field-based activities were reduced in scale. A daily scrutiny of the distribution data uploaded from the smartphones and a virtual meeting each evening allowed supervisors and monitors to focus on problem areas and challenges that could then be addressed and resolved. At the local level, supervisors focused on ensuring that distribution teams adhered to the covid-19 safety measures, as well as ensuring planning and management of the daily team movement plans. Their responsibility included checking the health of distribution team members each day and not allowing them to continue if they showed any covid-19-like symptoms. As yet, results of the local supervision have not been thoroughly analyzed, although anecdotally, it seems that it was quite a challenge for distribution teams to adhere closely to the distancing regulations. In addition, a whatsapp

group has been created at the national level which integrates the actors at different levels in order to resolve the difficulties and situations during the distribution.

Communication

The plan for communication included radio and television slots, town announcers and advocacy at every level. Advocacy meetings were completed in advance of the household registration phase, engaging leaders for the entirety of the campaign process. In advance of implementation of the revised strategy, messages were modified slightly to inform about the change of strategy, the new dates and the measures being taken to prevent transmission of covid-19. As well as radio, television and town announcers, mobile messaging and audio call messages (for the less literate) were used. Community leaders were involved in local mobilization and were asked to be alert to any miscommunication that they heard about the ITNs or covid-19 and to report these to the community supervisor. Following the distribution, communication reinforced the messages passed to households by the distribution teams, i.e. proper airing of new ITNs, use of ITNs, hanging techniques and measures to prevent covid-19.

Results

Household enumeration outcome

A total of 3,175,773 households were registered (more 9.3% from projection) corresponding to a total of 14,423,998 persons (13.55% more from projection) (Table 1). The real ITNs needs are therefore known after the enumeration. It was after the household enumeration that mosquitoes are conveyed to the villages.

ITNs distribution outcome

Of the 8,609,873 ITNs procured, 7,652,166 were distributed through mass distribution to the beneficiaries. The balance from the procurement was kept to be used for routine distribution. A total of 3,240,259 households were served in the whole country, which corresponds to 93.35 % of enumerated households. Moreover, 94.16 % of enumerated population were protected, which corresponds to a total of 13,581,637 people (Table 2).

Discussion

The 2020 ITNs mass distribution campaign in Benin was remarkable. It has not only been digitized for first time in Benin, but also the distribution has been implemented in the particular context of the covid-19 pandemic and then offered important lessons.

The benefit of digitizing the ITNs distribution campaign was particularly obvious. It enabled accurate and efficient implementation phases of the campaign. It also enabled the speed in data collection and monitoring as far as household enumeration and ITNs distribution are concerned. In the context of covid-

19 pandemic, the use of the digital tools and dashboards enable field teams and supervisors to review the distribution data, reports and maps generated each day from any location to limit in person contact to reduce the risk of spreading the disease as prompt monitoring and supervision feedbacks were shared by overseeing supervisors via WhatsApp and other communication tools. The digital platform was also used to send key malaria messages in form of short messaging service (SMS) on malaria, the use and care of the ITNs distributed to households to inform about the benefits of the nationwide ITN distribution and the ITNs they have received.

In addition, several other key factors enabled the mass campaign to continue during the covid-19 pandemic, and deserve to be highlighted:

- Strong support from the Government of Benin, through the Ministry of Health and the NMCP, to continue with the implementation of the ITNs campaign in advance of the high transmission malaria season despite the outbreak of the covid-19 pandemic.
- Effective coordination between international partners (Global Fund, World Health Organization, RBM Partnership to End Malaria, Alliance for Malaria Prevention, Bill and Melinda Gates Foundation) and the NMCP and in-country partners (the United States President’s Malaria Initiative, Catholic Relief Services)
- Regular communication between the main campaign funder (Global Fund) and the NMCP for timely decision-making to avoid delays
- Rapid problem-solving (for example, sourcing of covid-19 protective materials for campaign workers) by the NMCP with support from the Ministry of Health and partners
- Flexibility in modifying procurement procedures to minimize delays in the campaign implementation
- Use of an electronic system for data collection that facilitated a “no touch” approach during the ITN distribution and payment of campaign workers.

