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Indoor Residual Spraying (IRS 2) Task Order Six

SENEGAL
END OF SPRAY REPORT 2017

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BREIPS	Regional Office of Health Education and Information (<i>Bureau Régional de l'Education et de l'Information pour la Santé</i>)
Ceres	Regional Research Center in Eco-toxicology and Environmental Security
Locustox	(<i>Centre Régional de Recherche en Ecotoxicologie et de Sécurité Environnementale</i>)
DC	District Coordinator
DCV	Data Collection Verification
DEC	Data Entry Clerk
DEEC	Environmental Protection and Classified Institutions Agency (<i>Direction de L'environnement et des Etablissements Classés</i>)
DHMT	District Health Management Team
DMO	District Medical Officer
DPM	Medical Prevention Division (<i>Division de la Prévention Médicale</i>)
DPV	Directorate for Plant Protection (<i>Direction de la Protection des Végétaux</i>)
DOS	Directly Observed Spray
DREEC	Regional Environmental Protection and Classified Institutions Agency (<i>Direction Régionale de L'environnement et des Etablissements Classés</i>)
EC	Environmental Compliance
ECO	Environmental Compliance Officer
HPN	Health Post Nurse
IEC	Information, Education, and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
MOH	Ministry of Health
MSP	Mobile Soak Pit
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
PSECA	Preseason Environmental Compliance Assessment

- SNEIPS** National Health Education and Information Service
(*Service National de l'Éducation et l'Information pour la Santé*)
- SNH** National Hygiene Service
(*Service National d'Hygiène*)
- SOP** Spray Operator
- UCAD** University of Cheikh Anta Diop in Dakar
(*Université Cheikh Anta Diop de Dakar*)
- USAID** United States Agency for International Development

EXECUTIVE SUMMARY

In 2017, the President’s Malaria Initiative (PMI) Africa Indoor Residual Spray (AIRS) Project in Senegal conducted spray operations in the four target districts of Malem Hoddar, Kounghoul, Koumpentoum, and Nioro with funding from PMI and the United States Agency for International Development (USAID).

As part of an ongoing transition process, AIRS Senegal worked with the National Malaria Control Program (NMCP) through an integrated team where AIRS Senegal coached Ministry of Health (MOH) counterparts during the implementation of the IRS campaign in the four target districts.

The objective of this ongoing transition process is to increase the local government’s level of responsibility and ownership of indoor residual spraying (IRS). For this purpose, NMCP conducted Information, Education, and Communication (IEC) mobilization activities in all four target districts with direct funding from PMI while AIRS Senegal provided complementing technical assistance.

In 2017, Senegal’s IRS Steering Committee decided to continue spraying in “hot spot” health posts – defined epidemiologically as health post zones with malaria incidence in excess of 15 cases per 1,000 residents – within the four target districts (Malem Hoddar, Kounghoul, Koumpentoum, and Nioro). In total, Senegal’s IRS Steering Committee identified 77 “hot spot” health posts, where one round of spray operations was conducted. In 2017, the Senegal IRS Committee added 15 new health posts and decided to continue piloting the community-based IRS in the district of Malem Hoddar using community means of transportation considering experience and lessons learned from the 2016 pilot. In addition, AIRS Senegal piloted a new community-based IRS approach focusing in one health post outreach where the health post nurse (HPN), who is directly supervised by PMI AIRS and the National Hygiene Service (SNH), has been trained and is fully responsible for the implementation of spraying activities. In this approach, AIRS Senegal recruited spray operators (SOPs) at the village level to minimize the cost of camping sites and reinforce IRS acceptability in collaboration with local authorities. AIRS Senegal also continued the use of Tyvek suits as personal protective equipment (PPE) and wet wipes for cleaning in the district of Malem Hoddar.

AIRS Senegal worked in collaboration with NMCP in the four target districts and was responsible for conducting IRS operations, including monitoring and evaluation (M&E) and environmental inspections in collaboration with the Environmental Protection and Classified Institutions Agency (DEEC), mostly with regional offices in the three regions covering the four target districts. AIRS Senegal was also responsible for identifying operations sites, procuring insecticide and PPE, managing warehouses, providing trainings, and ensuring that all environmental safety and health guidelines are followed.

As for supervision of SOPs, AIRS Senegal worked with NMCP, District Health Management Team (DHMT), and SNH all four target districts.

In 2017, AIRS Senegal sprayed 96.2 percent of 162,556 structures found, and 89.8 percent of 174,049 target structures using an organophosphate insecticide, pirimiphos-methyl (Actellic 300 CS). AIRS Senegal conducted spraying over 20 operational days in three districts (Nioro, Koumpentoum, and Kounghoul) from June 30 to July 23, 2017 and over 10 operational days in Malem Hoddar from June 30 to July 9, 2017.

Table I shows the results of the 2017 spray campaign.

TABLE I. SUMMARY OF 2017 IRS CAMPAIGN

Indicator	Results
Number of districts covered by the PMI-supported IRS campaign	Four districts: Koumpentoum, Koungheul, Malem Hoddar, and Nioro
Insecticide used	Organophosphates: 49,098 bottles
Number of structures sprayed by SOPs	156,362
Number of structures found by SOPs	162,556
2017 IRS campaign spray coverage	96.2%
Population protected by 2017 IRS campaign	619,578
Number of people trained to deliver IRS with US Government funds ¹	1,017
Total number of people trained with US Government funds ²	2,642

For the 2017 spray campaign, AIRS Senegal used a total of 49,098 bottles of organophosphates with an average of 3.2 structures sprayed per bottle. AIRS Senegal continued to use the Dimagi-based SMS platform to collect and disseminate spray campaign data on a daily basis to PMI and local stakeholders. In addition, AIRS Senegal disseminated job aids reminding SOPs of best practices and gender messages through SMS. The project continued to use the smartphone application for delivering standardized supervision throughout the campaign, thereby improving the overall quality of the spray campaign. The project used a total of 18 mobile soak pits (MSPs) in 30 sites (See Sections 8 and 9 for more information).

¹ Total number of personnel trained in IRS implementation using PMI AIRS Project resources; this figure includes only spray personnel such as SOPs and substitutes, team leaders, site managers, supervisors /DREEC, and clinicians.

² Total number of people trained using PMI AIRS Project resources to implement/support elements of IRS in target districts.

I. COUNTRY BACKGROUND

In 2017, the NMCP, in collaboration with PMI Senegal and Senegal’s IRS Steering Committee, decided to continue IRS operations in Koumpentoum, Kounghoul, Malem Hoddar, and Nioro (Figure 1), targeting the same “hot spots” using a focus spraying strategy as in 2016. As shown in Figure 2, 77 health posts in these districts were selected for IRS.

