



U.S. PRESIDENT'S MALARIA INITIATIVE



**SENEGAL  
END OF SPRAY REPORT  
SPRAY CAMPAIGN:  
MAY 28–AUGUST 16, 2020**

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The views expressed in this document do not necessarily reflect the views of the United States Agency for International Development or the United States Government.



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# ACRONYMS

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<b>AIRS</b>	Africa Indoor Residual Spray
<b>BMP</b>	Best Management Practices
<b>COVID-19</b>	Coronavirus Disease 2019
<b>DEEC</b>	<i>Direction de l'Environnement et des Etablissements Classés</i>
<b>DHIS2</b>	District Health Information Software 2
<b>DHMT</b>	District Health Medical Team
<b>DMO</b>	District Medical Officer
<b>DOS</b>	Directly Observed Spraying
<b>DREEC</b>	<i>Direction Régionale de l'Environnement et des Etablissements Classés</i>
<b>EC</b>	Environment Compliance
<b>ECO</b>	Environmental Compliance Officer
<b>EOSR</b>	End of Spray Report
<b>HPN</b>	Health Post Nurse
<b>IEC</b>	Information, Education and Communication
<b>IRS</b>	Indoor Residual Spraying
<b>IsDB</b>	Islamic Development Bank
<b>ITN</b>	Insecticide-Treated Net
<b>LEVP</b>	<i>Laboratoire d'Ecologie Vectorielle et Parasitaire</i>
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MSP</b>	Mobile Soak Pit
<b>NHS</b>	National Hygiene Services
<b>NMCP</b>	National Malaria Control Program
<b>ODK</b>	Open Data Kit
<b>ODK</b>	Open Data Kit
<b>PMI</b>	U.S. President's Malaria Initiative
<b>PMT</b>	Performance Monitoring Tracking
<b>PPE</b>	Personal Protective Equipment
<b>PSECA</b>	Pre-spray Environmental Compliance Assessment
<b>RECM</b>	Regional Environmental Compliance Manager
<b>SBCC</b>	Social and Behavior Change Communication
<b>SEA</b>	Supplemental Environmental Assessment
<b>SLAP</b>	<i>Services de Lutte Antiparasitaire</i>
<b>SOP</b>	Spray Operator
<b>SPTS</b>	Spray Performance Tracking Sheet
<b>TL</b>	Team Leader
<b>TOT</b>	Training of Trainers
<b>UCAD</b>	<i>Université Cheikh Anta Diop de Dakar</i>
<b>USAID</b>	United States Agency for International Development
<b>WHO</b>	World Health organization

# 1. EXECUTIVE SUMMARY AND HIGH LEVEL RESULTS

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This End of Spray Report (EOSR) provides details on the U.S. President’s Malaria Initiative (PMI) VectorLink Senegal Project’s 2020 Indoor Residual Spraying (IRS) campaign which was implemented from May 28 to August 16, 2020 in Kedougou, Makacolibatang, Koumpentoum and Kougheul. Amidst the coronavirus disease of 2019 (COVID)-19 pandemic, the indoor residual spraying (IRS) campaign focused on ensuring compliance with COVID-19 mitigation and environmental compliance, community mobilization, and gender mainstreaming.

In preparation for the spray campaign, the PMI VectorLink Senegal Project (VectorLink Senegal or the Project) conducted a geographical reconnaissance in October and November 2019. On February 4-6 2020, VectorLink Senegal organized a National IRS Planning Workshop and completed advocacy visits in the four IRS targeted districts February 24-27, 2020. VectorLink Senegal conducted **environmental compliance** activities throughout IRS operations. The target number of rooms and structures was based on population estimates gathered as part of the mass insecticide-treated net (ITN) distribution campaign conducted in 2019 by the National Malaria Control Program (NMCP), using conversion ratios from population to rooms (2.4 persons/room) and from rooms to structures (1.67 rooms/structure) as determined through previous IRS campaigns.

For **implementation**, VectorLink Senegal completed procurement of IRS commodities, hiring of seasonal workers, and training of actors (National Hygiene Services (NHS) and *Direction Régionale de l’Environnement et des Etablissements Classés* (DREEC) supervisors, finance assistants, logistic assistants, SOPs, team leaders, site managers, pumps technicians, storekeepers, washers, drivers, washers, District Medical Team, Health Post Nurses). The campaign was conducted in two phases across four health districts: 25 operational days in phase 1 for Kedougou and Makacolibatang and 21 operational days in phase 2 for Koumpentoum and Kougheul. VectorLink Senegal used two types of insecticides: SumiShield® in Kedougou and Fludora® Fusion in Makacolibatang, Kougheul and Koumpentoum. **Communication activities** were primarily carried out by the NMCP. VectorLink Senegal established a **Monitoring and Evaluation system** based on two mobile phone applications—one for spray performance data and another one for supervision-related data. Table 1 below provides a summary of key data and figures of the 2020 IRS campaign.

**TABLE 1. 2020 VECTORLINK SENEGAL IRS SUMMARY**

Number of districts covered by IRS	Four districts: Kédougou, Makacolibantang, Koumpentoum, and Kougheul
Insecticide used in IRS	Neonicotinoid (SumiShield® 50WG, 1 district: Kedougou) Neonicotinoid combined with pyrethroid (Fludora® Fusion, 3 districts: Makacolibantang, Koumpentoum and Kougheul)
Structures targeted for spray (estimated target from population)	134,883
Structures found by spray operators	137,932
Structures sprayed	136,417
Spray coverage	98.9%
Population protected	571,649 (including 13,575 pregnant women and 95,249 children under 5 years)
Dates of IRS campaign (2 phases)	<ul style="list-style-type: none"> <li>- <b>Kedougou &amp; Makacolibatang:</b> May 28– July 1 (a 5-day pause due to the coronavirus disease in 2019 (COVID-19) cases issue and 5 additional days)</li> <li>- <b>Koumpentoum &amp; Kougheul:</b> July 13–August 16 ( 5 days pause for Tabaski, 3 days pause for Koumpentoum commune due to the SMC campaign)</li> </ul>
Length of IRS campaign	25 operational days in phase 1 21 operational days in phase 2
Number of people trained with funds from the U.S. Government to deliver IRS*	828 (630 men, 198 women)

## 2. SENEGAL BACKGROUND AND ACTIVITY SUMMARY

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As part of an effort to scale up vector control interventions in Senegal, the PMI provides funding for IRS. In 2007 with PMI funding, IRS implementation began as a pilot in three health districts (Velingara, Nioro, and Richard-Toll). Beginning in 2015, targeted IRS was implemented within districts where health posts reported high malaria incidence ( $> 15$  cases/1,000 inhabitants).

In 2017 under the PMI Africa Indoor Residual Spray (AIRS) project, Senegal conducted IRS in four districts: Koumpentoum, Kounghoul, Malem Hodar, and Nioro. The spray campaign lasted from June 30 to July 23, 2017 and targeted 174,049 structures using Actellic® 300CS. A total of 156,362 structures were sprayed out of 162,556 structures found by spray operators in the targeted districts, yielding a spray coverage of 96.2%.

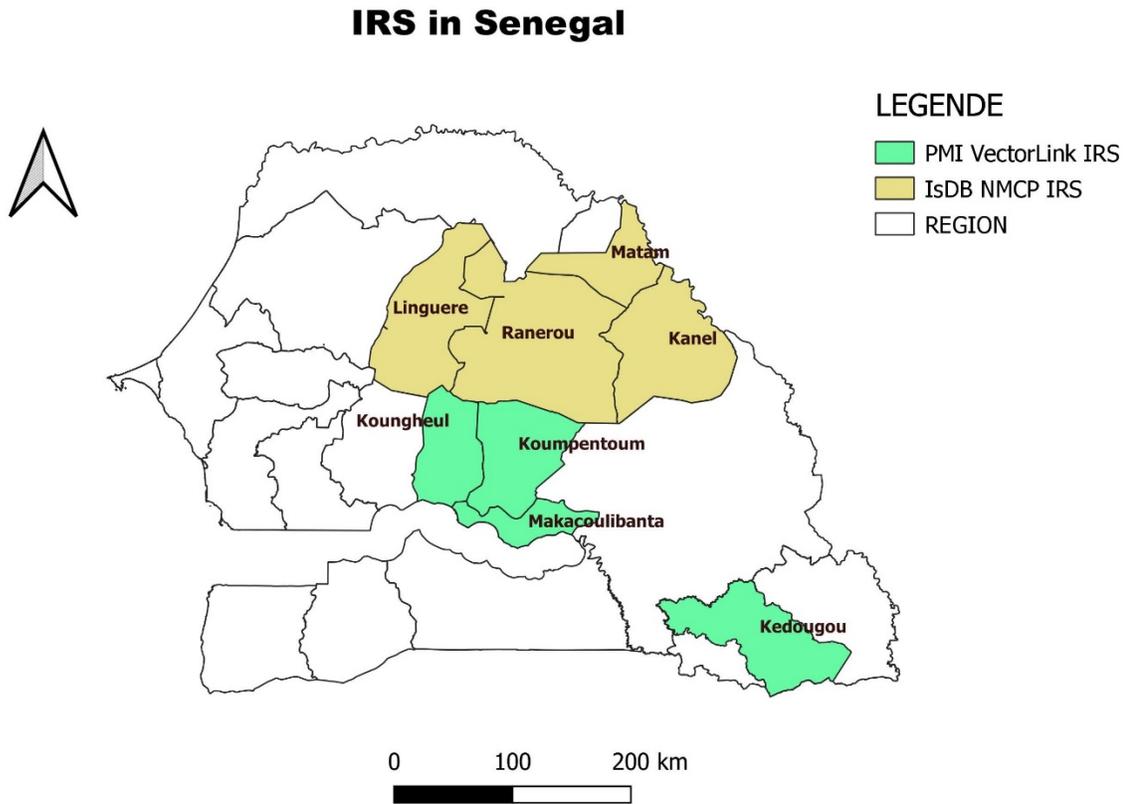
In 2018, the Senegal NMCP discontinued PMI-funded IRS and continued supporting vector control and preventive malaria activities including but not limited to entomological data collection and home-based treatment of malaria. The entomological data collection included monitoring insecticide resistance of malaria vectors and evaluating the density of the vectors and the sporozoite infection (SI) rates in the areas after withdrawal of IRS.

The Islamic Development Bank (IsDB) planned to support IRS in Senegal in 2016, however, administrative challenges delayed the campaign until July 2019 when the NMCP, in coordination with the medical regional of Matam, conducted a pilot in eight health posts in two districts (Kanel and Ranerou).

In 2020, in agreement with the NMCP, PMI-funded IRS restarted in four districts including two districts where IRS had been previously conducted (Kounghoul and Koumpentoum) and two new districts (Makacolibatang and Kedougou). At the same time, the IsDB-funded IRS was implemented in hot spot health posts in four health districts (Linguere, Ranerou, Kanel and Matam), from July 23 to August 13, 2020.

Below is the map of Senegal showing the location of the four health districts receiving PMI-funded IRS support.

**FIGURE 1. MAP OF 2020 PMI IRS DISTRICTS**



## 2.1 2020 SENEGAL IRS GOAL AND ACTIVITIES

The Project’s goal was to reach a minimum spray coverage of 85% of the structures found in each district by implementing high-quality IRS operations.

For the 2020 IRS campaign the following **activities** were planned:

- Develop a new 2020–2024 nationwide supplemental environmental assessment (SEA).
- Conduct trainings with a focus on IRS supervision and spray techniques to improve the overall quality of spraying.
- Conduct regular M&E of project activities to ensure alignment with set targets and objectives.
- Arrange all procurement, shipping, delivery, and storage of IRS commodities.
- Coordinate community mobilization activities in collaboration with stakeholders to raise awareness of IRS and to encourage beneficiary and stakeholder ownership.
- Collaborate with other implementing partners in the four districts to complement each other’s work and avoid duplication of efforts.
- Conduct insecticide susceptibility and synergist tests nationwide and measure the resistance intensity, as required, for the main malaria vectors, *Anopheles gambiae* s.l. and *An. funestus* s.l.
- Monitor the density, species composition, behavior, blood meal sources, and *Plasmodium falciparum* sporozoite infection rates of malaria vectors in the selected districts.
- Monitor the residual life of the sprayed insecticides using wall cone bioassays in the four IRS districts.

## 2.2 2020 KEY ACHIEVEMENTS

VectorLink Senegal achieved the following specific results:

- An overall spray coverage of 98.9% of structures found and a spray progress of 101% of targeted structures.
- A total of 571,649 people were protected including 13,575 pregnant women and 95,249 children under 5 years of age.
- Spray quality test results showed 100% mortality of exposed susceptible reared *Anopheles coluzzii* to the two insecticides, which is indicative of high spray quality.
- Female participation in the entire workforce in the 2020 IRS campaign was 30% of staff hired to support IRS on a target of 39% and 38% of trained staff on a target of 50%.