Results of this campaign showed that the enumerated population is greater than the projection (13.55% more). However, since net quantification had been made with a buffer (30% security stock), this increase did not have an impact on the quantity required to ensure universal access. The door-to-door distribution of ITNs to households provided an acceptable distribution coverage rate (94.16%) and offered an opportunity for demonstrating net-hanging and face-to-face health education on ITNs use and ways of reducing net wear and tear [16]. The door-to-door delivery approach was greatly appreciated by the population. Fixed point distribution was used during the pilot phase, but this approach is not suited to the context of the covid-19 pandemic in terms of compliance with barrier measures. A multi country comparison of ITN delivery strategies based on 14 surveys from five African countries did not find a significant association between delivery strategy and ownership of a net from the campaign [17–21].

Despite the satisfactory results of the 2020 ITNs campaign, some key challenges deserve to be shared:

- Change in distribution protocol: The first challenge is the change in distribution protocol (door-to-door approach instead of fixed distribution previously planned) while campaign is already underway.

The initial protocol was therefore quickly revised by a technical team.

- Challenges with covid-19 protection materials: Given covid-19 pandemic, additional materials had to be ordered with short notice and delivery time. The biggest challenge was related to the availability of protection materials in sufficient quantities on time. It was difficult to procure large quantities of certain materials such as masks, because masks were really seeking in the response against covid-19.
- Challenges with payment the actors: At the end of the each activity phase digital timesheets were generated from the system that was used to enable the efficient payment of staff for the number of days work as registered on the system using the unique Quick Response (QR) code provided for each staff to validate their presence on the field for each day's activities. However, as payment has be done through mobile money account, incorrect phone numbers and unreported team replacements affected the on-time payment of some actors.
- Availably of supervision teams: the same supervision teams are sometimes involved in other response activities against Covid-19.
- Budget implications: Changes to the budget were made quickly in line with the new door-to-door strategy, taking into account Benin's specific geographic and logistical context and available human resources. Given the urgency of the covid-19 situation and remaining funds in the country's grant, the Global Fund was able rapidly to approve the amendments. Important modifications included the necessary increase in days for community mobilization, briefings and training, supervision and distribution as well as for purchase of personal protective equipment.

ITNs mass campaigns are a major intervention for malaria prevention and also for other arthropod-borne diseases, such as dengue, filariasis and viral infections [22, 23]. The burden imputable to malaria is heavily concentrated in sub-Saharan Africa where cases associated with covid-19 are increasing [24]. Although covid-19 has the potential to cause substantial disruptions to health services, due to response measures limiting usual programmatic activities, it's important to continue to prevent malaria by adapting control activities to the context of the pandemic. Recent modelling study showed that the interruption of planned ITNs campaigns due to covid-19 pandemic could lead to a loss of life-years over 5 years that is of the same order of magnitude as the direct impact from COVID-19 in places with a high burden of malaria [25].

Conclusion

Benin has implemented the digital ITNs mass distribution campaign in the particular context of the covid-19 pandemic. Despite the great challenges of its implementation due to covid-19 outbreak, the campaign was successfully implemented and contributed to increasing household ownership and population access to ITNs, and therefore contributes to the achievement of the Global Technical Strategy for Malaria 2016–2030 goals. High political commitment, engagement and support add to the financial and technical supports from partners were essential factors for this success.

Declarations

Authors' contributions

RA, CA, BH, DDE, YC, EE, NA, FT, SS, LS and AOH designed the study. RA, CA, NA, EE and AOH coordinated the campaign implementation. RA drafted the manuscript and analyzed the data. BH, AOH, YC, CA and EE critically revised the manuscript for intellectual content. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

The datasets analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This report makes use of secondary data and is not subject to ethics approval. Administrative approval was obtained from National Malaria Control Programme.