FIGURE 1. MAP OF SENEGAL PMI IRS DISTRICTS

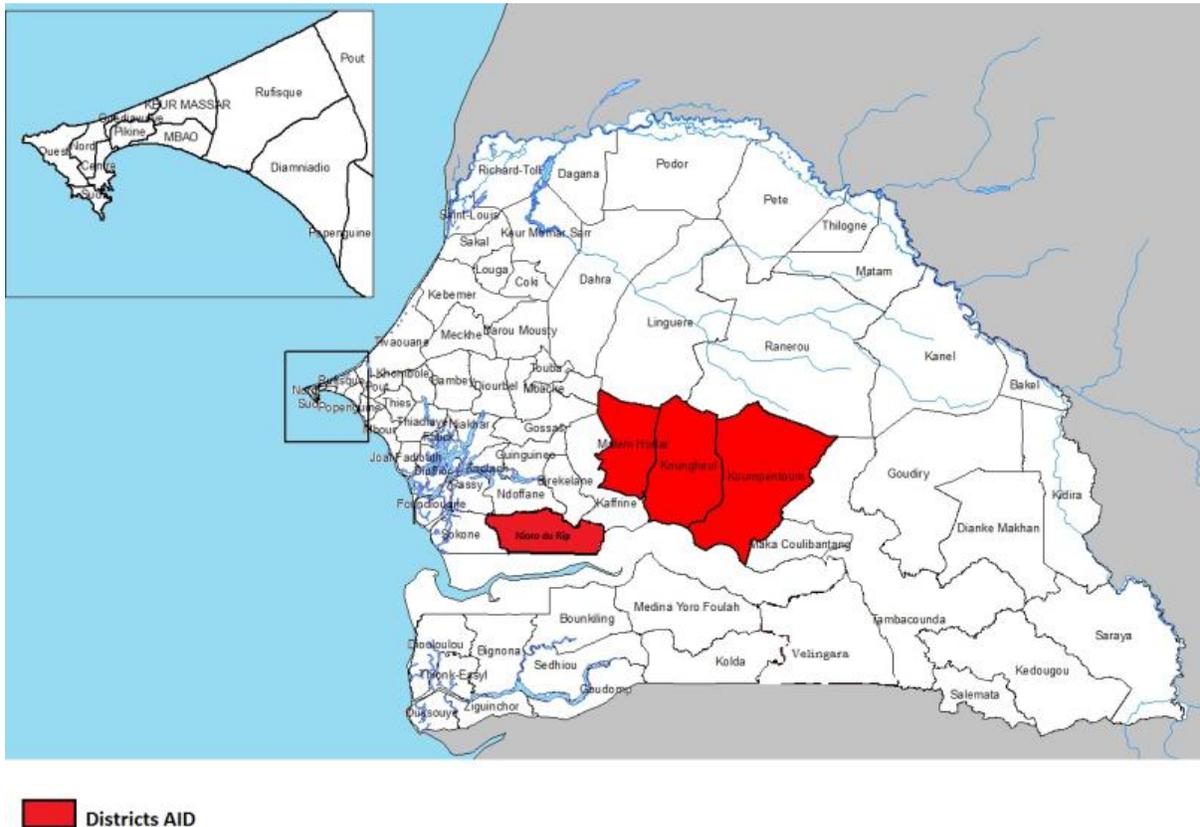
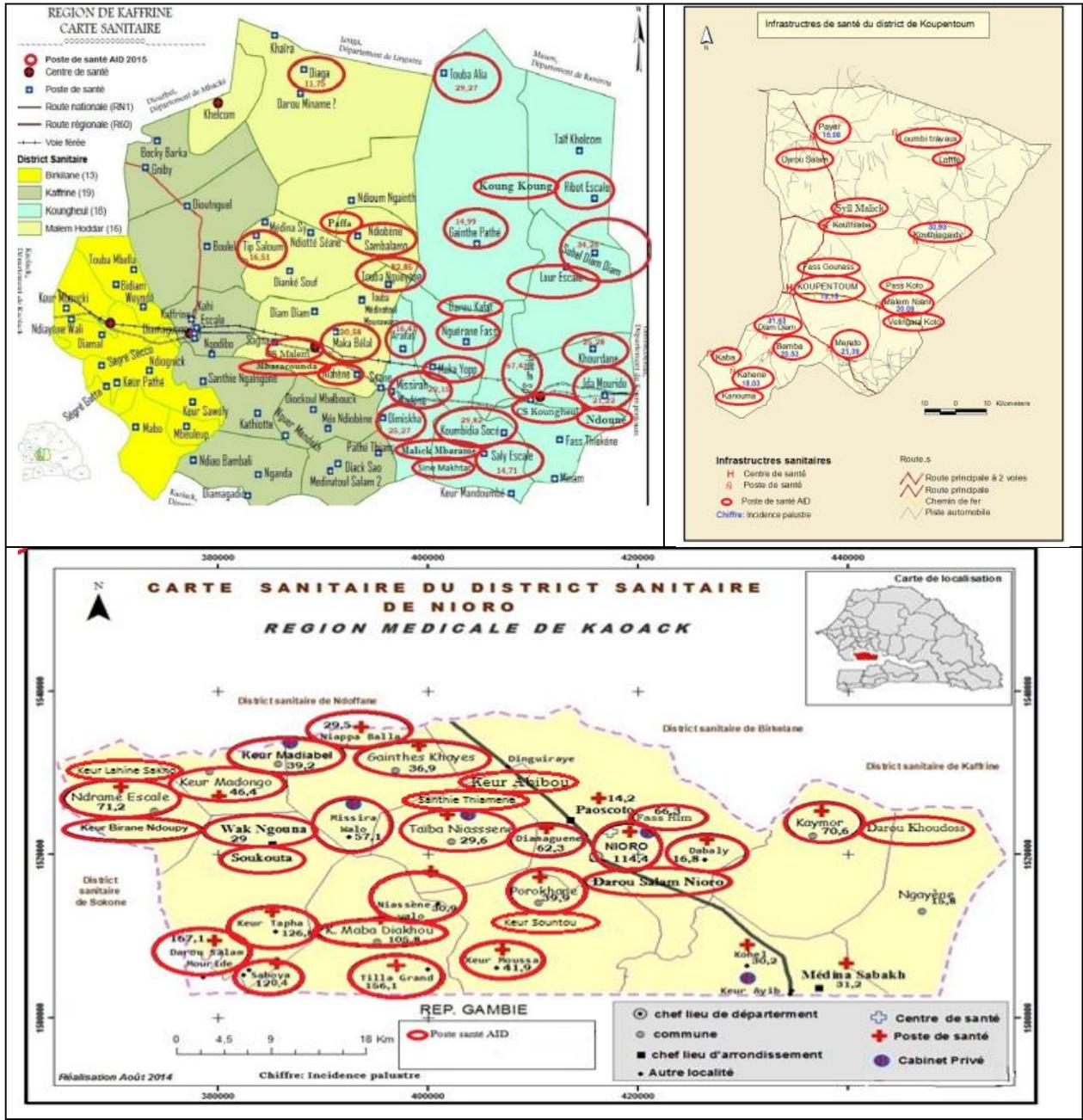


FIGURE 2. MAP OF SENEGAL PMI IRS HOT SPOTS



○ Health Posts IRS 2017

2.OBJECTIVES FOR 2017 IRS CAMPAIGN

In 2017, the main objective for the PMI AIRS Project in Senegal was to continue working with the Ministry of Health and Social Welfare, NMCP, PMI, and other stakeholders to achieve at least 85 percent spray coverage in the IRS target districts.

As in previous years, AIRS Senegal worked with the NMCP throughout the planning and implementation of the IRS campaign in the four districts. AIRS Senegal was responsible for IRS operations including M&E and environmental compliance (EC) inspections in collaboration with the regional offices in charge of environmental aspects covering the four target districts. AIRS Senegal also conducted the distribution and transportation of IRS commodities and personnel. In coordination with NMCP and the SNH, AIRS Senegal organized training and supervision of operations in all four districts with SNH playing a key role in training and supervision. NMCP conducted IEC mobilization activities in all four districts with direct funding from PMI/Senegal.

In 2017, the PMI AIRS Project used an organophosphate, pirimiphos-methyl (Actellic 300 CS) in all districts and the project was expected to carry out the following activities:

- Support training, capacity building, and advocacy at the national, regional, and district levels as a means of achieving IRS sustainability. This included building the capacity of the government, counterparts, and partners to lead a high-quality IRS campaign;
- Provide regular M&E support for the IRS program and periodic update on hot spot strategy evaluation;
- Carry out logistical assessments as needed and arrange all procurement, shipping, delivery, and storage of sprayers, spare parts, insecticides, and PPE;
- Ensure safe and correct insecticide application, thus minimizing human and environmental exposure to insecticides in compliance with the Supplemental Environmental Assessment amendment;
- Support NMCP and other local partners in coordinating IEC, sensitization, and mobilization activities to raise awareness and encourage acceptance of IRS;
- Assist NMCP in smoothly transitioning selected IRS responsibilities to districts, including development of communication plans, recruitment of spray personnel, development of district IRS micro-plans, development of training materials, supervision of IRS activities, and EC;
- Continue data collection and reporting via SMS for team leaders, the use of smartphones for IRS supervision in four districts, and the use of mobile soak pits at 12 operational IRS sites;
- Promote cost efficiency and innovations through due diligence and efficiency of operations, including the community approach in conducting IRS activities; and
- Spray at least 85 percent of a target of 174,049 structures in the four districts, protecting a target of 650,093 residents.

3. PREPARATION FOR IRS CAMPAIGN

3.1 IRS CAMPAIGN PLANNING

Under the NMCP's leadership, AIRS Senegal, SNH, *Université Cheikh Anta Diop de Dakar* (UCAD), and Senegal's IRS Steering Committee members, regional, and district health managers, administrative and local political authorities, national and regional SNH managers, and National Health Education and Information Service (SNEIPS) participated in the National IRS Planning Workshop on April 06-07 2017. The objectives of the workshop were to share and validate the 2017 IRS implementation plan and to include IRS activities in the annual health action plans for each PMI-supported district. At this meeting, participants validated the IEC/IRS communication plan developed by NMCP with AIRS Senegal's technical assistance. The workshop resulted in a consensus on the IRS activities to be implemented during the 2017 IRS campaign in the four target districts based on the focal spraying strategy and IRS innovations such as a new alternative approach on community-based IRS.

In collaboration with NMCP, PMI AIRS conducted an advocacy visit from February 7 - 10, 2017 to IRS target regions and districts, meeting with local authorities and advocating for local community participation (office space, operational sites, transport, community mobilization, refusal case management, etc.). As a result, all operational sites and office spaces were available free of charge for the project in Nioro, Koumpentoum, Malem and Koungeul. Table 2 lists the activities AIRS Senegal led or participated in related to planning and organizing the 2017 IRS campaign.

TABLE 2. 2017 IRS PLANNING AND ORGANIZATION

Areas	Activities implemented
IRS activities planning	<ul style="list-style-type: none"> • National-level planning (April 6-7, 2017) • District-level planning (micro-planning), and development of spray calendar respectively in Niore (April 18), Koumpentoum (April 21), Malem Hoddar (April 21) and Koungheul (April 22)
Recruitment of seasonal personnel	<ul style="list-style-type: none"> • PMI AIRS temporary personnel: finance assistants, logistics assistants, data entry clerks (DECs) • PMI AIRS site seasonal personnel: site managers, team leaders, SOPs • Auxiliary staff: drivers, storekeepers, repair technicians, washers, water suppliers
Personnel capacity-building	<ul style="list-style-type: none"> • Review of SOP training guide • Review of existing training manuals and tools • Training of AIRS district staff, including finance assistants, logistics assistants, DECs • Training of new SNH agents in three regions covering IRS districts (Kaffrine, Kaolack, Tambacounda) • Country-level IRS training of trainers • Gender training for trainers • Physicians' and nurses' training on IRS-related poisoning case management
Environment	<ul style="list-style-type: none"> • Management of obsolete waste: plastic, electronic, and scrap metal • Identification and selection of operational facilities at district and secondary sites • Training on the installation and utilization of mobile soak pit • Pre-inspection and validation for all IRS sites using smartphones • Letter report updated and submitted to home office and USAID for IRS environmental compliance (EC) • Monitoring secondary IRS site rehabilitation and final inspections using smartphones • Inspect and issue certificates to all transport vehicles prior to signing of a rental contract • Training on environmental management of IRS campaign
M&E	<ul style="list-style-type: none"> • Update IRS and mobilization data collection tools • Review IRS database and mobilization database • Recruitment of DECs for IRS by AIRS Senegal and for IEC mobilization by district; training for all DECs on data entry. • Training and use of SMS for collecting and sending timely data and updates • Update evaluation tools for hot spot assessment • Organize evaluation workshops at the operational site, district and national levels at the end of the campaign
Operations	<ul style="list-style-type: none"> • Advocacy for district's office space and operational sites as community contribution to the project • Finding secondary and camping site • Deployment of project district personnel (finance assistants, logistics assistants, DECs) • Micro-planning workshops in the four districts • Development of new community-based IRS alternative model protocol and implementation schedule • Validation of spray calendars and communication plans • Rehabilitation of IRS sites in compliance with environmental standards • Production of training manuals and data collection tools • Seasonal personnel's pre-IRS medical examination and pregnancy testing • Training of SOPs and auxiliary staff (drivers, storekeepers, repair technicians, washers) • Training of team leaders on Directly Observed Spray (DOS) • Development of supervision plan for SOPs • Implementation of supervision tools, including smartphone use • Coordination and monitoring of spray operations • Monitoring of spray performance tracking sheet
Logistics	<ul style="list-style-type: none"> • Physical inventory of existing equipment • Quantification of insecticide and IRS equipment • Equipment check to determine cleaning and repair needs