# 3. IMPLEMENTATION OF IRS ACTIVITIES

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## 3.1 IRS PLANNING AND PARTNER COLLABORATION

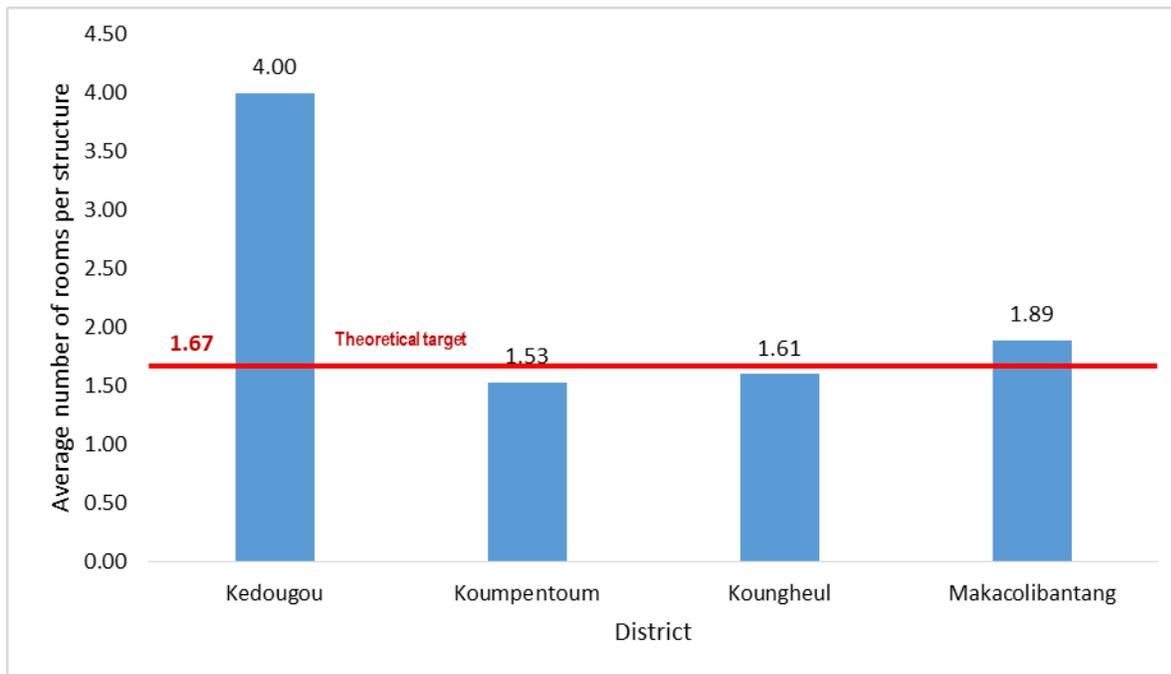
In October and November 2019, VectorLink Senegal conducted a geographical reconnaissance field visit in the four targeted districts to collect data on operational site availability and to better understand which resources were available at each site.

The target number of rooms and structures was based on population estimates gathered as part of the mass ITN distribution campaign conducted by the NMCP in 2019, using conversion ratios from population to rooms (2.4 persons / room) and from rooms to structures (1.67 rooms / structure) as determined through the 2017 AIRS campaigns.

In 2017, the AIRS campaign sprayed 261,900 rooms and protected 619,578 persons resulting in a ratio of 2.4 (619,578/261,900) persons per room and a ratio of 1.67 (261,900/156,362) rooms per structure for the four districts sprayed (Koungheul, Koumpentoum, Niore and Malem Hodar). During the planning process in 2020, VectorLink Senegal used these ratios (of persons per rooms and rooms per structure) to derive the target of rooms and structures using population data from the 2019 ITNs distribution mass campaign. In 2020, these theoretical ratios were used both for the districts that were already sprayed in 2017 (Koungheul and Koumpentoum) and the newly enrolled districts (Kedougou and Makacolibatang). However, the ratios of rooms per structure found in the 2020 campaign in the four districts, especially in Kedougou, were different from the assumed 1.67 rooms per structure theoretical ratios.

There was no significant difference between the theoretical ratio (1.67) and the observed ratios in the three districts of Koungheul (1.60), Koumpentoum (1.53) and Makacolibantang (1.89). The difference was more significant in the district of Kedougou (four rooms per structure) with 2.33 more rooms than the assumed 1.67 used for planning (Figure 2).

**FIGURE 2: AVERAGE NUMBER OF ROOMS PER STRUCTURE PER DISTRICT, 2020 SPRAY DATA**



VectorLink Senegal worked collaboratively with the NMCP to organize the National IRS Planning Workshop on February 4-6, 2020 in the city of Thies. In addition to the NMCP, the National Hygiene Services, *Université Cheikh Anta Diop de Dakar* (UCAD), regional and district health managers and administrative and local political authorities participated in the workshop. The main objective of the workshop was to share and validate the 2020 IRS timeline and include IRS activities in the annual action plans of both PMI- and IsDB-supported districts. The primary result of this workshop was a consensus on the timeline for IRS activities as well as agreement on roles and responsibilities of stakeholders during IRS implementation. VectorLink Senegal was responsible for the overall coordination of the campaign which included recruitment of seasonal workers, planning and implementation of trainings, transportation of workers and materials, supervision, environmental compliance, and monitoring and evaluation. The NMCP and the health districts were primarily responsible for the implementation of community mobilization activities and collaborated with VectorLink Senegal to coordinate all activities.

Jointly with the NMCP, VectorLink Senegal conducted advocacy visits from February 24-27, 2020 to IRS targeted regions and districts and met with local authorities as well as advocated for local community participation (office space, operational sites, transport, community mobilization, refusal case management, etc.). As their contribution to the implementation of IRS, the local authorities provided space for all operational sites and district offices to the Project free of charge. However, in the Kedougou commune, the space that had been donated by the Mayor was located in a residential building and could not be used as an operational site or office because there was no area to construct a soak pit. Therefore, the Project had to rent offices for both the district and the operational sites.

Senegal reported its first positive case of COVID-19 on March 2, 2020. As result, the district-level microplanning workshop scheduled in March 2020 did not take place because of COVID-19-related restrictions which included a ban on transportation from region to region, closure of schools and universities, and prohibition of meetings and gathering of persons. The curfew and ban on transportation between regions were lifted on June 30.

In order to continue planning of IRS activities, VectorLink Senegal worked closely with District Medical Officers (DMOs) and Health Post Nurses (HPNs) to develop spray calendars and itineraries which they shared virtually and were validated by administrative and health authorities.

## 3.2 TRAININGS

VectorLink Senegal trained 2,800 seasonal workers (37.8% females and 63.7% males) through eight series of training as indicated in the Table 2. All trainings were conducted in compliance with the COVID-19 prevention measures.

Prior to the start of the series of training, VectorLink Senegal staff participated in online IRS orientation sessions facilitated by VectorLink Headquarters staff. The goal of these orientations was to strengthen the skills of the Project's staff to effectively plan, prepare, facilitate, and evaluate trainings.

**TABLE 2: PEOPLE TRAINED, 2020**

Actors trained	Training on IRS Delivery								Other Trainings						NMCP		TOTAL		
	TOT		Training of SOPs		M&E and Data Entry		Logistics & Store Management		Finances		Poisoning Case Management		Security & EC		IEC				
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	TOTAL
Regional Directorate Environmental Officers	2	0															2	0	2
District Officers											4	0					4	0	4
Spray Operators			487	170													487	170	657
Team Leaders (TLs)			88	23													88	23	111
Data Cleaners					2												2	0	2
M&E Assistants					4	4											4	4	8
Logistics Assistants							4										4	0	4
Storekeepers							30	4									30	4	34
Sprayer Technicians			30	0													30	0	30
IEC Mobilizers (IRS)														746	679	746	679	1425	
Washers							0	66									0	66	66
Guards													60				60	0	60
Drivers													89				89	0	89
Waters supplies							1	5									1	5	6
IEC Supervisors															83	36	83	36	119
Office Cleaners														30			0	30	30
Field Supervisors	30	0															30	0	30
Site Managers			25	5													25	5	30
Finance Assistants									3	1							3	1	4
Health Post Nurses											55	34					55	34	89
TOTAL M/F	32	0	630	198	6	4	35	75	3	1	59	34	149	30	829	715	1743	1057	2800
<b>TOTAL</b>	<b>32</b>		<b>828</b>		<b>10</b>		<b>110</b>		<b>4</b>		<b>93</b>		<b>179</b>		<b>1544</b>		<b>2800</b>		<b>2800</b>

Note: IEC=information, education and communication

## 3.3 SPRAY OPERATIONS AND SUPERVISION

### 3.3.1 RECRUITMENT OF SEASONAL WORKERS

In total, VectorLink Senegal recruited 950 seasonal workers across 30 operation sites, comprised of 280 women (29.5%) and 670 men (70.5%). Table 3 lists the different cadres of seasonal workers recruited in 2020 by gender.

**TABLE 3. NUMBER OF SEASONAL WORKERS RECRUITED**

Position	Male (M)	Female (F)	TOTAL
SOPs	423	142 (25%)	<b>565</b>
Site Managers	25	5 (17%)	<b>30</b>
Team Leaders	88	23 (21%)	<b>111</b>
M&E Assistants	4	4 (50%)	<b>8</b>
Data Cleaners	2	0 (0%)	<b>2</b>
Storekeepers	30	4 (12%)	<b>34</b>
Finance Assistants	3	1 (25%)	<b>4</b>
Logistics Assistants	4	0 (0%)	<b>4</b>
Sprayer Technicians	30	0 (0%)	<b>30</b>
Washers	0	66 (100%)	<b>66</b>
Guards	60	0 (0%)	<b>60</b>
Water Suppliers	1	5 (83%)	<b>6</b>
Office and Operations Site Cleaners	0	30 (100%)	<b>30</b>
<b>Total M/F Hire for IRS</b>	<b>670</b>	<b>280 (30%)</b>	<b>950</b>

### 3.3.2 OPERATIONAL SITES

#### *COVID-19 ADAPTATION MEASURES*

Following PMI guidelines and recommendations about the continuity of malaria vector control activities, VectorLink Senegal developed a contingency plan to continue the implementation of IRS during the COVID-19 pandemic. The contingency plan was shared with PMI and included specific COVID-19 prevention and risk-mitigating measures.

Through the NMCP, the Ministry of Health provided VectorLink Senegal with exemption letters to travel restrictions. These letters allowed the Project's staff to move freely from one region to another during the 2020 IRS campaign despite the curfew and the national health emergency restrictions.

The Project's staff adhered to COVID-19 prevention measures included in the contingency plan: starting all training sessions with a presentation on COVID-19 disease, limiting the number of participants per training room to 10 persons, maintaining a social distance of two meters between any two persons, installing hand-washing stations at each training venue and operation site, providing operators with face masks and alcohol-based hand sanitizers, and disinfecting vehicles. Also, the Project staff posted COVID-19-related messages at all sites, sent SMS through the mHealth platform, and provided daily reminders on COVID-19 prevention during morning mobilization.

Despite all these measures, the COVID-19 pandemic had an impact on the campaign with the death of a driver contracted by a rental company who was working with the project. Subsequently, VectorLink Senegal and PMI

Headquarters agreed to pause the campaign from June 17–23. This pause allowed VectorLink Senegal, with NMCP support, to organize testing for the staff. In total, 44 the Project’s staff were tested for COVID-19, and four were positive. All positive cases recovered after following the Senegal Ministry of Health COVID-19 protocol, which included isolation in a treatment center and two consecutive negative tests before release.

### ***LAUNCHING OF OPERATIONS***

An official launching ceremony was organized with the participation of local authorities (Prefect, Mayor, DHMT, Mobilizers, SOPs, and some community leaders such as village chiefs, presidents of health committee), the NMCP Coordinator, VectorLink Senegal Chief of Party and staff.

Given the COVID-19 context, a small ceremony was organized which included a spray demonstration at the Mayor’s house to show authorities’ support of the IRS campaign. The 2020 spray campaign began on May 28 in Kedougou, May 29 in Makacolibatang, and July 13 in Koumpentoum and Kougheul.