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References

1. World malaria report 2019. Geneva: World Health Organization; 2019.
2. global plan for insecticide resistance management. Geneva: World Health Organization; 2012.
3. Shargie EB, Ngondi J, Graves PM, Getachew A, Hwang J, Gebre T, et al. Rapid increase in ownership and use of long-lasting insecticidal nets and decrease in prevalence of malaria in three regional States of Ethiopia (2006–2007). *J Trop Med*. 2010;2010:e750978.
4. Otten M, Aregawi M, Were W, Karema C, Medin A, Bekele W, et al. Initial evidence of reduction of malaria cases and deaths in Rwanda and Ethiopia due to rapid scale-up of malaria prevention and treatment. *Malar J*. 2009;8:14.

5. Lengeler C: Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database Syst Rev* 2004, 2:CD000363.
6. Lim S, Fullman N, Stokes A, Ravishankar N, Masiye F, Murray CL, et al. Net benefits: a multicountry analysis of observational data examining associations between insecticide-treated mosquito nets and health outcomes. *PLoS Med*. 2011;8:e1001091.
7. World malaria report. Geneva: World Health Organization; 2017.
8. Ahogni IB, Salako AS, Akinro B, Sovi A, Gnanguenon V, Roseric Azondekon R, et al. Physical integrity and survivorship of long-lasting insecticidal nets distributed to households of the same socio-cultural community in Benin, West Africa. *Malar J*. 2020; 19:58.
9. Guidelines for monitoring the durability of long-lasting insecticidal mosquito nets under operational conditions, WHO/HTM/NTD/WHOPES/2011.5.
10. Guidance note for estimating the longevity of long-lasting insecticidal nets in malaria control. Geneva: World Health Organization; 2013.
11. Estimating functional survival of long-lasting insecticidal nets from field data. Vector Control Technical Expert Group Report to MPAC. Geneva: World Health Organization; 2013.
12. Kilian A, Byamukama W, Pigeon O, Gimnig J, Atieli F, Koekemoer L, et al. Evidence for a useful life of more than three years for a polyester-based long-lasting insecticidal mosquito net in Western Uganda. *Malar J*. 2011;10:299.
13. RGPH4 : Que retenir des effectifs de population en 2013 au Bénin? https://www.insae-bj.org/images/docs/insae-statistiques/demographiques/_population/Resultats%20definitifs%20RGPH4.pdf. Accessed 21 Oct 2018.
14. Ministère de la santé du Bénin. Annuaire des statistiques sanitaires 2018 des départements du Benin; 2019.
15. Arroz J, Mendis C, Pinto L, Candrinho B, Pinto J, Martins MRO. Implementation strategies to increase access and demand of long-lasting insecticidal nets: a before-and-after study and scale-up process in Mozambique. *Malar J*. 2017;16:429
16. Masaninga F, Mukumbuta N, Ndhlovu K, Hamainza B, Wamulume P, Emmanuel Chanda5, et al. Insecticide-treated nets mass distribution campaign: benefits and lessons in Zambia. *Malar J*. 2018; 17:173
17. Thwing J, Hochberg N, Vanden Eng J, Issifi S, James Eliades M, Minkoulou E, et al. Insecticide-treated net ownership and usage in Niger after a nationwide integrated campaign. *Trop Med Int Health*. 2008;13:827–34.
18. Bennett A, Smith SJ, Yambasu S, Jambai A, Alemu W, Kabano A, et al. Household possession and use of insecticide-treated mosquito nets in sierra leone 6 months after a national mass-distribution campaign. *PLoS ONE*. 2012;7:e37927.
19. Zegers de Beyl C, Koenker H, Acosta A, Onyefunafoa EO, Adegbe E, McCartney-Melstad A, et al. Multi-country comparison of delivery strategies for mass campaigns to achieve universal coverage with

insecticidetreated nets: what works best? Malar J. 2016;15:58.