Areas	Activities implemented
	<ul style="list-style-type: none"> • Needs assessment for local and international procurement • Transportation needs assessment • Training of logistics assistants and storekeepers • Dispatching and delivery of materials from the central warehouse to districts and secondary sites • Management of contaminated solid wastes
Communication	<ul style="list-style-type: none"> • Technical assistance to NMCP in reviewing the IEC plan, reviewing and developing IEC materials, IEC material production and distribution, and validating districts' IEC plans • Participation in IEC activities supervision including HPN's orientation and IEC mobilizers and supervisors training
Partnership	<ul style="list-style-type: none"> • Meetings and frequent phone calls as needed between NMCP coordinator, PMI/Senegal team, and Abt's Chief of Party • Regular (weekly) meeting/phone calls between PMI AIRS Operation Manager, NMCP and SNH focal persons to coordinate IRS activities • Empowering regional environmental officers for IRS EC inspections • Partnership development with micro-finance institutions for timely and secured payment of SOPs and other vendors during campaign period.
Administration & Finance, Procurement	<ul style="list-style-type: none"> • 2017 budget preparation • IRS operations participants' agreements signing • Vehicle rental tender process • SOPs payment process

3.2 LOGISTICS PLANNING AND PROCUREMENT

3.2.1 INVENTORY

Based on the 2016 post-spray inventory data and decisions on the 2017 spray target areas, the team quantified the needs for the 2017 campaign.

At the final inspection for sites validation before spraying, the COP and environmental compliance officer (ECO) verified that all materials and equipment needed, conformed to optimum distribution for all sites. Results of those sites inventories were shared with logistic teams for corrections.

During the spray campaign, logistics assistants conducted an inventory at mid-campaign to secure appropriate stock in the districts. The team organized additional dispatches of materials to the secondary sites' storerooms at least every 10 days or as frequently as needed. Site storekeepers completed stock cards and records at the end of the day by site storekeepers for more traceability, thus enabling the logistics coordinator to have a daily update of stock in store.

During the 2017 spray campaign, organophosphates stock use was subjected to rigorous monitoring. AIRS Senegal developed stock cards for organophosphates inventory and stock disposal using first-expired, first-out. At the end of the 2017 spray campaign, the team counted all materials and equipment and ensured that they were adequately stored at the district level. The team also organized an inter-district exchange of assistant logisticians to carry out an exhaustive inventory of the material before returning it to the central store.

3.2.2 SERVICING OF EQUIPMENT

Goizper pumps were subject to preventive maintenance before their use in Kounghoul, Malem Hoddar, Nioro and Koumpentoum. The project also procured 495 Goizper IK VC 7.5 pumps and nozzles to supplement the quantity for an effective coverage in the four districts and ensure high quality spray.

In addition, the project serviced and deployed fire extinguishers and generators to all four districts prior to the start of the 2017 campaign.

3.2.3 PROCUREMENT

To estimate the adequate quantity of insecticide to procure IRS equipment, and other supplies required for the 2017 campaign, AIRS Senegal used the number of structures found in 2016 campaign, plus the additional structures in new hot spots added in 2017. The team used a ratio of 3.2 structures per bottle, and calculated based on the 2016 spray campaign performance data. Using 2016 IRS structures, it was possible to assess the exact number of SOPs needed for the 2017 campaign in a 20-day period, assuming that one SOP sprays an average of 13 structures per day. A list of items procured internationally and locally to meet the needs of the 2017 spray round is included in Annex A.

3.2.4 DISPATCHING OF COMMODITIES

By May 15, 2017 an important part of the local and international procurements were available at the central warehouse in Kaolack. AIRS Senegal then developed a dispatching plan and from May 23 - 25, 2017, all districts had received the appropriate quantities of IRS materials, 35 days prior to the start of the spray campaign.

During spray operations, AIRS Senegal's technical team members made supervision trips throughout the spray campaign to monitor stock management in the field storerooms. At the end of each trip, supervisors provided recommendations to the logistics assistants and storekeepers and coached them on addressing any identified shortcomings.

3.3 TRAINING

The AIRS Senegal team conducted jointly a series of trainings with the SNH and representatives from the NMCP for various spray personnel to prepare for the spray season as shown in Annex B. In total, AIRS Senegal funded the training of 1,017 people to deliver IRS, of whom 29.4 percent were female. The trainings and orientation sessions are described below.

In total, AIRS Senegal trained 2,642 persons including 1,204 women representing 46 percent of participants. From the total number of people trained for the 2017 spray campaign, AIRS Senegal hired 1,144 people, including 387 women representing 34 percent (See Table 6 in Section 5.1). The difference between the number of people trained and the number of people hired reflects how the project works with numerous government supervisors who are trained by AIRS Senegal, but not hired directly by the project.

3.3.1 ORIENTATION OF AIRS DISTRICT TEMPORARY PERSONNEL

After recruiting temporary district personnel (e.g., logistics and finance assistants), AIRS Senegal held an orientation workshop April 27-28, 2017 to build organizational and operational capacity of newly hired district staff aiming to enhance performance at their respective job posts. In total, seven temporary personnel were trained. The workshop topics included:

- Managerial aspects at district level;
- Abt's code of conduct;
- District-level activity timeline;
- EC measures;
- IRS/IEC;
- Stock management

- Logistics organization management;
- Financial procedures compliance;
- Data collection organization;
- Techniques for supervising spray operations;
- Roles and responsibilities; and
- Gender approach.

3.3.2 SMARTPHONE TRAINING FOR SNH STAFF

To ensure the use of smartphones for better supervision of IRS activities, AIRS Senegal and Dimagi, Inc. worked on the smartphone-based supervision tool while taking into consideration lessons learned and recommendations from previous years' experience. In addition, Senegalese government staff were trained with support from AIRS Senegal. AIRS Senegal trained 71 supervisors in all districts on the use of smartphones from June 8 to June 9, 2017.

The training covered the following topics:

- Revising supervision checklists;
- Method of smartphone use;
- Frequency of check list used
- Supervision reporting; and
- Guidelines for smartphone inventory management.

3.3.3 TRAINING NEWLY POSTED SNH STAFF IN IRS DISTRICTS

In 2017, the project trained new SNH personnel who had not previously worked on IRS, but were assigned to IRS regions/districts. This training began in Kaolack on May 9th and ended on May 13, 2017. The purpose of the training was to build the capacity of SNH staff who will train SOPs, team leaders, and site managers. In total, 14 SNH agents and one (1) health post nurse (HNP) (Touba Nguyenenne for new alternative approach to community-based IRS) were trained on the following topics:

- Overall vector control methods, especially IRS, their indications, and their limits;
- The various steps for IRS implementation at district level;
- Spray techniques and safety issues related to insecticide use;
- EC safety; and
- Gender approach in IRS to improve women's participation.

3.3.4 TRAINERS' ORIENTATION

AIRS Senegal conducted a trainers' orientation for all districts from June 8 - 9, 2017 in Kaolack. The purpose of the orientation was to share and harmonize training methodologies for SNH trainers to use for SOPs' training and supervision. As in 2016, AIRS Senegal invited DREEC inspectors at the orientation session and Touba Nguyenenne's HNP and trained a total of 74 people. AIRS Senegal designed a trainers' training manual highlighting SOPs' expected skills and the teaching methodology, including the following topics:

- Teaching methodologies and techniques;
- Household preparation for quality of spray,
- Guidelines for insecticide mixture;
- Guidelines for structure marking;

- Using smartphones for supervision;
- Using and cleaning of Tyvek suits as PPE;
- New approach on community-based IRS;
- Directly observed spray (DOS) for team leaders supervision;
- Supervisory data collection tools and questionnaires;
- Spray performance tracking tools;
- EC and safety measures;
- MSP use; and
- Gender-inclusive approach.

3.3.5 SPRAY OPERATOR TRAINING

SOP training took place June 12-16 in Koumpentoum, Malem Hoddar and Kougheul, and from June 18-22 in Nioro. As a result, 645 sprayers, 30 site managers, 131 team leaders, and 112 substitute sprayers were trained. Among these 918 IRS trained operational personnel, 438 were new to IRS operations.

Training covered the following topics:

- Spray techniques and proper management of insecticide;
- Data collection methodology;
- Household preparation for quality of spray;
- Guidelines for insecticide mixture including triple rinsing;
- Guidelines for structure marking;
- Sensitization of beneficiaries on IRS-related safety measures;
- Environmental compliance ;
- Roles and responsibilities; and
- Sexual harassment policy.