### ***MEDICAL EXAMINATION AND PREGNANCY TESTS***

Prior to the start of spray operations, 928 seasonal workers (including SOPs and substitutes, TLs, site managers, washers, storekeepers, and pump technicians) underwent a general medical examination to assess their medical fitness for IRS activities. As per the project’s policy and practices, all female personnel took a pregnancy test at the start of the spray campaign. To minimize health risks, all SOPs received complete sets of personal protective equipment (PPE) that included helmets, face shields, nose and mouth masks, long-sleeved cotton overalls, rubber gloves, pairs of cotton-rich stockings, robust gum boots, and neck covers.

### ***DEPLOYMENT OF SPRAY OPERATORS***

At each operational site, VectorLink Senegal deployed three to five teams of spray operators based on the target areas served by each site. Each team was composed of four to six SOPs and a team leader. Every morning, before leaving for the spraying sites, all SOPs were provided with breakfast. Vehicles were available to transport SOPs to and from spray villages. After returning to the operational site, SOPs returned PPE, unused insecticide, and empty sachets, and then they showered before going home. In some remote operational sites, SOPs stayed in the village for the number of days needed to provide IRS coverage to the village. In these circumstances, the Project provided SOPs with food and arranged for lodging with local communities.

Spray operations were completed within 25 operational days in the first phase and 21 operational days in the second phase. During the first phase of the campaign, a pause was observed for seven days, from June 17-23, as noted above. In the second phase, a pause was observed for three days (July 24 -27) in the commune of Koumpentoum only to implement seasonal malaria chemoprevention activities. An additional pause was observed for five days (July 29 to August 5) in the entire health districts of Koumpentoum and Kougheul for the Tabaski celebration.

### ***COORDINATION OF OPERATIONS***

IRS operations were coordinated at the national, district, and operational site levels. At the national level, VectorLink Senegal leadership and the NMCP established and maintained regular contacts, discussions, and information exchange on IRS planning, spray progress, and implementation updates.

The District Medical Officer (or his/her representative) and VectorLink District Coordinators provided leadership at the district level for implementation of IRS activities. At the operational site level, the Head of Health Post and VectorLink Site Manager coordinated IRS activities. At both the district and operational sites, daily meetings were organized throughout the duration of the IRS campaign to review performances, discuss challenges encountered, and identify solutions to ensure a smooth execution of spray activities. Discussions were held at the site level for immediate solutions. Community mobilizers were informed of any change in spray calendars for better coordination in the field.

## ***SUPERVISION***

Supervision of the IRS campaign involved identification of potential problems and immediate correction of inadequacies, leading to improved program performance and a successful campaign. VectorLink Senegal supervised all IRS activities as indicated in the project's supervisory plan. The VectorLink Senegal technical team supervised at the district level by providing overall operational and managerial support. The district-level monitoring team included VectorLink district coordinators, M&E assistants, and district logistics assistants. District health officers, HPN, DREEC and local authorities actively participated in supervision at the district-level.

At the operational site level, site managers, field supervisors, and team leaders provided guidance and oversight. All supervisors used smartphone-based checklists to conduct inspections of SOP morning mobilization, inspection for vehicles, homeowner preparation and SOP performances, storekeeper performance, and end-of-day clean-up.

Each site had an average of three to four spray teams. Every team leader directly supervised the work of four to six spray operators using the TL checklist. Site managers oversaw team leaders' performance and observed spray operators and other personnel on site, including washers and security guards.

During the campaign, VectorLink Senegal worked with the recently retired NHS agents as field supervisors because of the unavailability of active agents, who were engaged in COVID-19 crisis management. In the first phase of the campaign, every operation site had one local NHS supervisor agent. However, during the last week of the campaign's first phase and after the pause of the campaign due to COVID-19, VectorLink Senegal reduced the number of NHS supervisors to limit COVID-19 transmission risk. The entire responsibility of supervision was assigned to VectorLink team leaders and site managers, with the support of the VectorLink team. In the second phase of the campaign, VectorLink Senegal used a limited number of NHS agents also to limit transmission risk.

All VectorLink Senegal technical staff worked in the field during the campaign, performing close supervision and coaching all aspects of operations. They specifically focused on the supervision of spray techniques, environmental compliance, community mobilization, stock management, and handling of insecticides.

The NMCP Coordinator conducted a visit in the field during the first phase of the campaign and observed all aspects of operations, including spray techniques, environmental compliance, warehouse storage, and end-of-day activities.

The prefects of Makacolibatang, Koumpentoum and Koungheul visited spray sites and the VectorLink office and showed appreciation for the IRS teams' work.

### **3.3.3 KEY OPERATIONAL DETAILS**

#### ***MOBILE PAYMENTS***

VectorLink Senegal used a mobile money payment system to pay all seasonal workers. This approach significantly improved the timeliness of payments and largely eliminated the risks associated with managing large amounts of cash in the field.

However, the payment company did not have adequate presence and coverage in all operational sites. There were delays for some SOPs payments due to the lack of presence in the operational site and/or issues with the technical functionality of the mobile payment company platform.

#### ***SUMMARY OF POST-SPRAY ACTIVITIES***

Post-spray activities for the 2020 IRS campaign included evaluation meetings at the site, district, and national levels; demobilization of materials and equipment; site rehabilitation and solid waste management. A summary of the progress made for these post-spray activities is provided in Table 4 below. In addition, each post-spray activity is described in detail in this section.

**TABLE 4. POST-SPRAY ACTIVITIES**

Activities	Responsible Party	Results
Site-level IRS evaluation	HPNs, SOPs' site managers, TLs and SOP, religious and community leaders, elected officials and PMI VectorLink	Completed
District-level IRS evaluation	DHMT, HPNs, site coordinators, district high level authorities, religious and community leaders, local elected officials and PMI VectorLink	Completed
National-level IRS evaluation	Country-level partners, local elected leaders, UCAD, NHS, DMOs, PMI VectorLink, local media	Date of the national evaluation will be decided with the NMCP
IRS site closeouts	PMI VectorLink district staff	Completed
Data cleaning and archiving	M&E team	Completed
Waste disposal	PMI VectorLink, District of Tambacounda, NMCP, ProPlast, DEEC	Ongoing

***DEMOBILIZATION OF MATERIALS AND EQUIPMENT***

At the end of spray operations, the Project moved all materials and equipment from the 30 operational sites to the four district-level storerooms and conducted an inventory at the district level. All materials and equipment were transferred to the main VectorLink Senegal warehouse in Kaolack where a final inventory was conducted and all materials properly stored.

## 3.4 INSECTICIDES

### 3.4.1 QUANTIFICATION ASSUMPTIONS

The basis for quantifying the needs for insecticides was the most recent population data used during the 2019 universal insecticide-treated net distribution campaign. From the estimated size of the population, VectorLink Senegal used the ratio of 2.4 persons/room, as reported during the 2019 ITN mass distribution campaign, to calculate the number of rooms and from this derived the number of structures using a ratio 1.67 rooms per structure using data from the 2017 AIRS IRS campaign. Quantities for all insecticides were ultimately based on the number of structures targeted for spraying.

### 3.4.2 PROCUREMENT OF INSECTICIDES

The selection of insecticides was based on the results of insecticide susceptibility tests conducted in 2019 and trials on residual efficacy of the new formulation (SumiShield and Fludora Fusion) conducted by LEVP/UCAD. The selection process also considered the insecticide resistance management plan which recommends an insecticide rotation strategy. Vectors from all sites were susceptible to clothianidin, the active ingredient of SumiShield® 50WG and Fludora® Fusion and Actellic 300 SC with active ingredient pirimiphos-methyl was kept as a possible replacement for the rotation.

In total, VectorLink Senegal ordered and used 7,680 sachets of SumiShield® 50WG and 35,880 sachets of Fludora® Fusion making a total of 43,560 units of insecticide to spray 134,883 structures. All the sachets received were used for spraying (Table 5). Due to a shortage of insecticides, 1,431 rooms were not sprayed in the health district of Koumpentoum.

**TABLE 5. 2020 IRS INSECTICIDE USAGE SUMMARY (UNITS)**

Health districts	Sachets used	
	SumiShield®	Fludora® Fusion
<b>Kedougou</b>	5,320	-
<b>Makacolibatang</b>	-	6,595
<b>Koumpentoum</b>	780	13,182
<b>Koungheul</b>	1,580	16,103
<b>Total</b>	<b>7,680</b>	<b>35,880</b>

### 3.4.3 INSECTICIDE USE MONITORING

VectorLink Senegal developed a rigorous monitoring system for the use of insecticides. More specifically, the stock of insecticides in each storeroom was counted on a daily basis. Every day, each operator received six sachets of insecticide and at the end of the day upon the return from work, the number of full and empty sachets were counted and correlated to the number of structures sprayed. In each storeroom, all empty sachets were collected and kept as a source of verification of the number of insecticides received and used or remaining. No loss of insecticide was reported during the 2020 IRS campaign.

### 3.4.4 INSECTICIDE MANAGEMENT

In terms of insecticide use, VectorLink Senegal sprayed neonicotinoid (SumiShield® 50WG) in Kedougou and neonicotinoid combined with pyrethroid (Fludora® Fusion) in the three other districts (Makacolibatang, Koumpentoum and Koungheul). However, due to the shortage of insecticide in the districts of Koumpentoum and Koungheul, 2,360 sachets of SumiShield® left over from the spray campaign in Kedougou were used to complete spraying in those two districts. VectorLink Senegal rolled out the use of serial numbers for each insecticide unit in between the two spray phases. During the first phase, storekeepers and assistant logisticians serialized sachets using hand-written individual numbers. In the second phase, they serialized all insecticide sachets with pre-ordered barcoded stickers. For both phases, storekeepers and spray staff used paper insecticide

tracking sheets to track the insecticides that team leaders received and returned daily at each operational site. As a lesson learned, VectorLink Senegal noted that pre-ordered barcoded stickers are more easy to use than hand-written individual numbers. In addition, displaying stickers on insecticide sachets saves time and minimizes errors.

## 3.5 IEC/SBC ACTIVITIES AND OUTCOMES

Community mobilization was an important component of the IRS 2020 campaign implementation. Although communication was the primary responsibility of the NMCP, VectorLink Senegal provided significant technical support at both central and operational site levels. Communication activities started with the development of the IRS communication plan which included planning of activities, community mobilization, and training of actors in support of district operational plans. The NMCP shared guidance with the districts for the development of relevant district communication plans, taking into account local specificities and the context of COVID-19.

### 3.5.1 COMMUNICATION PLANNING

Each health district developed communication plans following NMCP guidelines. These plans were jointly validated by the NMCP and VectorLink Senegal. The plans took into account the local context, the experience of other malaria activities like the universal coverage of ITNs or the seasonal malaria chemoprevention to determine the targets, the most appropriate channels, the most relevant messages, and arrangements for adequate preparation and implementation of a quality IRS campaign. The district communication plans included mass media activities and interpersonal communication to be carried out before, during and after the sprayings.

Each district organized an orientation workshop with the district management teams and head of health post nurses to develop operational communication plans at the health post level. NMCP and VectorLink Senegal provided technical support to the district management teams during the development of the operational communication plans.

### 3.5.2 COMMUNITY MOBILIZATION

In the districts of Makacolibatang, Koumpentoum and Kounghoul, local development committees have been organized under the leadership of the administrative authorities. These committees also existed in Kedougou but administrative authorities did not organize a meeting specific to IRS. These committees, with support from local village authorities, made it possible to obtain the support of communities and village chiefs.

In the urban communes of Kedougou, Koumpentoum, and Kounghoul, the district teams and VectorLink Senegal set up social mobilization and rejection management committees. Participants included head of neighborhoods, representatives of youth organizations, and representatives of locally elected leaders. These committees were set-up to address issues (such as unwillingness to prepare households for spraying) with community rejection of household spraying. During the spray campaign some members of these committees moved to the field along with spray operators and helped for the preparation of households. Members of these committees included head of neighborhoods, representatives of youth associations and representatives of locally elected leaders.

Mass media activities included press releases, the broadcasting of radio spots in local languages, and interactive broadcasts on local radio stations. The Project used other communication channels to convey information about the arrival of spray teams including in mosques and caravans with criers in certain places, notably in urban communes.

All messages placed an emphasis on the benefits of IRS, the preparations to be made by the population before, during and after the spraying with a particular focus on the removal of personal items, which was often considered a major constraint and a reason for refusal.

The message also focused on the effectiveness of the product, the smell and certain specifications (e.g., no stains on the walls) to deconstruct some negative perceptions of the population on the product in districts where IRS has been previously conducted (Koungheul and Koumpentoum).

In addition, community mobilizers organized systematic home visits 48 hours before the date of spraying as well as door-to-door follow-up visits post-spray to get feedback from the communities and share messages of preservation of treated surfaces by not repainting them.