20. Ye Y, Patton E, Kilian A, Dovey S, Eckert E. Can universal insecticide-treated net campaigns achieve equity in coverage and use? The case of northern Nigeria. Malar J. 2012;11:32.
21. Noor AM, Amin AA, Akhwale WS, Snow RW. Increasing coverage and decreasing inequity in insecticide-treated bed net use among rural Kenyan children. PLoS Med. 2007;4:e255.
22. Masaninga F, Muleba M, Masendu H, Songolo P, Mweene-Ndumba I, Mazaba-Liwewe ML, et al. Distribution of yellow fever vectors in Northwestern and Western Provinces, Zambia. Asian Pac J Trop Med. 2014;7S1:S88–92
23. Nsakashalo-Senkwe M, Mwase E, Chizema-Kawesha E, Mukonka V, Songolo P, Masaninga F, et al. Significant decline in lymphatic filariasis associated with nationwide scale-up of insecticide treated nets in Zambia. Parasite Epidemiol Control. 2017; 2:7–14.
24. Hogan AB, Jewell BL, Sherrard-Smith E, Vesga JF, Watson OJ, Whittaker C, et al. Potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria in low-income and middle-income countries: a modelling study. Lancet Global Health [https://doi.org/10.1016/S2214-109X\(20\)30288-6](https://doi.org/10.1016/S2214-109X(20)30288-6) (2020).

Tables

Table 1 Registered population, households, and LLINs needs after household registration

Department	Household enumeration			Population enumeration		
	Registered household	Projected household	Variation (%)	Projected population	Registered population	Variation (%)
ALIBORI	278,720	308,208	10.58	1,114,879	1,295,882	16.24
ATACORA	246,730	263,436	6.77	986,921	1,119,036	13.39
ATLANTIQUE	418,775	461,679	10.25	1,675,099	2,012,262	20.13
BORGOU	385,979	444,718	15.22	1,543,914	1,887,852	22.28
COLLINES	230,078	238,856	3.82	920,314	984,887	7.02
COUFFO	238,214	242,222	1.68	952,855	983,850	3.25
DONGA	174,224	195,386	12.15	696,897	767,952	10.2
LITTORAL	217,978	233,769	7.24	871,913	960,950	10.21
MONO	159,037	162,903	2.43	636,149	624,841	-1.78
OUEME	352,186	395,077	12.18	1,408,742	1,691,938	20.1
PLATEAU	200,406	212,236	5.9	801,624	849,786	6.01
ZOU	273,446	312,668	14.34	1,093,785	1,244,762	13.8
BENIN	3,175,773	3,471,158	9.3	12,703,091	14,423,998	13.55

Table 2 Households served and distributed ITNs

Department	ITNs ditribution		Served households			Protected population		
	Allocated ITNs	Distributed ITNs	Registered households	Served households	Coverage (%)	Registered population	Projected population	Coverage (%)
ALIBORI	726,159	699,957	308,208	295,702	95.94	1,295,882	1,244,966	96.07
ATACORA	627,123	601,891	263,436	250,969	95.27	1,119,036	1,073,365	95.92
ATLANTIQUE	1,126,189	1,022,847	461,679	412,832	89.42	2,012,262	1,828,934	90.89
BORGOU	1,058,693	1,007,956	444,718	419,262	94.28	1,887,852	1,795,999	95.13
COLLINES	555,937	527,424	238,856	224,381	93.94	984,887	934,817	94.92
COUFFO	557,840	535,059	242,222	230,662	95.23	983,850	943,350	95.88
DONGA	435,622	407,922	195,386	181,645	92.97	767,952	718,628	93.58
LITTORAL	538,443	488,526	233,769	208,507	89.19	960,950	870,543	90.59
MONO	358,579	344,972	162,903	155,394	95.39	624,841	600,769	96.15
OUEME	947,304	891,011	395,077	368,360	93.24	1,691,938	1,589,614	93.95
PLATEAU	482,999	453,014	212,236	197,056	92.85	849,786	797,408	93.84
ZOU	704,789	671,587	312,668	295,489	94.51	1,244,762	1,183,244	95.06
BENIN	8,119,677	7,652,166	3,471,158	3,240,259	93.35	14,423,998	13,581,637	94.16