3.3.6 WASHERS, GUARDS AND DRIVER TRAINING

In total, the project trained 62 washers, 63 guards, and 66 drivers on the roles and responsibilities during an IRS campaign, code of conduct, and environmental safety.

3.3.7 TRAINING OF SITE MANAGERS AND STOREKEEPERS ON SPRAY PERFORMANCE TRACKING SHEET

PMI AIRS trained site managers (30) and storekeepers (40) on the purpose and use of the revised Spray Performance Tracking Sheet, including the file of data operation supervision for team leaders. Trainings were held on June 17, 2017 in Kougheul, Koumpentoum, and Malem Hoddar, and on June 23, 2017 in Nioro. In Malem Hoddar, in context with community-based IRS, 19 team leaders were trained on spray performance tracking sheet.

3.3.8 ORIENTATION OF SITE MANAGERS, TEAM LEADERS

To improve field coordination, the project trained spray leaders (30 site managers, 131 team leaders) on IRS management at the operational level in Koumpentoum, Kougheul, and Malem on June 17 and in Nioro on June 23, 2017. The sessions covered the following topics:

- Procedures and code of conduct;
- Roles and responsibilities of site managers and team leaders, and relationships with SNH supervisors;
- IRS supervision activities;
- Use of the error eliminator sheet; and
- Refresher of IRS guidelines for 2017 on chalk marking on structures, triple rinsing of insecticide

bottles, rinsing pumps and structure preparation.

The project conducted trainings on installation and uninstallation techniques of MSPs and on progressive rinsing on June 15 for Malem Hodar, June 17 for Koumpentoum and Koungheul and June 23 for Nioro. As a result, the project trained 11 SNH local supervisors, one HPN, five site managers, 35 team leaders, 10 storekeepers, and 88 SOPs.

3.3.9 TRAINING OF SITE MANAGERS AND TEAM LEADERS ON SMS AND SMARTPHONE USE

In 2017, AIRS Senegal trained site managers on the use of cell phones to report on operational data (e.g., number of SOPs, number of rooms found, number of rooms sprayed, and amount of insecticide used) via SMS on a daily basis. The project conducted one-day training session in Koumpentoum/Koungheul and Nioro/Malem Hoddar. Site managers were trained on how to use smartphones to fill out supervisory checklists. The workshop covered the following topics:

- Supervision checklists ;
- Technical tools for smartphone and mobile phone use; and
- Rules of procedures for smartphone and mobile phone fleet management.

3.3.10 HEALTH WORKERS' TRAINING ON INSECTICIDE POISONING MANAGEMENT

At the district level, 25 HPNs newly posted in IRS zones were trained by their respective DMOs.

3.3.11 TRAINING OF TEAM LEADERS ON DOS FILE

PMI AIRS trained team leaders on DOS file for one additional day after SOP training. In total, 131 team leaders were trained, including 53 women. The workshop covered the following topics:

- Team Leaders' roles and responsibilities in IRS supervision activities;
- Use of the DOS file, including revision of all items;
- Supervision frequency for DOS file;
- How to account for the nature and number of red flags; and
- How to address issues for quick resolution.

4. IEC ACTIVITIES

AIRS Senegal provides technical assistance to NMCP which has had the overall responsibility of the IRS IEC mobilization component since 2015. This technical assistance includes strategy development, development and production of IEC tools, validation of IEC communication plans, and supervision of IEC activities. AIRS Senegal's IEC objectives for the 2017 spray were to continue supporting NMCP and other local partners with coordination of IEC, sensitization, and mobilization activities to raise awareness and encourage acceptance of IRS. Since 2016, each district health center provided a data entry clerk (DEC) for IEC data collection and reporting. PMI AIRS provided technical assistance, including training and coaching in the field. In 2017, PMI AIRS also funded the training of mobilizers and community supervisors to fulfill the gap of funding due to the increase of hot spot posts.

4.1 PREPARATIONS

AIRS Senegal provided technical assistance to NMCP in the following areas:

- Review of national IEC policy and tools;
- Production of IEC tools;
- Validation of district IEC plans;
- HPNs' orientation for IEC mobilizers' training;
- Supervision of IEC mobilizers' training by HPNs;
- Supervision of IEC activities implementation and mobilization; and
- Coordination and monitoring of mobilization data collection and reporting to the district health offices and the PMI AIRS office in Dakar.

4.2 HPN'S ORIENTATION FOR MOBILIZATION

Under the supervision of NMCP and PMI AIRS, the district health management team (DHMT) facilitated orientation sessions for HPNs in the four target districts. The sessions were held June 13-15 in Koumpentoum and Kounghoul, June 13-18 in Niore, and June 12-14 in Malem Hoddar. Overall, PMI AIRS oriented 78 HPNs to prepare the IEC mobilizers for mobilization. The topics covered in this orientation included:

- An update on the counseling card, a job aid describing essential IRS messages for the IEC mobilizer;
- Guidelines for the campaign, especially for household preparation;
- Messages to be delivered during the mobilization;
- How to fill out data collection forms;
- Supervision of community IEC mobilizers;
- Structure identification and data entry;
- Ensuring mobilization data quality; and
- Training methodology.

Following this orientation, under the supervision of NMCP, SNEIPS and AIRS Senegal staff, HPNs conducted trainings for 1183 IEC mobilizers and 118 community supervisors in the four districts as illustrated in Table 3.

TABLE 3. NUMBER OF MOBILIZERS AND SUPERVISORS TRAINED ON IEC

	IEC Mobilizers			Community Supervisors		
	Male	Female	Total	Male	Female	Total
Nioro	74	316	390	25	14	39
Malem	20	68	88	8	3	11
Koungheul	106	206	312	19	11	30
Koumpentoum	215	178	393	25	13	38
TOTAL	415	768	1,183	77	41	118

4.3 IEC ACTIVITIES

PMI AIRS conducted IEC activity planning and implementation at the district level. AIRS Senegal provided technical assistance in the validation process of communications plans, supervised the implementation of IEC activities, and helped build the local team capacity. As last year, the district team was responsible for mobilization data collection and data recording. NMCP selected data clerks at the district level trained by AIRS. Thus, the district team collected and recorded IEC data. Each DEC for IEC was in every district health center, where they entered IEC forms into the Access database and transmitted the results to the central office in Dakar; then the AIRS data base manager verified data and generated a report for NMCP and partners. Before the data transmission, AIRS DEC supervisor assisted the district DEC in data recording control and verification in the field. A protocol for the devolution of the data management was validated with NMCP.

Unfortunately, there has been a lot of issues for the respect of this protocol. At the end of the spray period, with the exception of Malem Hoddar, data from Nioro and Koungheul were not yet available. The delay in the data transmission by HPN was the main cause of late recording of IEC data, despite the fact that it has been a point of discussion during the national planning workshop and that NMCP and DHMT were engaged to solve it.

Refusals cases in urban areas continued to be an issue for the project. This year, refusal cases are more crucial as some people argue that their refusal is due to their unwillingness to adhere to after-spray instructions. For example, a beneficiary said that he is going to paint his home right after the spraying. This situation has affected the progression and performances in urban areas. Another reason for refusal in urban setting is the removal of a significant number of household belongings outside the rooms during the rainy season. In addition, SOPs had difficulties recording data on refusal cases because residents refuse to give information about their structures. Local, administrative, political authorities, in some areas were involved in resolving refusal cases.

4.4 IEC SUPERVISION

The AIRS team, in coordination with NMCP and the Kaolack Regional Office's IEC representatives, managed the project's IEC activities and materials (see Table 4) and helped address refusal cases in Koungeul, Koumpentoum, and Niuro.

TABLE 4. IRS CAMPAIGN COMMUNICATION MATERIALS

Items	No. produced by NMCP (through AIRS Senegal)
Package of sheets laminated	300
Trainer's guide	110
IEC mobilizer's manual	1,330
T-shirts	4,000
Streamers	87

5. IMPLEMENTATION OF IRS ACTIVITIES

5.1 SPRAY CAMPAIGN

The official spray campaign ceremony was launched in Malem Hoddar in collaboration with NMCP, PMI AIRS, local authorities, DHMT, Regional Health Management Team, HPNs, mobilizers, SOPs, and community leaders (village chiefs, presidents of health committee). Opening remarks focused on the experience of the Malem Hoddar community-based IRS pilot which is considered as a promising strategy for the Government of Senegal for scaling up IRS in Senegal. In all other districts, DHMTs chose to hold IRS launch ceremonies where acceptability was low in previous years. This is the case in Koumpentoum commune and in the village of Nguem Yallah in Malem Niani Health Post

The 2017 spray campaign began on June 30 in Koumpentoum, Koungeul, Malem Hoddar and Niore. The community-based IRS lasted 10 operational days. In other districts, spray operations were completed within 20 operational days per district over 24 days in total, including days of resting (six-day work week) except in Malem where the team continuously sprayed for 10 days.

AIRS Senegal sprayed organophosphates in all districts. SOPs used Goizper pumps in all districts. To improve management of spray pumps, SOPs' roles and responsibilities were reviewed with guidelines of progressive rinsing (triple rinsing) of spray pumps. Pump repair technicians were in charge of supervising the progressive rinsing and measuring insecticide leftover after spraying. Based on lessons learned and recommendations related to return of mixed insecticide, the slogan during 2017 campaign was "no return of mixed insecticide". During supervision, efforts were made to minimize substantially the return of mixed insecticide.

In total, 1,144 seasonal workers hired by AIRS Senegal (including SOPs, site managers, team leaders, washers, storekeepers, assistant logisticians, accountants, repair technicians, security guards and drivers) were deployed over the 30 sites in the four target districts, as shown in Table 6.