Overall, community mobilizers reached 322,585 persons through door-to-door visits, both before and after the campaign, in the four health districts.

### 3.5.3 PRODUCTION OF COMMUNICATION AND EDUCATIONAL MATERIALS

VectorLink Senegal produced a variety of communication materials which were distributed to the targeted communities including 2,600 t-shirts, 400 polo shirts, 2,400 caps, 186 banners, 130 training guides, and 1,920 IRS pocket guides on IRS for community health workers and supervisors.

Spray operators collected information on mobilization during the spray visit using the VectorLink Collect application installed on their smartphone. Out of the 136,417 structures visited, 132,725 acknowledged they were visited by a mobilizer, and 130,364 households were adequately prepared before the arrival of the spray team (Table 6).

**TABLE 6. 2020 IRS HOUSEHOLD VISITED BY COMMUNITY MOBILIZERS**

District	Household visited by mobilizers		Household prepared before spray team arrival	
	Yes	No	Yes	No
Kedougou	7,882	416	7,694	604
Koumpentoum	46,412	1,068	46,314	1,166
Koungheul	59,151	1,376	58,072	2,455
Makacolibantang	19,280	314	18,284	1,310
<b>Total</b>	<b>132,725</b>	<b>3,174</b>	<b>130,364</b>	<b>5,535</b>

## 3.6 CAPACITY BUILDING EFFORTS (SUPPORT TO GOVERNMENT ACTIVITIES)

Due to the COVID-19 pandemic, the IRS boot camp planned to build capacities of stakeholders from the Ministry of Health and other partners was cancelled.

## 3.7 GENDER MAINSTREAMING

VectorLink Senegal worked to integrate men and women into its IRS campaign and to create a safe work environment for all women. The Project focused on recruiting females into IRS supervisory roles. One challenge to recruiting females for the field supervisor position was that a limited number of women met the educational level requirements to perform supervisory duties. In 2020, the percentage of females in supervisory roles was 21% (Table 7).

**TABLE 7. SUMMARY OF GENDER-RELATED INDICATORS, 2020**

Gender Indicator	Females Trained to Support IRS	Females Hired to Support IRS	Females Hired in Supervisory Roles†	Female SOPs Hired	Female TLs Hired
2020	38% (1057)	30% (280)	21% (72)	25% (142)	21% (23)

## 4. ENTOMOLOGY

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VectorLink Senegal assessed the spray quality in all districts during the spraying period using wall cone bioassay tests to provide an indicator of the spray quality. The Project conducted cone bioassays in two sprayed villages in each IRS district within two to four days of receiving IRS during the first week of the campaign. The same houses will be used for the monthly spray decay monitoring to evaluate the residual effect of each insecticide on the tested surfaces.

### 4.1 METHODS

Mud and cement walls were the two main types of surfaces found in IRS districts. One to two sentinel sites were selected in each spray district. In each sentinel site, one sprayed structure with each type of wall surface (mud and cement) was randomly selected and used for the cone bioassays. In addition to the sprayed structures, one unsprayed structure (which was eligible but not sprayed for any reason) was used for control bioassays in each of the sites.

The susceptible mosquito colony (*An. coluzzii* strain) reared in insectary of *Services de Lutte Antiparasitaire* (SLAP) was used for the cone bioassays and the tests were conducted following the SOP 09/01.

Three cones were fixed on each selected house wall surfaces in each side of the wall and about 10 mosquitoes, two to five days old, non-blood fed were introduced into each cone (a total of about 30 per structure) and exposed for 30 minutes while one control cone containing ten mosquitoes was similarly exposed on an untreated surface. The number of knocked down mosquitoes was counted at 60 minutes post-exposure (30 minutes after transferring to disposable paper cups). Mosquitoes were provided with sugar solution and kept in an insecticide-free room for delayed mortality recording, with favorable temperature ( $25^{\circ}\text{C} \pm 2$ ) and humidity conditions ( $70\% \pm 10$ ). Delayed mortality of both insecticides was recorded daily (for up to five days post-exposure in case of survival). When control mortality was between 5% and 20%, test mortality was corrected using Abbott's formula.

### 4.2 RESULTS

Table 8 showed the results of wall bioassays indicating that the structures were adequately sprayed in both districts, with 100% mortality recorded between one and four days on both wall types.

**TABLE 8: RESULTS OF CONE BIOASSAY FOR IRS QUALITY ASSESSMENT IN IRS DISTRICTS USING SUSCEPTIBLE *AN. COLUZZII***

Insecticide sprayed	Sentinel site (District)	Date sprayed	Date of bioassay	Type of wall surface	% Mortality Rate (Number tested)			
					T0			
					Day1	Day2	Day3	Day4
Sumishield	Bandafassi (Kedougou)	06/13/2020	06/21/2020	Mud	100% (62)	100% (62)		
				Cement	98.9% (88)	100% (88)		
	Niéménéké (Kedougou)	06/04/2020	06/27/2020	Mud	100% (59)	100% (59)		
				Cement	100% (80)	100% (80)		
Fludora Fusion	Souaréounda (Makacolibantang)	06/12/2020	06/26/2020	Mud	100% (90)	100% (90)		
				Cement	100% (60)	100% (60)		
	Sinthiou Boure Bana Ndao (Makacolibantang)	06/02/2020	06/28/2020	Mud	100% (90)	100% (90)		
				Cement	100% (60)	100% (60)		
	(Darou salam 2) Koumpentoum	07/18/2020	07/19/2020	Mud	99% (100)	99% (100)	100% (100)	
				Cement	99% (67)	100% (67)		
	Ndoum (Koungheul)	07/17/20	07/20/2020	Mud	100% (105)			
				Cement	100% (68)			
	Keur Serigne Diabe (Koungheul)	07/16/2020 07/17/2020	07/21/2020	Mud	100% (103)			
				Cement	98% (64)	98% (64)	98% (64)	100% (64)

# 5. ENVIRONMENTAL COMPLIANCE

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## 5.1 IRS CAMPAIGN ASSESSMENTS

VectorLink Senegal implemented the 2020 IRS campaign under a new Supplemental Environment Assessment (SEA) approved in April 2020. The SEA is valid for the period of 2020–2024 and authorizes the use of five WHO-recommended classes of insecticides: pyrethroids, carbamates, organophosphates, neonicotinoids, and clothianidin/deltamethrin combination, including the use of chlorfenapyr in the pyrrole class.

The Environmental Compliance (EC) team composed of the Regional Environmental Compliance Manager (RECM), the Environment Compliance Officer (ECO) and EC Assistant worked with the regional environmental services and district coordinators to oversee all environmental compliance activities before, during, and after the campaign. VectorLink Senegal used the Environmental Mitigation and Monitoring Plan as the guide for corrective actions to mitigate potential environmental impacts. The Environmental Mitigation and Monitoring Report in Annex A describes mitigation actions the Project has taken to achieve safe and efficient spraying.

As part of the initial Pre-spray Environmental Compliance Assessment (PSECA), VectorLink Senegal assessed all IRS facilities (storerooms, wash areas, soak pits) a few weeks ahead of spray activities. Upon completion of the assessment, a work plan of required upgrades and improvements for each site was shared with the operations team to ensure that renovations were completed on time.

For the 2020 campaign, the Project prepared 30 operation sites with 26 new fixed soak pits. The new fixed soak pits used the improved design, with plastic sheets lining the walls, a cover of the bio-beds, and a topmost layer of large stones as prescribed in the revised 2020 PMI Best Management Practices (BMP) Manual. VectorLink Senegal used eight large capacity Mobile Soak Pits of the second generation (MSP II) to supplement the fixed soak pits in districts of Kedougou, Kounghoul, and Koumpentoum. During the final assessment, the EC team worked with district coordinators to identify suitable locations for installation of the remaining mobile soak pits in the communities. The project team also used the final assessment to verify completion of all refurbishments and authorize the distribution of insecticides to the operations sites.

To ensure a healthy workforce throughout the campaign, the Project conducted pre-campaign medical checkups for all candidates working in the field as well as pregnancy tests for the female candidates. A total of 928 people received medical check-ups were. Of these, nine people were declared unfit to participate in the IRS campaign. Also, 267 women received pregnancy tests, and only one was positive.

Team leaders conducted daily health checks including temperature check and screening questions for each spray operator regarding health status, to ensure that all SOPs were fit before heading to the field.

VectorLink Senegal emphasized the importance of household preparations to all IRS cadres during training and stressed the role of team leaders, field supervisors, and SOPs in mobilizing and assisting beneficiaries to empty the rooms. VectorLink Senegal invited a Goizper technical representative to lead the sprayer maintenance session at the training of trainers (TOT). District spray teams carried out weekly calibrations and oiling of the sprayers to ensure good functionality throughout the campaign.

The VectorLink Senegal team together with government partners and M&E assistants carried out mid-season inspections at the operation sites and in the field. The goal was to ensure ongoing compliance with prescribed safety requirements and to build in-country capacity to sustain IRS implementation. Site managers, after receiving feedback from inspections, addressed “red flags” and prescribed solutions during morning assemblies. An example of a red flag addressed was the quantity of leftover insecticide that SOPs brought back from the field at the end of the day after spraying especially during the first week of the campaign. VectorLink Senegal

addressed this red flag by ensuring that site managers and TLs were monitoring very closely the effective use of the remaining insecticide at the end of the spray in the field.

## 5.2 INCIDENT REPORTS

VectorLink Senegal recorded three incidents during the campaign. Table 9 below provides a list of all incident reports.

**TABLE 9. 2020 PMI VECTORLINK SENEGAL INCIDENT REPORT SUMMARY**

Dates	Description of Incident	Location
June 6, 2020	Insecticide Exposure Due to Equipment or PPE Malfunction or Misuse: SOP experienced a sprayer malfunction that resulted in an insecticide spill when spraying a structure.	Makacolibantang
July 7, 2020	Vehicle and Transport Accidents: Rental vehicle was bringing two VL staff, from the Kougheul district office to the hotel when a motorcycle driver hit the car from behind.	Kougheul
July 12, 2020	Other Health and Safety Concern: Scorpion sting while cleaning around operation site.	Kougheul

To mitigate the risk of insecticide pilferage and data falsification, the Project implemented several processes:

- The Project serialized each insecticide sachet with a unique number. Each TL had to sign against the serialized insecticide units during issuance in the morning and reconciliation at the end of the day. Team leaders tracked distribution of insecticide against each SOP in the team.
- Supervisors conducted spot checks of Daily Spray Operator forms to verify whether the number of structures recorded as sprayed tallied with the expected number of insecticide sachets used.

## 5.3 DEMOBILIZATION AND WASTE MANAGEMENT

VectorLink Senegal decommissioned all 30 sites and moved all spray equipment and materials from the operational sites to the respective district stores within one week after the 2020 campaign. The Project disposed of the solid waste and will move all contaminated waste materials (used nose masks, and empty insecticide sachets) to the District of Tambacounda. Contaminated waste (insecticide sachets, nose masks, and exhausted granulated activated carbon from mobile soak pits and charcoal from de-silted old soak pits) will be incinerated in October 2020 (Table 10).

The EC team led the post-spray season inspections at all the operations sites at Kedougou (June 30–July 1) Makacolibatang (July 27), Kougheul and Koumpentoum (August 14–18, 2020) to ensure that temporary storage facilities had been cleaned, soak pits properly closed and cleared of vegetation, and covered, and no IRS-related hazardous material remained at the sites.

All empty sachets of insecticides and the solid wastes are stored in the storeroom of the district office in Kougheul and will be transferred to the Tambacounda health district for incineration as agreed in the memorandum of understanding signed between VectorLink Senegal and the health district. All plastic wastes (hard hats, face shields, broken Goizper pump parts, plastic sheets) were moved to the Kaolack warehouse and will be donated to ProPlast Company for recycling as stipulated in the agreement signed between VectorLink Senegal and ProPlast; recycling activity will take place in October.

All electronic materials including printers, phones, laptops, and air conditioners were moved to the main VectorLink office in Dakar.

Contracted waste management companies upon completion of their task will issue certificates of completion to document incineration, recycling, and all other waste disposal methods.

**TABLE 10. INVENTORY OF CONTAMINATED SOLID WASTES**

Districts	Contaminated items		
	Empty insecticide sachets	Masks	Gloves
Kedougou	5,320	2,531	25
Makacolibantang	6,595	2,202	17
Koungheul	17,683	6,140	36
Koumpentoum	13,962	3,980	17
<b>Total</b>	<b>43,560 sachets</b>	<b>14,853</b>	<b>95</b>

# 6. MONITORING AND EVALUATION

## 6.1 DATA COLLECTION

In 2020, VectorLink Senegal used two approaches for capturing spray data: mobile data collection using smartphones for the SOP form, and paper-based data collection for the team leader. In both approaches, the Project used standardized data collection forms designed to capture all core PMI indicators (Table 11). All SOPs received training on mobile data collection and additional sessions on paper-based data capture and quality.