Figures

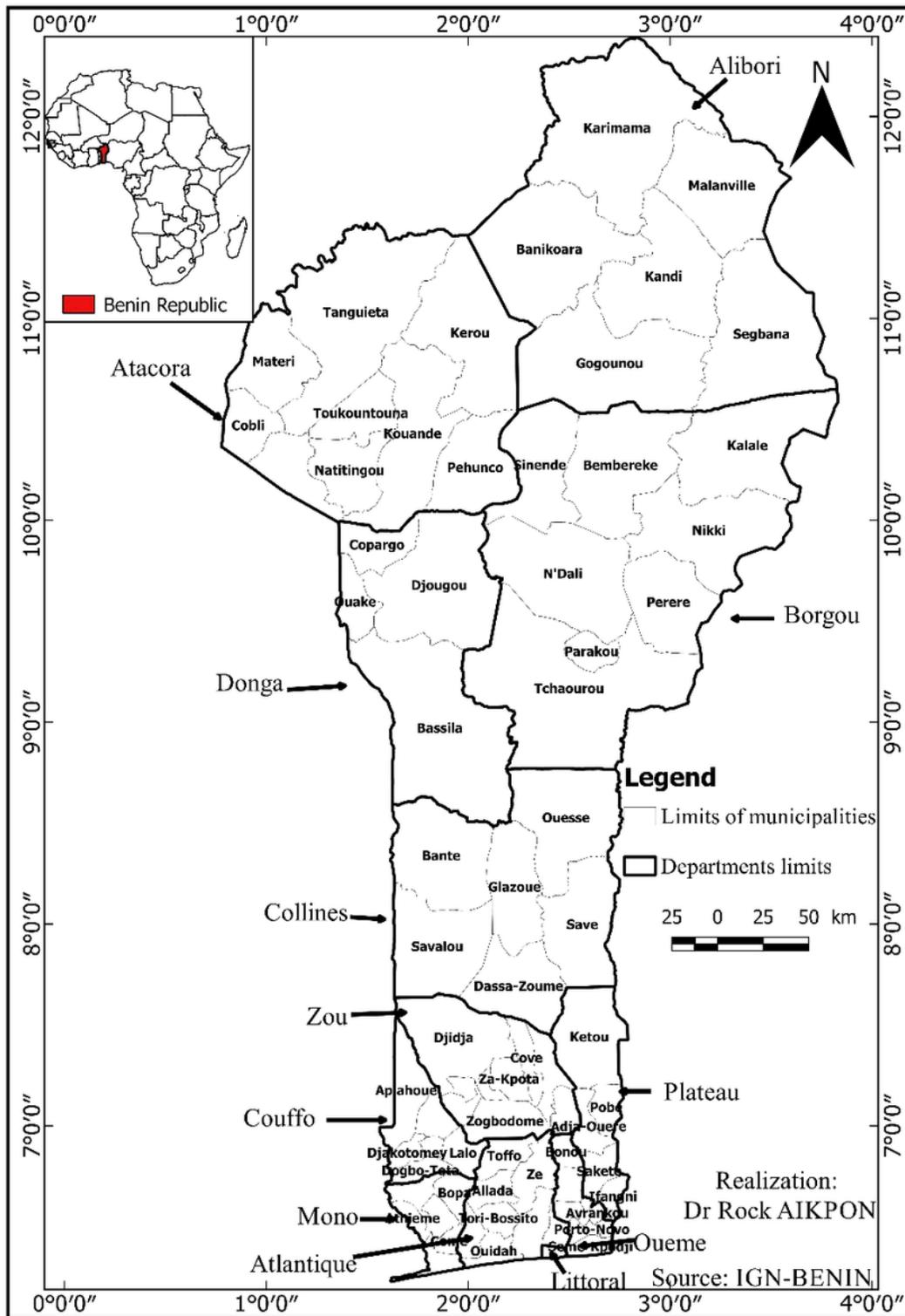


Figure 1

Map of Benin

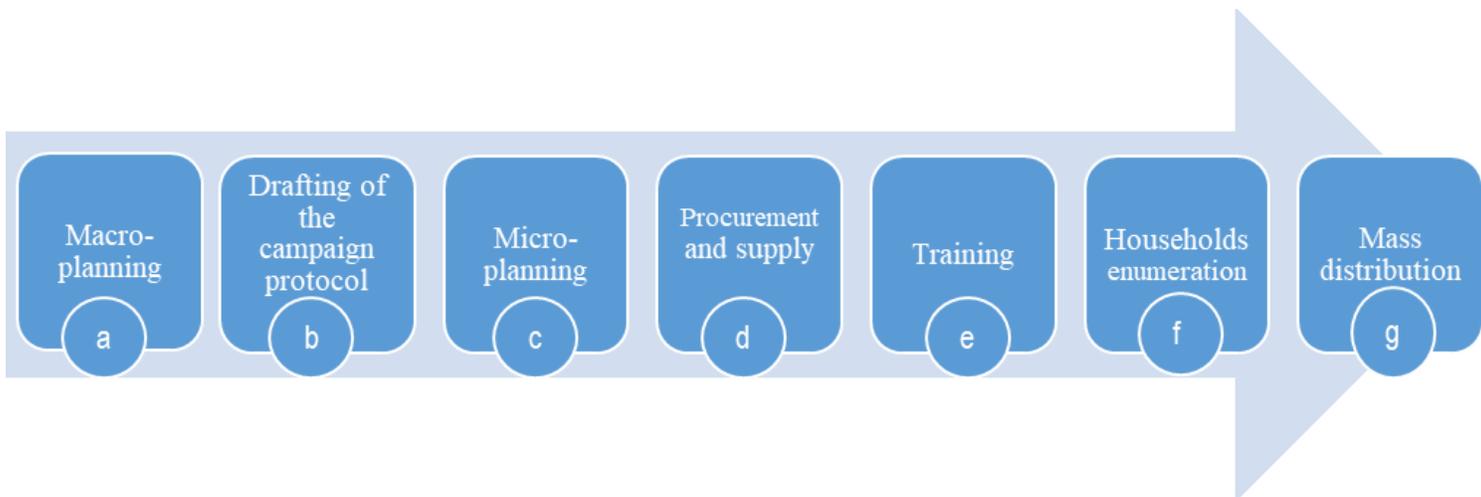


Figure 2

ITNs mass distribution implementation process

Coupon d'identification du ménage
 CAMPAGNE NATIONALE POUR L'ACCÈS UNIVERSEL AUX MOUSTIQUAIRES BENIN 2020

Département:

ZS:

Commune:

Arrondissement:

Village:

Site de distribution:

Nom et Prénoms du chef du ménage:

'Coupon à ne pas perdre'