The 30 sites were distributed as follows: 13 in Niore, 8 in Koumpentoum, and 9 in Koungeul. In Malem Hoddar, where AIRS Senegal implemented community-based IRS, local leaders provided seven operational centers and one office space free of charge for the project. At each operational site, AIRS Senegal deployed two to five teams of four to five SOPs depending on the size of the sites. Spray teams worked six days per week with average hours of operation from 7 a.m. until 2 p.m. Before leaving for the spray sites, all SOPs were provided breakfast. After returning to the operational site, SOPs returned PPE, unused insecticide and empty bottles, cleaned themselves, and went home. In some remote operational sites, SOPs camped overnight (i.e., with communities providing lodging and the project covering food and other supplies). In Malem Hoddar, local community leaders provided horse-drawn wagons to transport SOPs and their equipment. Each wagon transported six operators.

Prior to the start, 1,050 seasonal workers (including SOPs, team leaders, site managers, washers, storekeepers, and repair technicians pumps) underwent a general medical examination to assess their medical fitness for IRS activities. Note that in 2017, DMOs conducted medical checkups in the four districts free of charge to the project. As per the project's rules and regulations, all female personnel took a pregnancy test at the start of the spray campaign and repeated the test one month after. The results of the repeat test indicated four out of the total 285 women tested had positive test results. The team assigned pregnant workers as site cleaners. All SOPs received complete sets of PPE comprising helmets, face shields, nose and mouth masks, long-sleeved cotton overalls, rubber gloves, pairs of

cotton-rich stockings, robust gum boots, and neck covers. In Malem Hoddar, the project provided SOPs with Tyvek suits as overalls and wet wipes for cleaning PPEs.

TABLE 5. NUMBER OF PEOPLE HIRED

Position	Male (M)	Female (F)	TOTAL
SOPs	438	207	645
Operational site managers	28	2	30
Team leaders	78	53	131
Data entry clerks	13	14	27
Storekeepers	30	10	40
Finance assistants	2	1	3
Logistics assistants	3	1	4
Repair technicians	36	1	37
Washers	0	62	62
Guards	63	0	63
Drivers	66	0	66
Water suppliers	0	7	7
Office and operations sites cleaners	0	29	29
Total Hires for IRS	757	387	1,144

5.2 OPERATION COORDINATION AND SUPERVISION

For adequate coordination of spray operations, AIRS/Senegal held regular meetings at site and district levels. Coordination and supervision activities are described below.

5.2.1 COORDINATION AT SITE LEVEL

The team conducted coordination meetings at the site level daily. Meetings included all actors, namely: site managers, HPNs, community supervisors, and local SNH supervisors. At the site level, participants discussed all issues encountered during IRS implementation and proposed immediate solutions. Teams informed IEC mobilizers of any changes in spray calendars for better field coordination.

5.2.2 COORDINATION AT DISTRICT LEVEL

The DMO or his/her representative conducted coordination at the district level involving all supervision actors (central and regional level SNH and PMI AIRS team) and DHMT. Participants discussed issues during those meetings and proposed solutions to ensure smooth execution of on-the-ground activities.

5.2.3 COORDINATION AT NATIONAL LEVEL

The Chief of Party for AIRS Senegal, the PMI Malaria Advisor, and the NMCP coordinator established a consultative meeting on IRS implementation updates and issues. In addition, the AIRS team coordinated on a weekly basis with NMCP and SNH IRS focal persons to discuss all IRS implementation activities including planning, training, and supervision. The IRS Steering Committee met for decision-making as needed (e.g., waste disposal and the future of IRS in Senegal). The PMI AIRS Senior Management Team met on daily basis to monitor IRS activities.

5.2.4 SMS JOB AIDS

In 2017, a list of job aids was developed and sent to SOPs regularly. Job aids included reminders related to SOPs' performance, safety and quality of spray, structure marking and sexual harassment.

5.2.5 OPERATIONS SUPERVISION

IRS campaign supervision involved identification of potential problems, immediate correction of inadequacies, and problem-solving. This supervision led to improved program performance and helped to ensure a successful overall campaign. The IRS Steering Committee reviewed and validated the IRS supervision checklist and supervision manuals for use by all supervisors during the 2017 spray operations. The following manuals and tools were available:

1. Supervision manual
2. Training of trainers manual
3. Spray operator pocket guide
4. Operator booklet
5. Site manager guide
6. Store monitoring plan
7. Team leaders guideline
8. District coordinator guide
9. Guide for logistics assistant
10. Storekeeper manual
11. Manual for pump repair technician
12. Guide for training on environment
13. Insecticide shipping guide
14. Manual on pesticide intoxication case management for physicians
15. Manual on pesticide intoxication case management for HPNs
16. Guide for IEC mobilizers' trainer
17. Manual for IEC mobilizers
18. Manual on data collection

5.2.6 SUPERVISION AT SITE LEVEL

At the site level, there was an average of three to four spray teams per site. Every team leader directly supervised the work of four to five SOPs. Site managers were in charge of overseeing team leaders'

performance and observing the work of SOPs and other actors on site, including washers and security guards.

In 2017, the team leader supervision checklist was used to ensure effective supervision by the Team Leader in the field. The team leaders' supervision file was helpful and all related issues were addressed daily under PMI AIRS and partners' supervision. The percentage of red flags was generally not significant.

SOPs had the same seating arrangements as in 2016, where they kept pumps between their legs while seated in the vehicles.

Every site had one local SNH supervisor. After one week of supervision in a given site, those assigned SNH supervisors would rotate with their colleagues from other operational sites. At the end of the day, there were debriefing meetings with the team leader, site manager, and SNH supervisor to share the findings and lessons learned from the day and to make recommendations for the next day.

5.2.7 SUPERVISION AT REGIONAL AND NATIONAL LEVEL

Representatives from the SNH regional offices and the central level conducted supervision visits to assess the campaign progress, and observe local SNH agents' performance. However, PMI AIRS noted the lack of attendance in Koungeul and Nioro where regional SNH supervisors did not participate in the debriefing meetings at the end of the day nor did they share observations with AIRS Senegal staff.

5.2.8 PMI AIRS SENEGAL AND OTHER PARTNERS SUPERVISION

AIRS Senegal technical staff continued working in good collaboration with DHMT and local SNH agents in the field during the length of the campaign, performing close supervision and coaching of all aspects of operations. They specifically focused on the supervision of spray techniques, EC, IEC mobilization, stock management, and handling of the insecticide. Careful and consistent supervision was a key factor in the successful implementation of the spray campaign.

NMCP's Coordinator, AIRS Senegal's Chief of Party, the DMO, and the mayor of Koungeul conducted a site visit in the field to supervise IRS activities. The team observed spray techniques, environmental compliance, warehouse, end-of-day activities, beneficiaries' appreciation, etc. The NMCP Coordinator and COP also visited Koumpentoum where they met the DHMT and local authorities (prefects, mayors) who described the impact of the IRS intervention in terms of malaria case reduction (according to HPNs). Local authorities mentioned the excellent collaboration between DMO and the project field team, particularly the District Coordinator in coordinating activities and solving refusal cases. The NMCP Coordinator appreciated local authorities' substantial and sustainable contribution in providing facilities to the project during the campaign period. The Regional Director of Health in Kaffrine visited Koungeul commune site with the COP. He also helped address some refusal cases.

Two supervision visits were carried out by the Home Office Technical Program Manager and Finance and Contracts Analyst. They observed and made recommendations on IRS operations activities as well as on financial procedures.

While in the field, the AIRS Senegal team continued coaching SNH officers, DREEC, and the DHMT on how to conduct proper supervision using smartphones. Supervision also focused on:

- Ensuring spray calendars are implemented as planned and monitoring SOPs' daily performances to prevent any voluntary slowdown in SOP operations.
- Strengthening working relationships between various actors in the field.
- Management of refusal cases in close collaboration with local authorities.
- Improving spraying techniques as needed.

Supervision had an important impact, including improved adherence to the following:

- Spray progress timelines in operational sites;
- Household preparation for quality of spray;
- Guidelines for insecticide mixture;
- Guidelines for structure marking; and
- Daily performance targets of spray teams.

Additionally, there were no beneficiary complaints reported to authorities and most refusal cases were managed; however some categorical cases were noted mostly in urban areas.

One week after the start of the campaign, PMI AIRS assessed recurrent supervision issues and made recommendations that all supervisors and partners in the field applied to significantly reduce errors and mistakes during the implementation phase.

In 2017, AIRS Senegal noted increased government authorities' ownership of IRS. For example, local authorities provided all district offices and operational sites free of charge in the four districts; the prefect of Nioro and the deputy mayor of Koungheul made visits to spray sites and showed appreciation for the IRS team's well-organized work; prefects chaired all districts' IRS evaluation meetings

Table 6 summarizes the spray operations supervision and monitoring schedule.