Prior to the campaign, the M&E team configured each smartphone (16 GB, 5th generation Samsung Galaxy phone) with a mobile version of the Open Data Kit (ODK) and CommCare application – the two platforms used for data collection and supervision. VectorLink Senegal provided smartphones to each SOP and TL and registered SIM cards for each of the operations site manager’s smartphones.

During the spray campaign, SOPs captured data on the Daily Spray Operator form in the smartphone. At the end of each spray day, TLs verified the SOP forms for completeness and accuracy when completing the Team Leader Summary form and then sent data to the server. The M&E Assistants assisted the TLs with verification and synchronization of data to the server.

**TABLE 11. DATA COLLECTION TOOLS**

Tool	Purpose	Enhancement	Person Responsible
Daily Spray Operator Form	To report standard spray data together with insecticide use.	Added a note variable to fill some special cases that require explanation	SOP
Team Leader Summary Form	To check the data accuracy in the SOP form and to provide a daily summary of his/her team’s work.	Developed a mobile application of this form	TL

## 6.2 SPRAY PERFORMANCE TRACKING SHEET

VectorLink Senegal used the Spray Performance Tracking Sheet (SPTS) tool. This tool allowed daily tracking of SOP performances and the use of insecticide. Site managers were responsible for recording the performance data. They worked with storekeepers to input information on insecticide use on the SPTS on a daily basis. This information was available to district coordinators and shared with district medical officers. In addition, VectorLink Senegal synthesized the data and shared it every week with PMI and all partners including the NMCP and the district health team.

## 6.3 DATA ENTRY

Data entry is done by the SOPs using smartphones just after the spraying of each structure/room. SOPs gave their smartphone to the TL at the end of each spraying day for verification, finalization and synchronization to the server. The M&E team reported daily totals to the Home Office and operational teams of VectorLink Senegal for real-time oversight of operations and timely decision-making.

## 6.4 DATA QUALITY ASSURANCE

To ensure data quality, the Project maintained protocols for all levels of data handling, management, and reporting. By the established protocol, SOPs were the only people allowed to record spray data using strict structure counting and marking procedures. TLs, field supervisors, M&E assistants, district coordinators, and other supervisors conducted regular spot checks of the data while in the field. The following are some of the data quality assurance tools and approaches that VectorLink Senegal implemented:

- Standardized data collection tools and comprehensive training for all seasonal workers on data collection and entry.
- Daily Team Leader Summary Form to summarize spray results for each SOP and identify and correct data capturing errors.
- Double data verification by Dimagi and VectorLink Collect.
- Validation checks in the VectorLink Collect database.

## 6.5 VECTORLINK COLLECT DATABASE

VectorLink Senegal rolled out the VectorLink Collect database to store, visualize, and analyze spray data. The database was created on the free and open-source District Health Information Software 2 (DHIS2), hosted online by BAO Systems and managed by the Abt Home Office team. The new database has multiple advantages including an interactive dashboard to have a real-time view of spray progress, and ability to generate pivot tables to design customized reports.

The M&E Manager and Database Manager were trained by the Monitoring & Evaluation Specialist at the Home Office on VectorLink Collect. The VectorLink Senegal team trained eight M&E Assistants and two Data Cleaners on data collection techniques with smartphones and the mobile spray data collection protocol.

The Project used a two-stage data cleaning process built into VectorLink Collect: the IRS Duplicate Finder and the Mop-up Tool.

## 6.6 MHEALTH

In the 2020 spray campaign, VectorLink Senegal used mobile phones for supervision and job aids through technological platforms such as CommCare, and ODK. Five checklists were used: spray operator morning mobilization, spray operator transportation vehicle inspection, homeowner preparation and spray operator performances, end of day cleanup, and storekeeper performance inspection. Supervision checklists used both platforms, VectorLink supervisors used ODK, and non-VectorLink supervisors used CommCare (which was managed by Dimagi). Checklists were the same on both platforms. The site manager also used the CommCare platform as a performance monitoring tracking (PMT) reporting tool which captured the total number of rooms found and sprayed during the day as well as the quantity of pesticides used.

In 2020, 6,545 inspections were conducted using smartphones. Users of the CommCare platform completed 6,034 inspections and users of ODK completed 511 inspections. The same supervisory checklists were available on CommCare and ODK platforms. In total, 3,843 red flags were observed, with 2,177 (56.6%) reported through the CommCare platform and 1,666 (43.6%) through the ODK. Some red flags were erroneous responses due to misunderstanding of the questions. Examples of red flags observed included: leaking pumps, missing sprayable surfaces, and eating while in the field. These red flags were addressed by supervisors on-the-spot.

VectorLink Senegal used SMS to send out important job aids and reminders. Messages sent to all spray actors included communications on safety and an incident-free environment: Because the Project had to manage the campaign during the emerging COVID-19 pandemic in Senegal, the team set up recurring reminders to all seasonal workers on this to include social distancing, regular hand washing, and wearing of masks.

## 6.7 MOBILE DATA COLLECTION INITIATIVE

As part of its efficiency and cost-saving efforts, VectorLink Senegal rolled out digitized spray data collection using a mobile version of the ODK application. The goal of mobile data collection was to improve data-processing and reporting time while maintaining real-time data availability for operational decision making during the spray. Building on lessons learned from other IRS countries, VectorLink Senegal implemented mobile data collection in all four districts.

At the end of each day, the TLs (who oversaw four to six SOPs) checked each smartphone for any validation errors, incomplete forms, and forms with incorrect metadata details. After all verification was complete, the TL sent data from the SOP phones to the VectorLink server. SOP data was also reported by the TLs in a paper-based synthesis form which is used by the Site Manager to fill out the SPTS and to send data in the CommCare based PMT. When a site completely lacked mobile network coverage, the smartphones assigned to that site were transported to the Health Post or the nearest community with network coverage and internet connectivity for spray data synchronization to take place.

## 6.8 RESULTS

The VectorLink M&E indicators matrix in Annex B provides results for core and other spray indicators for the 2020 campaign. Details for main indicators are presented below.

## 6.9 SPRAY COVERAGE AND POPULATION PROTECTED

During the spray campaign, SOPs found a total of 137,932 structures and sprayed 136,417, for a spray coverage of 98.9%. In terms of targets, VectorLink Senegal sprayed 136,417 out of 134,883 structures targeted (101%). This was due to a greater number of structures found across all four districts, than targeted. Specially, in two district—Koumpentoum and Kounghoul—the number of structures found greatly exceeded the target (124% and 119%, respectively, Table 12). While structures were underestimated in these two districts, the number of structures were over-estimated in Kedougou—only 34% of structures targeted, were found. This was due to an inadequate estimation of the target based on the population of the last universal ITN distribution campaign. Ratios of rooms to structures was derived from population data using the average ratio found during the last IRS campaign in 2017.

The SOPs recorded 577,816 people living in the structures found and IRS protected 571,649 (98.9 %) of them from malaria (persons living in the sprayed structures). This includes 13,575 pregnant women and 95,249 children under 5 years of age. Details on the number of structures found and sprayed and populations protected by district are presented in Table 12.

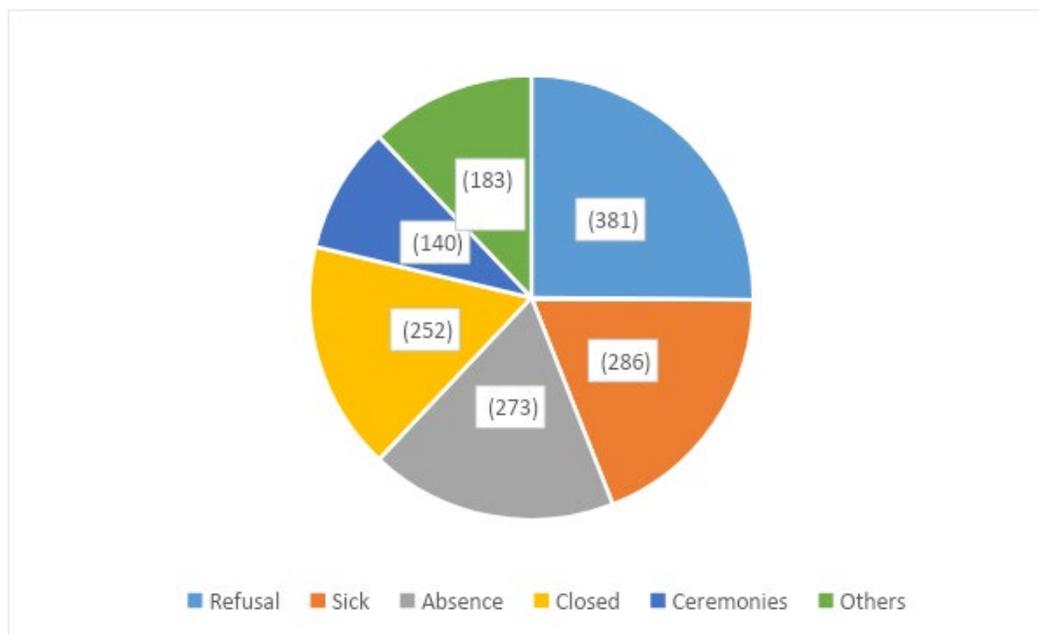
**TABLE 12. IRS COVERAGE: ELIGIBLE STRUCTURES SPRAYED AND POPULATION PROTECTED IN TARGETED AREAS**

Districts	Structures					Population		Pregnant Women Protected	Children Under 5 Years Protected	Rooms				
	Targets	Found by SOPs	# Sprayed	% Sprayed (Coverage)	% Sprayed (Progress)	# Protected	# Not Protected	# Protected	# Protected	Targets	Found By SOPs	# Sprayed	% Sprayed (Coverage)	% Sprayed (Progress)
Kedougou	23,711	8,278	8,016	97%	34%	74,968	2,430	1,415	11,537	39,598	38,484	32,083	83%	81%
Koumpentoum	39,579	49,255	48,929	99%	124%	180,234	923	4,309	29,845	66,098	75,915	74,998	99%	113%
Koungheul	50,599	60,806	60,213	99%	119%	220,178	1,502	5,141	36,382	84,500	98,606	96,777	98%	115%
Makacolibantang	20,993	19,593	19,259	98%	92%	96,269	1,312	2,710	17,485	35,059	38,339	36,439	95%	104%
<b>TOTAL</b>	<b>134,882</b>	<b>137,932</b>	<b>136,417</b>	<b>99%</b>	<b>101%</b>	<b>571,649</b>	<b>6,167</b>	<b>13,575</b>	<b>95,249</b>	<b>225,255</b>	<b>251,344</b>	<b>240,297</b>	<b>96%</b>	<b>107%</b>

## 6.10 REASONS WHY STRUCTURES WERE NOT SPRAYED

Out of the 137,932 structures found, 1,515 (0.6%) were not sprayed. As shown in Figure 2, the five main reasons for not spraying structures were refusal (381), sick (286), absence (273), closed (252), ceremonies (140), and others (183). Note that all villages were sprayed with the exception of the village of Noumbou Bassary (Health Post of Dindeferlo, Kedougou district) where the entire village (20 rooms) refused IRS.

**FIGURE 3. REASONS REPORTED FOR NOT SPRAYING STRUCTURES**



## 6.11 INSECTICIDE USE AND SPRAY OPERATOR PERFORMANCE

On average, one sachet was used to spray 3.13 structures and 5.52 rooms. These ratios were more homogenous with rooms sprayed than structures especially in Kedougou where one sachet was used to spray only 1.51 structures. This difference was mainly due to larger structures found in the district of Kedougou, as compared to structures found in other districts.

**TABLE 13. INSECTICIDE USAGE AND SPRAY OPERATOR PERFORMANCE**

Districts	# of Sachets Used	# of Structures Sprayed	Average # of Structures Sprayed per Sachet	# of Rooms Sprayed	Average # of Rooms Sprayed per Sachet
Kedougou	5,320	8,016	1.51	32,083	6.03
Koumpentoum	13,962	48,929	3.50	74,998	5.37
Koungheul	17,682	60,213	3.41	96,777	5.47
Makacolibatang	6,595	19,259	2.92	36,439	5.53
<b>TOTAL</b>	<b>43,559</b>	<b>136,417</b>	<b>3.13</b>	<b>240,297</b>	<b>5.52</b>

Overall, VectorLink Senegal sprayed **136,417** structures and, on average, SOPs sprayed 14 structures per day. The Project also reports spray coverage by room (any delimited area of a structure) because historically, the Government of Senegal recorded and reported IRS results by rooms. The total number of rooms sprayed was **240,297** with SOPs averaging 25 rooms per day as shown in Table 14.