2200-22-16-2-002-104-YU

ty Security Sticker

Figure 3

Coupon for household registration

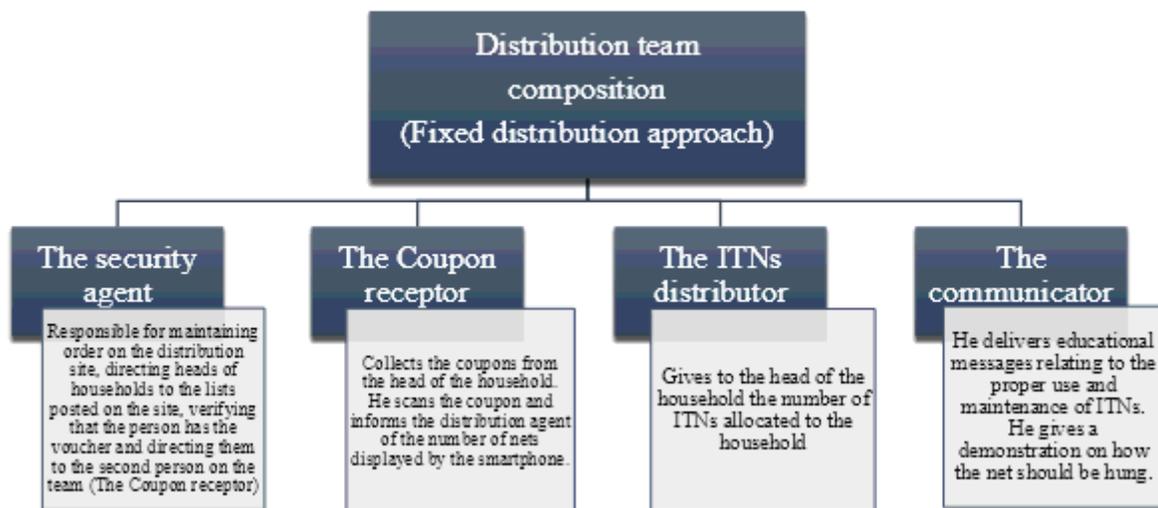


Figure 4

Distribution team composition and roles in fixed distribution approach

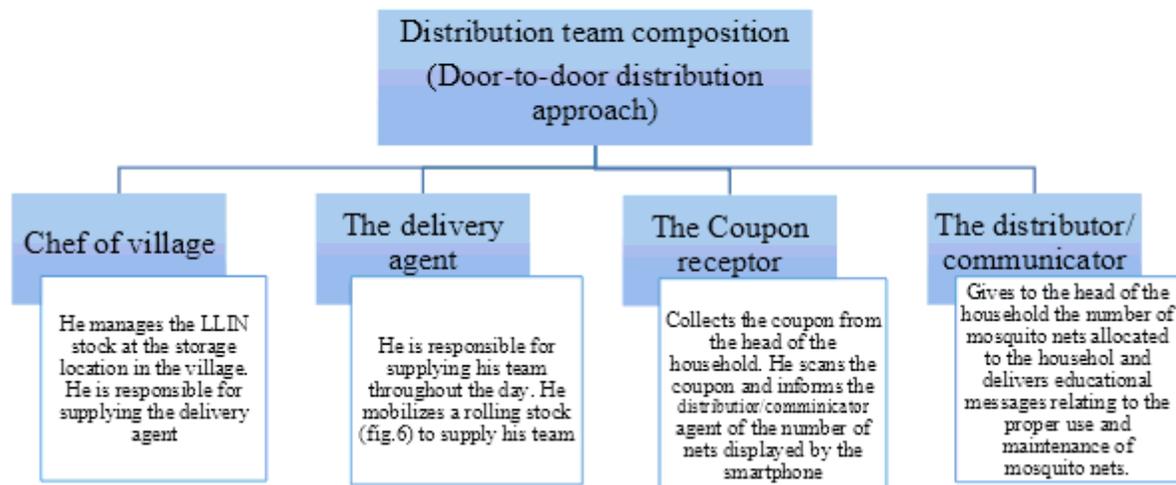


Figure 5

Distribution team composition and roles in door-to-door distribution approach



Figure 6

Rolling stock mobilized by the delivery agent to supply the distribution team; (a) motorbike, (b) rickshaw.