TABLE 6. SPRAY OPERATIONS SUPERVISION AND MONITORING SCHEDULE

Actors	Frequency	Supervised areas
District SNH staff	Daily visit during the entire period of spraying	Spraying techniques, environmental safety and compliance, SOPs' behavior; IEC messages delivered; spray performance; and spray organization in the field
SNH (regional and central)	Two visits for central-level and two for regional-level SNH – duration of four days.	Spraying techniques, environmental safety and compliance, SOPs' behavior, supervision of SNH supervisors, IEC
Abt national and field office Abt Home Office	Daily visit during the entire period of spraying two visits (M&E and TPM)	Spraying techniques, environmental safety and compliance, SOPs' behavior, supervision of SNH supervisors, management of storekeepers, IEC message delivered, spray performance
NMCP	One visit during the campaign	Field organization, environmental safety and compliance, partner relationships, supervision of SNH supervisors, IEC component
Regional Health Office	One visit	Spray operations and beneficiaries' impressions; IEC mobilization (solving refusal cases)
DHMT	Five visits for IEC mobilization and for Spray operations	Spray operations and beneficiaries' impressions; IRS operations in joint supervision with Abt staff; IEC mobilization
Local leaders (mayors, etc.)	Three visits throughout the campaign	IEC mobilization, oversight of entire IRS operations, solving refusal cases

5.3 SMARTPHONES FOR SUPERVISION

In an effort to improve, standardize, and automate supervision, in 2017, AIRS Senegal and its subcontractor Dimagi, Inc. updated smartphone applications for daily SMS reporting and IRS operations supervision.

5.3.1 EQUIPMENT USED

AIRS Senegal distributed 74 Samsung Galaxy J2 phones to SNH supervisors, site supervisors, and ECO. The AIRS Senegal team along with Dimagi updated the mobile application components of the supervision forms on each phone and set up an email address where users would receive the daily reports for the supervisor’s teams. AIRS Senegal senior managers’ phones were also updated with the mobile application components.

The following supervision forms were included in the Dimagi-supported smartphone application:

1. SOPs’ morning mobilization and vehicle inspection;
2. Structure preparation and observations on spraying techniques;
3. SOPs’ return at the end of day;
4. Storekeepers’ performance monitoring ;and
5. Data Collection Verification (DCV).

In addition to the Dimagi application, there are three checklists for EC inspection: using the Open Data Kit (ODK) Collect application: two for pre-IRS inspection related to site validation and one form for post-IRS inspection.

5.3.2 IMPLEMENTATION, STRENGTHS, AND CHALLENGES OF THE mHEALTH SUPERVISION

Local supervisors completed the forms on a daily basis. Site managers were in charge of SOPs’ morning mobilization and their return to base. Central level supervisors (AIRS Senegal staff and SNH supervisors) and regional level SNH also completed sub-forms, but did not systematically follow spray teams for a full day.

Dimagi sent automated reports from these supervision checklists to a list of stakeholders, which had been provided by AIRS Senegal. Every day around 6:00 pm, supervisors would receive the supervision data as an e-mail, which they could access on their smartphone in a tabular format as well as an MS Excel attachment.

Strengths of the smartphone for supervision included:

- SMS reports reviewed daily by M&E team before sharing with partners and stakeholders;
- Daily sharing of supervision reports with users and stakeholders in the implementation; and
- Automatic updates of the mobile application.

Table 7 summarizes challenges and solutions for system implementation.

TABLE 7. CHALLENGES AND SOLUTIONS FOR SYSTEM IMPLEMENTATION

Difficulties Encountered	Alternative Solutions Proposed and Implemented
SMS	
<p>As in 2016, the SMS report generated by the CommCare platform by Dimagi, Inc. was difficult to understand and explore.</p> <p>The length of the SMS jobs aids sent to SOPs impacted the cost of the message.</p>	<p>Development of a new Excel report template using data sent from the CommCare platform</p> <p>Reduce the SMS wording</p>
Mobile Application	

High number of false red flags on supervisory checklist due to its high frequency and length

Review length and content of supervisory checklist

5.4 SPRAY PERFORMANCE TRACKING SHEET INCLUDING DOS NEW FILE

The revision of the Spray Performance Tracking Sheet (SPTS) tool in 2017 includes team leader's data operations supervision in all four target districts. This tool allowed daily tracking of SOP performance and the use of insecticide with team leaders completing total supervision and number of issues recorded. PMI AIRS supervisors addressed all issues daily. After analyzing the data, site managers communicated feedback to the team leaders and provided recommendations and corrections as needed. They also shared the performance results with the DHMT and other partners on a daily basis.

Site managers were responsible for recording the performance data. They worked with storekeepers to input information on insecticide use on the SPTS daily. This information was available to DCs and shared with DMOs. In addition, AIRS Senegal synthesized the data and shared it weekly with all partners including PMI, NMCP, SNH, the district health team, and PMI AIRS Home Office. All stakeholders visiting spray operations during the campaign appreciated the tool.

Markings

In 2017, AIRS Senegal continued using chalk marking to track households sprayed. Chalk marking has been consistently implemented and well-supervised

5.5 LOGISTICS AND STOCK MANAGEMENT

In 2017, AIRS Senegal shipped adequate quantities of batches of organophosphates insecticide based on district warehouse sizes. District warehouses were supplied more frequently because of the space limitation for restocking and stock monitoring.

As for the insecticide, AIRS Senegal established a warning threshold in each district central storage facility based on the total insecticide stock for each site. From there, two pesticide re-stockings were carried out over the course of the campaign to avoid stock-outs or the potential for any stock-outs.

In Malem Hoddar, AIRS Senegal extended community-based IRS to more health post outreach sites. AIRS opened a small office in Niahene managed by an experienced assistant logistics and a storekeeper under the supervision of the AIRS District Coordinator in Koungheul. AIRS Senegal provided the district with the full supplies of PPE and pesticide for the 10-day duration of the spraying.

5.6 CONTINUED COMMUNITY-BASED IRS IN MALEM HODDAR FROM 2016

In 2016, in an effort to reduce IRS cost and build country capacity to lead IRS implementation, PMI AIRS, in collaboration with NMCP, piloted community-based IRS in Malem Hoddar.

In 2017; PMI AIRS conducted community based IRS while taking in consideration lessons learned from previous experience including:

- Begin the campaign early in the year and at the same time in all districts to avoid heavy rain;
- Begin spraying hard-to-reach geographic areas;
- Rent horse-drawn wagons versus free contribution from the community, as recommended by local authorities in the 2016 evaluation workshop. Because the community uses the horses for income generating purposes, it was determined that requesting them free of charge would take away this source of income generation;

- Increase spray length from six days to ten days to improve communication and supervision strategies;

The 2017 community-based IRS included seven health posts versus four in 2016.

In collaboration with NMCP, PMI AIRS continued advocacy visits for community-based IRS and ensured local community participation regarding the choice of operational sites, provision of appropriate transportation, and supporting community mobilization.

AIRS Senegal recorded a high level of commitment for the 2016 pilot from administrative authorities, political leaders, village chiefs and other community leaders. SOPs' recruitment was conducted at the community level to minimize camping sites' cost and reinforce IRS acceptability. In 2017, during the campaign, the project rented horse-drawn wagons to SOP teams to transport teams and materials needed for spraying. However in a few cases, village leaders provided horse-drawn wagons free of charge to the project. In some villages, community leaders provided meals to non-resident SOPs. The spraying in Malem Hoddar was completed in 10 operational days.

Overall, in Malem Hoddar, 136 operators wore Tyvek suits (88 SOPs, 19 team leaders, 8 local supervisors including the HPN and 7 pumps technicians, 5 store keepers and 9 security guards). Eighty-eight SOPs sprayed 12,629 structures with a coverage rate of 94.5 percent of 13,367 structures found. The average number of structures sprayed per day per SOP was 15.6. Of the 43,916 people protected, 873 were pregnant women and 8,000 were children under five.

Challenges and Solutions on Community-Based IRS Implementation

Difficulties Encountered	Alternative Solutions Proposed and Implemented
<u>Not enough educated people for SOP position in some health posts (Diaga)</u>	Recruited outside the health post
In some areas (Paffa and Diobene), horse-tracked carts provided free of charge were not available on time for SOP transportation because they were also used by the owners for agricultural work	AIRS Rented horse-tracked carts for SOPs transportation during spray campaign



Villages leaders meeting in Touba Gueyenne Health Post (Malem Hoddar)



AIRS Home Office Technical Program Manager and AIRS Chief of Party during field visit in Malem Hodda



Horse wagon used during the spray in Malem Hoddar

5.7 EXPERIENCE PILOT OF COMMUNITY-BASED IRS NEW ALTERNATIVE APPROACH IN TOUBA NGUEYENNE

PMI AIRS has proposed new alternative approaches to implement IRS at the community/village level as part of the health post activities. AIRS Senegal has discussed and reviewed this idea with NMCP as a means to reduce the cost of IRS. The NMCP has highly appreciated this approach and describes it as a logical continuation of the 2016 community-based IRS conducted in Malem Hoddar and a promising strategy for the government to use to scale up IRS in the country. Touba Ngueyenne's health post has been chosen as pilot area for the following criteria:

- Touba Ngueyenne's HPN played a key role in the community-based IRS appropriation in this health post area during the 2016 pilot by leading all IRS activities, including mobilization;
- Commitment of community leaders in this health post, including village chiefs and the health committee leader. This commitment contributed to the process of organizing meeting sessions, sharing useful information for implementation, and providing transportation and accommodation under the leadership of the HPN;
- Local authorities (district's prefect, mayor, DHMT, HPNs, and village leaders) support the approach.