**TABLE 14. SPRAY OPERATORS PERFORMANCES**

Districts	Structures Sprayed	Rooms Sprayed	# of Operational Days	Cumulative Number of Spray Operators	Average # Rooms/Day /SOP	Average # Structures/Day/ SOP
Kedougou	8,016	32,083	22	1,787	18	4.5
Koumpentoum	48,929	74,998	21	2,608	29	18.8
Koungheul	60,213	96,777	21	3,805	25	15.8
Makacolibatang	19,259	36,439	19	1,599	23	12.0
<b>TOTAL</b>	<b>136,417</b>	<b>240,297</b>	<b>22</b>	<b>9,799</b>	<b>25</b>	<b>14</b>

# 7. CHALLENGES, LESSONS LEARNED AND KEY RECOMMENDATIONS

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Overall, the 2020 IRS campaign was successful at achieving its spray targets and spray coverage. Nevertheless, VectorLink Senegal encountered some challenges during the operations. Based on the lessons learned from dealing with these challenges, VectorLink Senegal made specific recommendations for future IRS campaigns.

## 7.1 CHALLENGES

The 2020 IRS campaign in Senegal was carried out in a very difficult context marked by many challenges, including:

- The COVID-19 pandemic and its multiple implications/constraints.
- Adjusting the number of seasonal workers in vehicles to comply with the social distancing almost doubled the number of vehicles needed for operations and increased the logistics management challenges.
- Accommodating training sessions to guidance of 10 participants per room due to COVID-19 was difficult because multiple venues and facilitators were needed to do simultaneous training sessions.
- Logistical challenges due to restrictions put in place in-country, including the late arrival of some IRS equipment (sprayers) purchased internationally due to the closure of airports due to COVID-19 and limited in-country travel.
- The percentage of structures sprayed in Kedougou was low (33%) because in Kedougou district and especially in the urban commune, there was a big difference between the theoretical room per structure ratio (1.67 room per structure) in the work plan and the actual ratio (4 rooms per structure) found in the field.
- Refusal cases were particularly high in urban settings such as Kedougou. Of those structures not sprayed in Kedougou, 51% was due to refusals because most household members were absent from their house. Also, those found in the house could not make the decision to accept spraying and/or move personal items.
- While the mobile data collection was successfully implemented, the team still experienced delays of two to three days in synchronizing data from a few remote sites that lacked network coverage and electricity; therefore, the smartphones from those remote sites had to be transported to nearby sites with network coverage in order to synchronize all data.
- Mobile payment was difficult in some more remote areas and caused delays of receiving codes or the need to move long distances by SOPs to get cash, among other issues.
- The VectorLink Collect system largely depends on uninterrupted internet connectivity because it is a cloud-based platform with a server located in the United States. When internet connectivity was poor and TLs had no option, the smartphones were given to the site manager who worked to find a stable internet connection to send data to the server. The connection issue occasionally caused delays for submission of data to the server.

## 7.2 LESSONS LEARNED

- Good planning, coordination and management at both VectorLink Senegal and the Home Office contributed to the successful implementation of project activities.

- Coordination with the NMCP was a key component of the success of the IRS campaign. More specifically, the NMCP was involved in all planning steps at central and district levels and provided VectorLink with all the authorizations needed for travels despite the COVID 19 restrictions imposed by the Government.
- Involvement and availability of the district team and health post nurses allowed VectorLink Senegal to implement IRS despite many challenges related to the COVID 19 context. VectorLink ensured that trainings were conducted in compliance with the social distancing, handwashing and wearing of masks procedures recommended to prevent COVID 19.
- The involvement of local authorities in IRS operations planning, supervision, and end-of-spray evaluation contributed to the success of IRS acceptance by the population and the resolution of refusals cases. In all districts, mainly in urban communes like Kedougou, Red Cross volunteers or youth associations mobilized by district teams were very helpful in household preparation and helped avoid refusals.
- Implementing IRS campaign in urban areas should take into account specific constraints such as the type of rooms and structures, the mobility of household members who may be absent during the campaign, the reluctance to help remove personal items and financial costs including rental of vehicles and refurbishment of sites which are generally higher in urban areas than in rural areas.
- The presence of experienced site managers, team leaders, and SOPs contributed to reduce the impact of challenges during the implementation. Site managers and team leaders were available the day before the start of the campaign to prepare material, coding, and packaging for each SOP. They coordinated closely with HPNs to adjust progress plan when the rain disturbed the initial plan, which helped in not losing days.
- The presence of VectorLink Senegal teams in the field for supervision during the entire campaign with systematic use of the supervision tools for spray operations monitoring and on-site problem solving greatly improved SOPs' performance and allowed for prompt problem solving.
- The quantification based on the target population (data from the 2019 ITNs mass distribution and 2017 IRS campaign) that was initially used in the work plan to calculate the number of rooms and structures resulted in underestimated figures in Kounghoul and Koumpentoum, and overestimation in Kedougou. The 2020 IRS campaign data and findings from the census of structures being done in Kedougou will better inform quantification for the 2021 campaign.
- VectorLink will work to identify mobile payment companies with evidence of presence in all project areas.

### 7.3 RECOMMENDATIONS

- Adapt communication training and strategies to target reasons for refusals such as the removal of household items in urban areas and wrong messages regarding the toxicity of insecticides.
- Identify prior to the start of the campaign locations in each operational site where network coverage is adequate and ensure daily synchronization of data in these locations if possible.
- Maintain involvement of administrative authorities, district and health post teams and local leaders in all steps of IRS planning and implementation to have a greater involvement and ownership of the project.
- Use data from the 2020 IRS campaign for Makacolibatang, Kounghoul and Koumpentoum districts for planning purposes.
- Conduct a census of rooms and structures in Kedougou and Bandafassi communes prior to the 2021 IRS campaign.
- Hire experienced SOPs and reinforce the training in all aspects to ensure that the quality of IRS and the capacity to solve problems is available.
- Find a mobile money payment company that can cover all IRS sites and districts for the timely payment of SOPs.

# ANNEX A. IRS

## ENVIRONMENTAL MITIGATION AND MONITORING REPORT

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Implementing Organization: Abt Associates Inc.