Key factors leading to the success of the alternative new approach to IRS in Touba Ngueyenne included:

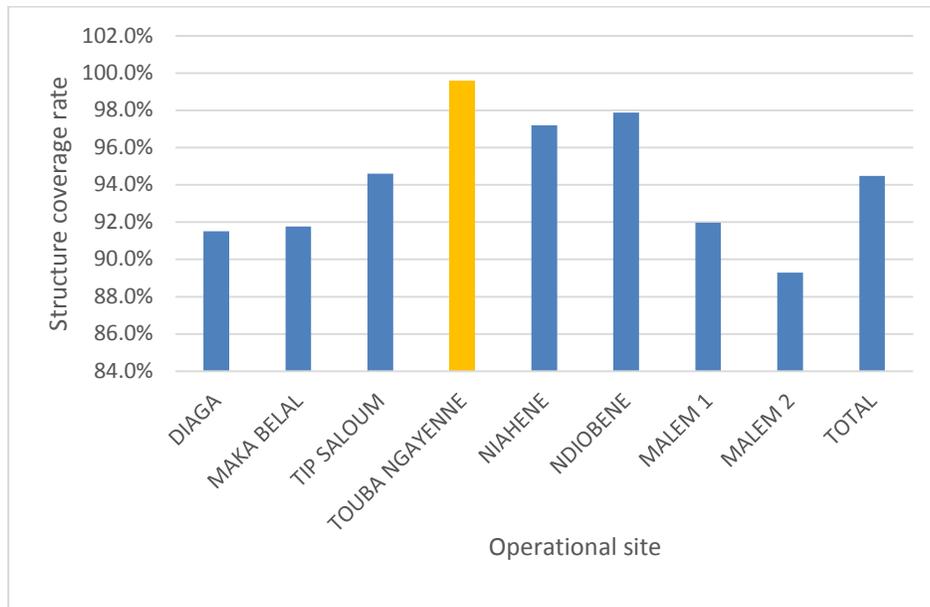
- AIRS Senegal recruited SOPs from the villages to be sprayed for a door-to-door approach, avoiding the need to travel long distances between villages;
- The village leader provided an adequate facility that met environmental compliance for storage of IRS materials;
- The HPN was the key player trained on spraying techniques, site management, and supervision.

The spraying in Touba Ngueyenne was completed in 10 days. In total, 13 people were trained (eight SOPs, two team leaders, one storekeeper, one pump technician and one supervisor). Training targeted spraying techniques and other environmental compliance measures. Eight SOPs sprayed 1,395 structures obtaining a coverage rate of 99.6 percent of 1,401 structures found. This high performance is related to the high acceptability of beneficiaries. The average rate of structures sprayed per day per SOP was 18.9. This high performance is due to the fact that SOPs are working within the village, walking door-to-door.

Among 4,480 people found, 4,470 (99.8%) were protected. Out of the 4,470 people protected, 80 were pregnant women and 838 were children under five.

Figure 3 illustrates the performance of all Malem Hoddar operational sites and highlights Touba Ngueyenne's 99.6 percent coverage rate.

FIGURE 3. COMPARISON OF STRUCTURE COVERAGE BETWEEN OPERATIONAL SITES IN MALEM HODDAR



In Malem Hoddar, the start of the rainy season represents a migratory period where some populations move with their animals to other areas for farming purposes. During this campaign, SOPs found several households empty, which explains the relatively low coverage in some health posts as shown in the figure above. No categorical refusal case has been reported in Malem Hoddar. During the evaluation meeting, local authorities expressed high appreciation of this initiative and strongly recommended its continuation.

6. POST-SPRAY ACTIVITIES

6.1 SUMMARY OF POST-SPRAY ACTIVITIES

Post-spray activities included campaign evaluation meetings at the site, district, and national level; demobilization of commodities; site rehabilitation; and solid waste management which is covered in Section 9. Table 8 provides details on each post-spray activity.

TABLE 8. POST-SPRAY ACTIVITIES

Activities	Responsible Party	Results
Pregnancy tests	DMO	Completed
Site-level IRS evaluation	HPNs, SOPs' site managers, team leaders and SOP, religious and community leaders, elected officials and PMI AIRS	Completed
District-level IRS evaluation	DHMT, HPNs, site coordinators, district authorities, religious and community leaders, local elected officials, local media and PMI AIRS	Completed
National-level IRS evaluation	Country-level partners, district authorities, local elected leaders, UCAD, SNH, SNEIPS, DMOs, PMI AIRS, local media	Ongoing
IRS site closeouts	PMI AIRS district staff	Completed
Data cleaning and archiving	M&E team	Completed
IRS equipment inventory at district level	PMI AIRS district staff	Completed
IRS equipment inventory at central warehouse	PMI AIRS district staff	Not started
Waste disposal	PMI AIRS, a local cement factory (SOCOCIM), NMCP, TRANSTECH, DEEC	Ongoing

6.1.1 POST SPRAY EVALUATION MEETINGS

At the post-spray evaluation meetings, participants identified strengths and limitations of the 2017 spray campaign planning and implementation.

6.1.1.1 STRENGTHS

- AIRS Senegal collaborated with NMCP to advocate for offices and operational sites free of charge for the project. As a result, all operational sites (30) and office space (4) were provided free of charge to the project this year;
- High level of administrative and local authorities' involvement in IRS;
- PMI AIRS, in collaboration with local authorities, agreed to have SOPs sign a commitment letter to stay with the spray campaign through the end of the spraying period to prevent newly trained SOPs from drop-out;
- High level of commitment of Malem Hoddar's community leaders for community-based IRS, providing means (rental or free) for SOP's transportation and accommodation to non-residents;

- HPN and team leaders' commitment in Touba Ngueyenne to manage IRS and high level of acceptability by beneficiaries there;
- Close supervision of SOPs at all levels; use of DOS tool enabling team leaders to correctly supervise SOPs;
- Site managers and team leaders dispatching and coding SOPs' materials the day before the start of spray operations;
- Promoting gender equity;
- The team solved issues reported by the Dimagi's Supervisory Report on daily basis.

6.1.1.2 LIMITATIONS AND IMPROVEMENT AREAS

- Capacity of MOH and, particularly, DHMT, to implement IRS activities on top of with their routine activities at the health center. The current limited human resources capacities at both the NMCP and district health offices would make it very challenging for these local organizations to fully implement IRS operations;
- Low literacy level of seasonal workers was noticeable among some spray operators and IEC mobilizers when filling out data collection forms; which made it difficult to transmit IEC data;
- Low IRS coverage in urban areas due to refusal cases;
- One incident was reported from a beneficiary who entered in three consecutive rooms before the recommended two hour period. She showed signs of intoxication (diarrhea and vomiting) and was brought to the health center where she received treatment. She was released from the health center two hours after her admission and returned home.

6.2 DEMOBILIZATION OF COMMODITIES

Following completion of spray operations, the project moved the leftover insecticide, equipment, and PPE from the 30 operational sites to the three district-level warehouses. At the end of the inventory at district level, all items in addition to the leftover active charcoal, empty bottles of insecticide and solid wastes were transferred to the main warehouse in Kaolack. Annex A details the post-spray inventory of the equipment and supplies available at the central warehouse.

7. ENTOMOLOGY

Since 2015, the Laboratory of Vector and Parasite Ecology (LEVP) was subcontracted through the PMI AIRS Project to continue the implementation of entomological monitoring activities. Entomological data are being collected in villages belonging to selected health posts in hot spot areas and in non-treated areas. In Koumpentoum, all health posts were hot spots, which ended up not having internal control sites. AIRS Senegal will carry out entomological monitoring including cone bioassays in the four former sentinel sites. In Kougheul, former internal control sites were sprayed in 2017 (Table 9).

UCAD conducted cone bioassays one month after spraying with a susceptible strain of *An. gambiae* s.l. in the four IRS districts (Koumpentoum, Malem Hoddar, Kougheul, and Nioro). The purpose of the tests was to assess the quality of spraying. PMI AIRS supervised the activities in the four IRS districts. The results of the cone bioassays one month after the spray are illustrated in Tables 10; 11, 12 and 13 and the number of houses used for control and tests in Table 9. These results highlight the high quality of spraying in all IRS districts.

TABLE 9. SENTINEL SITES FOR ENTOMOLOGICAL SURVEILLANCE

District	Status	Health Post	Sentinel Villages	Control houses	Test houses	Geographical coordinates	
						Latitude	Longitude
Nioro	Hot Spots	Darou Salam	Bamba Diakhatou	1	5	14.08069°	16.04251°
		Thila Grand	Ndramé Ndimb	1	5	13.604914°	-15.963954°
	Non-Hot Spots	Paos Koto	Paos Koto			13.783977°	-15.801159°
		Medina Sabakh	Camara			13°38'17.6'	15°57'48.2"
Ndofane	Control for Nioro	Tawa Mboudaye	Tawa Mboudaye			13°58'31.6'	16°12'15.5"
		Darou Mbitteyene	Darou Mbitteyene			13°59'01.5'	16°08'11.9"
Koumpentoum	Hot Spots	Koumpentoum	Village I	1	5	13.909582°	-14.503577°
		Mérito	Koumaré	1	5	13.905140°	-14.372731°
		Kouthiaba	Kouthiaba	1	5	14.177377°	-14.454830°
		Syll Serigne Malick	Syll Serigne Malick	1	5	14°12.341	-14°32.506'
Tambacounda	Control for Koumpentoum	Koussanar	Koussanar			13.864912°	-14.080138°
		Sinthiou Malem	Ly Counda			13.791756°	-13.839031°
Kougheul	Hot Spots	Ida Mouride	Ida Mouride	1	5	13.988108°	-14.681809°
		Saly Escale	Pakala	1	5	13.831722°	-14.937530°
	Non-Hot Spots	Fass thieckene	Sam Diebel			13.90672°	014.78555°
		Keur mandoumbe	Ko Soce			13.84771°	014.85147°
Kaffrine	Control for Kougheul	Djokoul	Wey Naan			13.980534°	-15.219800°
		Ngodibo	Pété			14.096960°	-15.452728°
Malem Hoddar	Hot Spots	Maka Belal	Maka Belal	1	5	14.109558°	-15.234244°
		Tip Saloum	Tip Saloum	1	5	14.18189°	15.24248°
	Non-Hot Spots	Dianké Souf	Dianké Souf			14.228570°	-15.334641°
		Ndiote Seane	Ndiote Mor Coumba			14.420000°	-15.178220°
Kaffrine	Control for Malem Hoddar	Ngodibo	Pété			14.096960°	-15.452728°
		Kathiote	Thiamene Kathiote			13.56952°	-15.23827°

AIRS Senegal is conducting supervision monthly to ensure the compliance of entomology standard operating procedures related to mosquito collection in the field.