Geographic Location of USAID-funded Activities: Senegal

Period Covered by this Report: January 1–December 31, 2020

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
1a. Insecticide selection for any USAID-supported malaria program is subject to the criteria listed in the USAID Programmatic Environmental Assessment, country SEAs, and host country requirements.	All insecticides used for the campaign met the USAID Programmatic Environmental Assessment selection criteria. The SEA, which was approved on April, provides nationwide coverage for the period 2020–2024. Ministry of Environment and sustainable Development (MEDD) endorsed two classes of insecticides for IRS usage.	No outstanding issues	
1b. Procurement and inventory logs must be maintained.	Procurement and inventory logs maintained 43560 units of insecticides were available for 2020: <ul style="list-style-type: none"> <li>● 7680 unit of SumiShield® 50WG and</li> <li>● 35880 unit of Fludora® Fusion</li> </ul>	No outstanding issues	
1c. Ensure storage facility and personal protective equipment are appropriate for the active ingredient used and in accordance with approved SOPs.	Operations facilities were sited appropriately: Central warehouse and site stores were equipped with thermometers, fire extinguishers, spill response kits, wooden pallets, and Material Safety Data Sheets. Stores had adequate ventilation, impermeable floors, secured windows, and doors with double locks. All the storage facilities were guarded 24/7. Proper PPE used by workers, if needed: Before the distribution of insecticides, all the stores were supplied with adequate personal	No outstanding issues	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
	<p>protective equipment for SOPs, field supervisors, storekeepers, and other casual workers. A dress rehearsal was conducted at each site to ensure there were no issues of mismatches with the personal protective equipment. Each SOP had at least two pairs of coverall, rubber boots, neck cover, headlamp, (daily) nose mask, and surgical gloves.</p>		
<p>1d. Distribute insecticides to facilities that can manage such commodities safely in storage, use, and disposal (i.e. in a manner generally equivalent to Implementing Partner’s own SOPs/Waste Management Plan</p>	<p>All insecticide management records were reviewed and maintained. Distribution of the insecticides started at the central warehouse and moved to the district stores and further to the operations sites, overseen by the District Logistics Assistant. Distribution was guided by historical records of insecticide consumption by site and followed the “First Expire, First Out” rule. All operations site stores were inspected twice before the campaign and found to be appropriate before insecticide distribution was authorized. During the campaign, each store was inspected at least once: any safety gaps were rectified at the time of the inspection. All empty insecticide units were properly stored, documented, labeled, and transported to the central warehouse at the end of the campaign for disposal.</p>	<p>No outstanding issues.</p>	
<p>2a. Inspect and certify vehicles used for insecticide or team transport prior to contract.</p>	<p>Transport vehicles had a valid inspection certificate on-board: Pre-contract inspection of vehicles used for IRS operations was conducted at the district level on May 26-27, 2020 for the first phase and July 10 - 12, 2020 for the second phase. The selected vehicles were inspected again by the VectorLink team before certification, for compliance with PMI VectorLink Project requirements. A total of 89 vehicles were rented to support the 2020 IRS operations.</p>	<p>No outstanding issues</p>	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
2b. Train drivers	<p>Due to COVID-19 and the government directive prohibiting gathering, the drivers' safety training was organized in several sessions: One session for Kedougou (15 drivers) and one Makacolibantang (17). Two sessions for Koungheul (31) and two Koumpentoum (26) with preventive measures against COVID 19.</p> <p>All 89 drivers with inspected and certified IRS vehicles received an orientation on safety issues including speed limits, a maximum carrying capacity, proper use of personal protective equipment, spill and emergency response procedures, and Abt's policy on motor vehicle use during the IRS campaign. The project's sexual harassment guidelines were also incorporated into the drivers' training.</p> <p>Issues related to COVID-19 were highlighted, e.g., social distancing, use of nose masks, hand sanitizers, regular handwashing, and regular vehicle disinfection.</p>	No outstanding issues	
2c. Ensure availability of cell phone, personal protective equipment and spill kits during insecticide transportation.	<p>Transport vehicles are equipped with cell phone, spill kit, and PPE. All 89 trained drivers provided their cellphone numbers (which were shared with the site managers at each operations site), received adequate personal protective equipment, and spill response kits.</p>	No outstanding issues	
2d. Initial and 30-day pregnancy testing for female candidates for jobs with potential insecticide contact.	<p>Records are kept of pregnancy testing for all female team members: All female SOPs, TLs, supervisors, site managers, storekeepers, and washers had pregnancy tests at selected health centers at the district level on May 2020 for the first phase and July 2020 for the second phase.</p> <p>A second round of pregnancy tests was conducted on August 2020; 360 pregnancy tests were performed and only one was positive</p>	No outstanding issues	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
<p>2e. Health test all spray team members for duty fitness.</p>	<p>Records are kept of medical exam results for all team members: All SOPs, washers, site managers, and storekeepers were taken through a medical fitness examination at selected health centers at the districts on May 2020 for the first phase and July 2020 for the second phase. They were examined for physical fitness, respiratory problems, and allergic reactions to the insecticides.</p>	<p>No outstanding issues</p>	
<p>2f. Procure services of, distribute, and train all workers with potential insecticide contact on the use of personal protective equipment.</p>	<p>Operators wore complete PPE during application and clean-up, according to SOP requirements: Local and international procurement of all required personal protective equipment and IRS commodities was done in good time and distributed to the operations sites a week before the SOPs training. All categories of workers with expected exposure to insecticide received personal protective equipment training either at the TOT or during the cascaded trainings (for SOPs, TLs, washers, storekeepers, etc.).</p>	<p>No outstanding issues</p>	
<p>2g. Train operators on mixing insecticides and the proper use and maintenance of application equipment.</p>	<p>SOP training was organized at the health post level. Held 13 sessions in Kedougou, 12 in Makacolibantang, 17 in Koumpentoum and 19 in Kounghoul. With 30 trainers, it was possible to organize all sessions simultaneously in a week for each district. More logistics was needed to deploy the trainers due to COVID-19. <u>General measures:</u></p> <ul style="list-style-type: none"> <li>✓ Hand washing stations</li> <li>✓ Hydro alcoholic solution</li> <li>✓ Respect of social distancing</li> <li>✓ Module on COVID 19 mitigation practices</li> <li>✓ Dissemination of preventing messages about COVID 19</li> <li>✓ Check health including temperature check if possible</li> <li>✓ Clean frequently with water and soap touched surfaces</li> </ul>	<p>No outstanding issues</p>	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
	Trainers provided all operators specific demonstration of how to properly clean sprayers using the progressive-rinsing procedure and to ensure thorough cleaning of sprayer parts at the end-of-day clean-up.		
2h. Provide adequate facilities and supplies for end-of-day cleanup.	All facilities were compliant, and materials required for clean-up are present: All 30 operations sites had storage facilities that were either provided by the district or rented from an individual equipped with adequate wash areas and soak pits for end-of-day clean-up. These facilities were inspected during the Pre-spray Environmental Compliance Assessments, and deficiencies were fixed before insecticide distribution to the site was authorized. The Project supplied soap, water, and washing containers for all sites.	No outstanding issues	
2i. Enforce application and clean-up procedures.	Inspections were performed as scheduled, corrective action is taken as needed: TLs and site managers were responsible for enforcing end-of-day clean-up procedures. In all, 547 end-of-day clean-up inspections were conducted and only 79 incidents of non-compliance were reported.	No outstanding issues	All incidents of non-compliance were corrected immediately through verbal feedback.
3a. Implement Information, Education and Communication (IEC) campaigns to inform homeowners of responsibilities and precautions, including washing itchy skin and going to health clinic if symptoms develop and do not subside.	Review IEC materials and records and execute pre-application IEC campaigns: IEC assistants conducted enumeration and mobilization from 27 May to 29 June in Kedougou and Makacolibantang for the first phase and from July 13 to August 14 in Koungeul and Koumpentoum. As part of the IRS trainings, community mobilizers and SOPs were trained to inform homeowners about their roles and responsibilities before, during, and after spray protocols for household safety. Households were sensitized to wash itchy skin with plenty of water and soap and, if itching persisted, to contact the	No outstanding issues	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
	<p>nearest clinics. Out of 7,042 inspections of homeowner preparation, only three beneficiaries claimed that they were not informed of potential reactions to insecticide exposure. There were no reports of failure to inform a homeowner on referral to a clinic in case of exposure.</p>		
<p>3b. Ensure health facility staff are aware of insecticide poisoning management.</p>	<p>Staff from partnering health facilities across all 30 operations sites received orientation on insecticide selected for 2020 IRS. Material Safety Data Sheets were shared with the health workers after the orientation to assist with managing possible exposures.</p>	<p>No outstanding issues</p>	
<p>4a. Storage facilities and transportation vehicles must be physically secured to prevent theft.</p>	<p>Storage facilities and transportation vehicles are secured: All storage facilities had secured doors with double locks, and windows with bars and screens. All vehicles (pick-ups/buses) had secured a boot/bucket with a tarpaulin to ensure the safety of the insecticide during transport and to prevent theft.</p>	<p>No outstanding issues</p>	
<p>4b. Maintain records of all insecticide receipts, issuance, and return of empty containers.</p>	<p>All insecticide management records were reconciled: All insecticide issued was based on a request with appropriate approvals and accompanied by delivery notes. All insecticides received at operations sites were recorded in the store ledger, and on individual stock cards for each item including both full and empty sachets. Additionally, all sachets issued to the field were barcoded, scanned, and recorded in the insecticide tracking sheets and a cloud-based database. Out 296 completed store inspections, only 24 reported non-compliance related to records maintenance. Incidents were investigated and guidance and corrective measures provided on the spot.</p>	<p>No outstanding issues</p>	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
<p>4c. Conduct analysis comparing number of houses treated vs. number of containers used.</p>	<p>The Project treated 135,741 structures with 43,560 units of insecticide. VectorLink Senegal monitored the usage ratio on a weekly basis to ensure the consumption was in line with the plan.</p>	<p>No outstanding issues</p>	
<p>4d. Examine houses treated to confirm application.</p>	<p>During the campaign, VectorLink Senegal completed 3,941 homeowner preparations and spray operator performance inspections and carried out numerous spot checks. Wall cone bioassays conducted 2 days after spraying established that the walls received high-quality insecticide application based on the results of 100% mosquito mortality.</p>	<p>No outstanding issues</p>	
<p>4e. Perform physical inventory counts during the application season.</p>	<p>Supervisors carried out 263 storekeeper performance inspections in all 34 stores. Of the 263 inspections, 50 incidents were observed, where the balance on the stock card did not equal the result of a physical stock inventory counts Investigations were carried out immediately to rectify the error.</p>	<p>No outstanding issues</p>	
<p>5a. For shipments of insecticide over water, sachets/ bottles will be packed in 220 liter open top barrels with a water-tight top and a locking ring, or in a similar durable container. Waterproof labeling must be affixed to the barrel, with the identity of the pesticide, number of bottles inside, the weight, the type of hazard posed by the contents, and the personal protective equipment to be worn when handling the barrel.</p>	<p>No insecticides were transported across water. All insecticides were transported by road from the central warehouse to the site stores.</p>	<p>No outstanding issues</p>	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
<p>5b. Train applicators on the SEA operational requirements, SOPs, PMI BMPs, and approved Waste Management Plan, developed for the safe and effective storage, distribution, application, and disposal of insecticides.</p>	<p>The VectorLink Project trained all cadres of IRS actors on how to handle insecticide in storage and in the field, how each type of waste is generated during the campaign, and where each is to be stored, managed, and disposed of in accordance with the Safer Use Action Plan and the revised PMI BMP manual.</p>	<p>No outstanding issues</p>	
<p>5c. Ensure application equipment and personal protective equipment are appropriate for the active ingredient used and in accordance with approved SOPs, and maintain equipment to avoid leaks.</p>	<p>Adequate spare parts were made available at all operations sites. Sprayer servicing and calibrations were conducted weekly to ensure the right dosage of the active ingredient was applied. Personal protective equipment use was enforced throughout the campaign. Out of 3941 homeowner preparation and spray operator performance inspections, 240 observation reported an SOP not using personal protective equipment appropriately and corrective guidance was delivered on the spot. Pump leakage was reported in only 181 instances. These were resolved promptly.</p>	<p>No outstanding issues</p>	
<p>5d. Maintain application equipment.</p>	<p>Equipment is maintained and operated to eliminate leaks: Site managers and supervisors carried out weekly calibration and oiling of the sprayers, replacing worn-out nozzles and nozzle sieves.</p>	<p>No outstanding issues</p>	
<p>5e. No application of insecticides within 30 yards of beekeeping sites.</p>	<p>There are no known beekeeping sites across the IRS districts in. However, TOTs and SOP trainings emphasized keeping any beehives at least 30 meters away from spray areas.</p>	<p>No outstanding issues</p>	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
<p>6a. Handling, treatment, and disposal of nonhazardous (general waste) and hazardous wastes must be in accordance with the approved Waste Management Plan /SOPs and the PMI BMPs. The WMP, which outlines SOPs for managing waste processes, must be in accordance with PMI best practices and host country requirements</p>	<p>Non-hazardous wastes were recorded and stored away from contaminated wastes. Non-contaminated cardboard from the insecticides will be reused. All hazardous wastes were recorded, labeled, and kept in the stores while awaiting disposal either by incineration Tambacounda Regional Hospital. Uncontaminated coveralls and boots not appropriate for IRS will be donated to partner industries that will recycle the waste from the IRS campaign.</p>	<p>No outstanding issues</p>	
<p>6b. Choose sites for disposal of liquid wastes, including fixed and mobile soak pit sites according to PMI BMPs</p>	<p>Disposal sites near operations sites were appropriate according to PMI BMPs: Locations for all 26 fixed soak pits and 8 MSPs were reviewed by the RECM, with consideration for liquid waste disposal that accumulated from washing of personal protective equipment as prescribed in the revised PMI BMP guidelines.</p>	<p>No outstanding issues</p>	
<p>6c. Construct fixed and mobile soak pits with charcoal according to the BMPs to adsorb insecticide from rinse water.</p>	<p>All fixed soak pits were constructed according to PMI BMPs. MSPs were constructed in Kedougou District with the appropriate charcoal stacked as prescribed in the revised PMI BMP guidelines.</p>	<p>No outstanding issues</p>	
<p>6d. Maintain soak pits as necessary during season.</p>	<p>Soak pits perform properly throughout the application season: All soak pits were in good shape and absorbed waste water without puddling during the campaign. Results from the End-of-Day Clean-Up form on soak pit performance were reported.</p>	<p>No outstanding issues</p>	<p>Future soak pit rehabilitation will follow the directive that says all soak pits will be blocked from receiving water from the wash area during the off-season.</p>

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
6e. Monitor waste storage and management during campaign.	All solid wastes were recorded, properly labeled, and moved from the site offices to district offices for final inventory and then to the central warehouse for disposal. Of 296 inspections carried out, there was only one report of contaminated items not separated from non-contaminated waste. Guidance was provided on the spot to fix the error.	No outstanding issues	
6f. Monitor disposal procedures post-campaign	The ECO and the RECM will guide the partners who will eliminate the waste on the BMPs and supervise the activities. They will also monitor the disposal and ensure adherence of personal protective equipment usage during the disposal.	No outstanding issues	
7a. Wastes will only be disposed in incinerators that comply with PMI BMPs Collect and maintain treatment and disposal documents and records on file.	All solid wastes for recycling will be sent to ProPlast Industries and all for incineration will be sent to Tambacounda Regional Hospital. These facilities meet specifications of the PMI BMP guidelines.	No outstanding issues	
7b. Country-level USAID EC documentation must contain guidance on proper disposal of wastes	Both liquid and solid waste disposal procedures were aligned with the Safer Use Action Plan and in accordance with the revised PMI BMP guidelines.	No outstanding issues	

# ANNEX B. 2020 PMI VECTORLINK SENEGAL INDICATOR MATRIX

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>Objective 1: Implementation of Malaria Vector Control (VC) Interventions</b>														
<b>1.1</b>	<b>Successfully Execute IRS and Other Integrated Malaria VC Activities</b>													
1.1.1	Number and percentage of completed annual country work plans developed and submitted on-time		Project records Annually	Country	1		1		1	1		1		
1.1.2	Number of eligible structures targeted for spraying		Project records Annually	Country	NA		NA		134,883	137,932				
1.1.3	Number of eligible structures sprayed with IRS <sup>1</sup>		Project records Annually	Country	NA		NA		114,651	136,417				
1.1.4	Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)		Project records Annually	Country	NA	NA	NA		85%	98,9%				

<sup>1</sup> Target based on 85% of estimated eligible structures in indicator 1.1.2

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.1.5	Number of people protected by IRS		Project records Annually	Country Sex Pregnant women Children <5	NA	NA	NA	NA	540,611 TBD <sup>2</sup> TBD TBD	571,649 13,575 pregnant women 95,249 children <5				
1.1.6	Number and percentage of vector control project country programs submitting an EOSR within 45 days after the end of spray (including completing MEP and EMMR)	X	Project Annually	Country	NA		NA		1	1				
1.1.7	Number and percentage of IRS country programs that conduct a Post-Spray Data Quality Audit within 90 days of spray completion	X	Data Collection Forms Annually	Country	NA		NA		1					
1.1.8	Number of Insecticide Treated Nets (ITNs) distributed, by channel		Project Records Annually	Country Channel	NA	NA	NA	NA	TBD	399,850 TBD <sup>3</sup>				

<sup>2</sup> With geographical reconnaissance data

<sup>3</sup> Data not available at VectorLink level

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.1.9	Number and percentage of countries completing ITN durability monitoring data collection as planned in a given project year	X	Project Records Annually	Country										
1.1.10	Number and percentage of PMI-funded durability monitoring surveys with reports submitted within 90 days of the end of data collection	X	Project Records Annually	Country										
<b>1.2</b>	<b>Strengthen Capacity of NMCPs, VC Personnel, and Other Institutions to Implement and Manage IRS and Other VC Activities</b>													
1.2.1	Total number of people trained to support VC in target areas		Project Training Records Annually	Country VC Intervention Sex Job Function	NA	NA	NA	NA	1,034	2,791 <sup>4</sup> 1734 men 1057 women				
1.2.2	Total number of people trained to support VC in target areas with USG funds <sup>5</sup>		Project Training Records Annually	Country VC Intervention Sex Job Function	NA	NA	NA	NA	813	828 <sup>6</sup>				

<sup>4</sup> 2 DREEC, 04 medical District officers , 657 SOPs, 111 team leaders, 02 data cleaners, 08 M&E assistants, 04 Logistic assistants, 34 storekeepers, 30 sprayer technicians, 1425 IEC mobilizers, 66 washers, 60 guards, 80 drivers, 06 water supplies, 119 IEC supervisors, 30 office cleaners, 30 field supervisors, 30 Sites managers, 04 Finance Assistants, 89 health post nurses.

<sup>5</sup> For IRS programs, this includes spray operators, team leaders, and supervisors (and site managers).

<sup>6</sup> 30 IRS supervisors, 30 site managers, 111 team leaders, 657 SOP,

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.2.3	Number of people trained during the Master (National) Training and/or IRS Training of Trainers.		Project Training Records Annually	Country Sex Type of Training	NA	NA	NA	NA	70	32 <sup>7</sup>				
1.2.4	Total number of people hired to support VC in target areas.		Project Records Annually	Country VC Intervention Sex Job Function	NA	NA	NA	NA	22 <sup>8</sup>	950 <sup>9</sup> 670 men 280 women				
1.2.5	Number of VC project training workshops targeting NMCP and other host country staff		Project Training Records Annually	Country Technical Area Job Function	NA	NA	NA	NA	2	0				
1.2.6	Number of NMCP and other vector control host country staff who have logged into VectorLink Collect		DHIS2 Logs Annually	Country Job Function	NA	NA	NA	NA	TBD	28 <sup>10</sup>				

<sup>7</sup> TOT : Training Of Trainers

<sup>8</sup> 4 finance assistants, 4 logistic assistants, 8 M&E assistants, 1 data cleaner, 4 districts coordinators

<sup>9</sup> 565 SOP, 111 Team Leaders, 30 Site Managers, 30 Supervisors, 30 Pump technicians, 66 washers, 60 security guards, 6 water suppliers, 34 Storekeepers, 8 ME assistants, 02 Data Cleaners, 4 logistic assistants, 4 finance assistants and 30 office and operations sites cleaners

<sup>10</sup> 13 VectorLink staff, 2 NMCP, 2 DEEC, 7 HO, 4 DMO

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.2.7	Number and percentage of technical assistance requests to support ITN distribution planning and/or implementation completed on time as planned in a given project year	X	Project Records Annually	Country Technical Area Channel										
1.2.8	Number and percentage of technical assistance requests to support operational routine monitoring systems for continuous ITN distribution completed on time as planned in a given project year	X	Project Records Annually	Country Channel										
<b>1.3</b>	<b>Environmental Compliance and Safety</b>													
1.3.1	Number of seasonal vector control personnel trained in environmental compliance and personal safety standards in vector control implementation		Project Training Records Annually	Country Sex (# and %) Job Function	NA	NA	NA	NA	1,034	2,791: 1057 women (38%) 1734 men (62%)				
1.3.2	Number of health workers receiving insecticide poisoning case management training		Project Training Records Annually	Country Sex (# and %)	NA	NA	NA	NA	77	89: 55 men (62%) 34 women (38%)				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.3.3	Number of adverse reactions to pesticide exposure documented that resulted in a referral for medical care		Incident Report Forms Annually	Country Type of Exposure	NA	NA	NA	NA	0	1				
1.3.4	Number of SEAs and Letter Reports submitted at least 60 days prior to the commencement of VC campaigns	X	Project Records Annually	Country					1 SEA	1 SEA				
1.3.5	Number and percentage of permanent and mobile soak pits inspected and approved prior to IRS campaigns or before first use		Project Records - PSECAs Annually	Country	NA	NA	NA	NA	31 Fix SP 15 MSP	26 Fix SP 8 MSP				
1.3.6	Number and percentage of storehouses inspected and approved prior to IRS campaigns		Project Records - PSECAs Annually	Country Storehouse Type	NA	NA	NA	NA	35	35 100%				
<b>1.4</b>	<b>Promote Gender Equality in all Facets of Planning and Implementation</b>													
1.4.1	Number and percentage of women hired to support VC campaigns		Project Records Annually	Country Sex (# and %) Job Function	NA		NA		39%	950 29% women (280)				
1.4.2	Number and percentage of women hired in supervisory roles in target areas for VC activities		Project Records Annually	Country Sex (# and %) VC Intervention Job Function	NA	NA	NA	NA	33%	72 21%				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.4.3	Number and percentage of trainees (permanent and seasonal) who have completed gender awareness training		Project Records Annually	Country Sex (# and %) Job Function	NA	NA	NA	NA	1,034	2811: 1062 women (13%)				
1.4.4	Number and percentage of women in senior leadership roles in VectorLink country offices	X	Project Records Annually	Country Sex (# and %)										
<b>1.5</b>	<b>Implement and Support SBCC and Mobilization Activities</b>													
1.5.1	Number of radio spots and talk shows aired		Project Records Annually	Country VC Intervention Talk Show or Radio Spot	NA	NA	NA	NA	NA	812				
1.5.2	Number of print materials distributed to or targeted at beneficiaries		Project Records Annually	Country VC Intervention	NA	NA	NA	NA	NA	7938				
1.5.3	Number of people reached with vector control and/or SBCC messages via door-to-door messaging		Project Records Annually	Country VC Intervention Sex	NA	NA	NA	NA	NA	322,535				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>2. Entomological and Epidemiological Data to Drive Decision-Making</b>														
<b>2.1</b>	<b>Vector Control Activities Monitored via Entomological and Epidemiological Data</b>													
2.1.1	Number of project-supported entomological sentinel sites established to monitor vector bionomics (vector species, distribution, seasonality, feeding time, and location)		Entomological Reports Annually	Country VC Intervention	2 1	1 1	1 1	11	1 1	21				
2.1.2	Number and percentage of vector bionomics monitoring sites measuring all basic entomological indicators (species composition, indoor and outdoor human biting rates, hourly human biting rates, indoor resting densities)		Entomological Reports Annually	Country VC Intervention	46 46	55 53	50 50	TBD TBD	34 34	28				
2.1.3	Number and percentage of vector bionomics monitoring sites measuring the following all advanced entomological indicators: sporozoite rates and entomological inoculation rates		Entomological Reports Annually	Country IRS or Entomology Only Program	46 46	55 53	50 50	TBD TBD	34 34	28 28				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.4	Number and percentage of insecticide resistance monitoring sites that tested all priority insecticides for the relevant local vector control intervention		Entomological Reports Annually		20	15	27	TBD	19	ND				
2.1.5	Number and percentage of houses in which WHO cone bioassays were conducted within two weeks of spraying with greater than 98% test mortality recorded for IRS countries		Entomological Reports Annually	Country Insecticide Type	NA	NA	NA	NA	40 30 for Fludora 10 for Sumishield	ND 25 10				
2.1.6	Number and percentage of sites that conducted WHO cone bioassays after the completion of spraying at monthly intervals until test mortality drops below 80% for two consecutive months for IRS countries		Entomological Reports Annually	Country Insecticide Type	NA	NA	NA	NA	40 30 for Fludora 10 for Sumishield	ongoing				
2.1.7	Number of countries with an integrated vector control analytics dashboard created by PATH, available for decision-making	X	Project Reports Annually	Country										

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.8	Number of people trained (VectorLink and non VectorLink staff) in entomological monitoring		Project Records Annually	Country Sex (# and %)	ND	ND	ND	ND	34	18 <sup>11</sup>				
2.1.9	Number and percentage of sites in which WHO cone bioassays were conducted to evaluate bio-efficacy of bed nets		Entomological Records Annually	Country	NA	NA	NA	NA	NA	NA				
2.1.10	Number of nets in which WHO cone bioassays were conducted to evaluate bio-efficacy of bed nets		Entomological Records Annually	Country	NA	NA	NA	NA	NA	NA				
<b>2.2</b>	<b>NMCPs Develop Country-Level IRS and Other Malaria VC Strategies</b>													
2.2.1	Number and percentage of countries with an integrated malaria vector control strategy, including a plan for monitoring and managing insecticide resistance supported by the project	X	Project Records Annually	Country										

<sup>11</sup> UCAD (13 field technicians + 2 lab technicians), IRD (1 entomologists), IPD (1 entomologist), PNLP (1)

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.2.2	Number and percentage of countries with a data and visualization dashboard complete for IRS and/or entomology data in VectorLink Collect for vector control decision making	X	Project Records Annually	Country										
2.2.3	Number of countries that implement sub-national insecticide rotation	X	Project Records Annually	Country										
<b>2.3</b>	<b>Build capacity of NMCPs and local institutions to collect, analyze, and use data for strategic malaria control decision-making</b>													
2.3.1	Number of individuals trained from NMCPs and national institutions to review and interpret data for integrated vector control decision making		Project Training Records Annually	Country Job Function Organization	ND		ND		ND	ND				
2.3.2	Number and percent of targeted individuals that report using new analytical tools and/or skills in their planning, resourcing, implementation, or measurement activities		Capacity Assessments Thrice Over Project Life	Country Job Function Organization	ND		ND		ND	NA				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>3. Procurement and Logistics</b>														
<b>3.1</b>	<b>Cost-Effective Procurement Mechanism Established</b>													
3.1.1	Number and percentage of insecticide procurements that had a pre-shipment QA/QC test, done by a third party, at least 60 days prior to spray campaign	X	Procurement Records Annually	Country Insecticide Type										
3.1.2	Number and percentage of insecticide procurements received on-time to allow for the initiation of spray operations as scheduled		Procurement Records Annually	Country Insecticide Type	NA		NA		7680 Sumishield 35880 Fludora	7680 Sumishield 35880 Fludora				
3.1.3	Number and percentage of targeted countries with international equipment procurements, including PPE, received on-time to allow for the initiation of vector control campaigns as scheduled	X	Procurement Records Annually	Country VC Intervention										
3.1.4	Number of VectorLink staff trained on procurement	X	Project Records Annually	Country										

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>3.2</b>	<b>Robust Inventory Management and Logistics Systems Established</b>													
3.2.1	Number and percentage of logistics and warehouse personnel (seasonal and full-time) trained in VC supply chain management		Project Training Records Annually	Country VC Intervention Sex Job Function	NA	NA	NA	NA	5 5 TBD	39 <sup>12</sup> 4 women				
3.2.2	Number and percentage of operations site warehouses where physical inventories can be verified by daily stock records		Inventory and Stock Records Annually	Country	NA	NA	NA	NA	35	ND				
3.2.3	Number and percentage of IRS countries that successfully completed spray operations without an insecticide stock-out	X	Inventory and Stock Records Annually	Country Insecticide Type										
<b>4. Innovation</b>														
<b>4.1</b>	<b>Conduct operational research or monitoring to scale up new tools, methods, and approaches</b>													
4.1.1	Number of operational research studies on promising new tools or new methods/approaches to existing tools that are implemented		Project Records Annually	Country Type of Innovation	ND		ND		1	1 <sup>13</sup>				

<sup>12</sup> 30 site storekeepers, 4 district central storekeepers, 4 logistic assistants, 1 central warehouse manager

<sup>13</sup> Urban landscape analysis in Diourbel, Touba and Kaolack

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>4.2</b>	<b>Create and share knowledge through dissemination of best practices and lessons learned</b>													
4.2.1	Number of innovations, best practices, and other data or lessons learned shared with other partners or international institutions for global reporting on the Vector Learning Exchange	X	Project Records Annually	Country Technical Area										
4.2.2	Number of individual members who use the Vector Learning Exchange	X	Project Records Annually	N/A										
4.2.3	Number of symposia and/or presentations submitted to and accepted at global conferences		Project Records Annually	Country Technical Area	1	1 PAMCA	1	1 PAMCA	2	0	ND			
4.2.4	Number of success stories written or videos produced and shared on the VectorLink project website		Project Records Annually	Country	NA	NA	NA	NA	1	0				
4.2.5	Number of peer-reviewed journal articles submitted and accepted	X	Project Records Annually	Technical Area										
4.2.6	Number of contributions to vector control global or country policy and/or guidance documents		Project Records Annually	Country Technical Area	NA	NA	NA	NA	0	0				

Num	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
<b>4.3</b>	<b>Develop and deploy cost-savings approaches</b>													
4.3.1	Number of innovative or novel approaches implemented to achieve cost savings in IRS and integrated malaria vector control programs		Project Records Annually	Country VC Intervention	NA	NA	NA	NA	0	ND				
4.3.2	Number of cost effectiveness assessments of existing approaches in the implementation of IRS and integrated malaria vector control programs		Project Records Annually	Country VC Intervention	NA	NA	NA	NA	0	ND				
<b>4.4</b>	<b>Cultivate public-private partnerships</b>													
4.4.1	Number of private sector entities engaged with to establish public private partnerships to increase the quality and coverage of malaria vector control activities globally		Project Records Annually	Country	NA	NA	NA	NA	1	1 <sup>14</sup>				

<sup>14</sup> Proplast for waste management