TABLE 10. CONE BIOASSAY RESULTS, KOUMPENTOUM

Villages	< 1 month								1 month							
	Control				Sprayed Wall				Control				Sprayed Wall			
	Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Koumare	30	0	0.00%	0	90	60	96.70%	100%	30	0	0.00%	0	94	64	97,87%	100%
Kouthiaba	30	0	10.00%	0	30	120	100%	100%	0	30	0	6,67%	32	123	100%	100%
Syll Serigne Malick	30	0	0.00%	0	30	120	100%	100%	30	0	6.45%	0	31	126	100%	99,15%*
Village I	30	0	0.00%	0	90	60	97.80%	81.7%	30	0	10%	0	98	65	93,20%	91,45%*
Subtotal	120	0	2.50%	0	240	360	97.90%	96.90%	90	30	5.56%	6.67%	255	378	96.68%	98.30%*
TOTAL	120		2.50%		600		97.30%		120		5.83%		633		97.51%	

M: Mud; C: Cement

TABLE 11. CONE BIOASSAY RESULTS, KOUNGHEUL

Villages	< 1 month								1 month							
	Control				Sprayed Wall				Control				Sprayed Wall			
	Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Ida Mouride	0	31		0.00%	63	95	100%	100%	0	31	0	3.23%	64	93	75%	73.1%
Pakala	30	0	6.70%	0	94	62	100%	100%	33	0	9.1%	0	91	60	84%*	95%*
Subtotal	30	31	6.70%	0	157	157	100%	100%	33	31	9.1%	3.23%	155	153	78.7%*	80.5%*
TOTAL	61		3.30%		314		100%		64		6.25%		308		80.84%*	

M: Mud; C: Cement

TABLE 12. CONE BIOASSAY RESULTS, MALEM HODDAR

Villages	< 1 month								1 month							
	Control				Sprayed Wall				Control				Sprayed Wall			
	Number		Mortality 24h		Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Maka Bellal	31	0	3%	0	95	61	98.90%	100%	0	31	0	12.90%	91	64	100%	92.82%*
Tip Saloum	0	31	0	3%	61	97	100.00%	100%	0	33	0.00%	9.09%	64	94	100%	96.49%*
Subtotal	31	31	3%	3%	156	158	99.40%	100%	0	64	0.00%	10.94%	155	158	100%	97.16%*
TOTAL	62		3%		314		99.70%		64		11%		313		97.49%*	

TABLE 13. CONE BIOASSAY RESULTS, NIORO

Villages	< 1 month								1 month							
	Control				Sprayed Wall				Control				Sprayed Wall			
	Number		Mortality 24h		Number		Mortality 24 h		Number		Mortality 24 h		Number		Mortality 24 h	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Bamba Diakhatou	37	0	8.10%	0	104	63	97.9%*	91.4%*	37	0	5.41%	0.00%	150	37	99.33%	97.30%*
Ndramé Ndimb	0	35	0	5.70%	34	140	100%	100.00%	36	0	5.56%	0	39	147	100.00%	100%
Subtotal	37	35	8.10%	5.70%	138	203	98.4%*	97.3%*	73	0	5.48%	0	189	184	99.47%	99.46%*
TOTAL	72		4.20%		341		97.90%		73		5.48%		373		99.46%*	

8. MONITORING AND EVALUATION

Based on lessons learned from prior spray operations, AIRS Senegal improved the M&E system for the 2017 campaign. These improvements included:

- Emphasize accuracy of both the data collection and data entry processes through comprehensive trainings and supervision at all levels;
- Streamline and standardize data information flow to minimize errors and facilitate timely reporting and use of data for effective IRS operations;
- Continue quality data sharing with NMCP and other stakeholders on a daily and weekly basis. Ensure IRS data security and storage for future reference through establishment and enforcement of proper protocols.

8.1 DATA ENTRY

The data collection closely followed the process described in the country work plan. The project employed 27 Data Entry Clerks (DECs): thirteen assigned to Nioro, six in Koungheul, three in Malem Hoddar, and five in Koumpentoum. These DECs entered spray data while four DECs, specifically recruited for IEC, entered mobilization data. Each of the DECs received a laptop that contained the AIRS Senegal Access database. DECs entered SOP forms into the Access database and transmitted the results to the central office in Dakar within 24 hours of the receipt of the data. The networking access built into the database provided automated real-time updates of spray progress reports both locally and at the PMI AIRS home office. Once entered, the paper forms were filed and archived at the data entry sites.

Each of the IEC DECs were provided with office space in district health centers. The team uploaded the Access database for IEC onto DECs' laptops. DECs entered IEC forms into the database and transmitted the results to the central office in Dakar. Each week, DEC supervisors checked the IEC data.

To reduce the variances between Team Leader summary forms and SOP data collection forms, a ratio of totals and details was established in the database. This approach enabled DECs to immediately identify errors on spray forms or in the data entry, and immediately clean the data.

8.2 MOBILE MHEALTH

In 2017, AIRS Senegal continued implementing mHealth activities on a routine basis to improve access to real-time information and allow the team and Steering Committee to supervise the spray campaign. With the help of a subcontractor, Dimagi, Inc., AIRS Senegal implemented the SMS data reporting in all four spray districts and implemented the supervisory forms on smartphones in all districts as described earlier in this report. AIRS Senegal worked with Dimagi, Inc. to update the basic phones and smartphones and to format the subsequent reports, and guide the training, and supervision.

8.2.1 SMS DATA REPORTING

In 2017, AIRS Senegal used an SMS data reporting system, whereby team leaders would send, via SMS, their daily operational data. Dimagi, Inc. CommCare System sent the spray data in a simple MS Excel style format via email. The M&E team reviewed and modified the report format into a more user-friendly format and sent it to the AIRS Senegal and home office staff, AIRS partners, and the Steering Committee

on a daily basis. This allowed the operations team and other stakeholders to receive and process the data immediately, and thus take corrective actions, if needed.

8.3 DATA QUALITY ASSURANCE

8.3.1 DATA COLLECTION/IN-FIELD VERIFICATION

AIRS Senegal instituted data quality assurance activities for both data collection and data entry verification through updated supervisory tools and the standard database audit checks. AIRS Senegal's data quality assurance efforts significantly reduced the number of errors found on daily SOP forms and in the M&E database, improving the overall quality of the data and IRS results. Table 14 describes which data quality assurance forms the AIRS Senegal team used throughout the campaign, and the corresponding percentage of structures verified.

TABLE 14. SUPERVISORY TOOLS USED

M&E supervisory tools	Structures verified	Percent of errors found (number of errors divided by the number of records verified)
Error Eliminator	Completeness and accuracy of data: heading information (215,517 lines)	0.3%
	Completeness and accuracy of data: structure information (227,890 lines)	0.2%
	Logic Control (150,264 lines)	0.2%
Data Collection Verification	871 compounds	1.5%
Data Entry Verification	208,694 lines	0.8%

8.3.1.1 ERROR ELIMINATOR

AIRS Senegal supervisors, team leaders, and site managers used the Error Eliminator daily to detect and correct common errors on SOP forms before they were transported to the data center.

8.3.1.2 DATA COLLECTION VERIFICATION FORM

AIRS Senegal senior management, local supervisors, and SNH supervisors used the DCV tool to interview households to verify spray coverage data. This year, the AIRS Senegal team included the DCV Form in the smartphone supervisory application and supervisors and site managers used the forms each week; 871 compounds were visited using the DCV Form. The most frequent types of errors were related to recording of the household population data (specifically a discrepancy between the number of people found by SOPs during spray operations and the number of people found during the DCV process). The team made corrections by cross-checking the data recorded on the SOP forms. Staff conducted DCV visits approximately two days after an area had been sprayed and identified errors in a timely manner to correct mistakes and notify SOPs and team leaders to prevent repeat errors.

8.3.1.3 DATA ENTRY VERIFICATION (DEV) FORM

The M&E manager, database managers, and the database supervisors used the DEV tool to verify that the data entered into the database matched the data on the daily SOP forms. They found fewer errors in 2017

compared to 2016, as a result of the in-field supervisory verification tools (i.e., Error Eliminator and DCV tools), and the data cleaning tool that compares spray totals to spray details, installed on DEC's computers. In 2017, the team verified 208,694 lines using the DEV Form and identified and corrected 1,767 errors. The DEC's were re-trained when required.

8.3.1.4 ACCESS DATABASE AUDIT LOCKS AND DATA CLEANER

In addition to the database validation rules (e.g., the number of pregnant women in the structure cannot exceed the number of women in the structure), the database manager verified daily all data entered into the database. On a daily basis, the database manager also sent errors to the DEC's and database supervisors for immediate cleaning. Each week, the M&E manager double checked data before sharing with the team. This practice allowed AIRS Senegal to verify DEC's performance and make any corrections or conduct re-trainings if necessary.

8.4 SPRAY RESULTS

The 2017 AIRS Senegal performance indicators are presented in a Monitoring and Evaluation Plan (MEP) matrix in Annex C. Details of some key IRS indicators, such as number of structures sprayed and people protected are provided in the following sections of the report.

8.4.1 SPRAY DATA

SOPs found a total of 162,556 structures and sprayed a total of 156,362 structures. As such, the overall spray coverage was 96.2 percent, as shown in Table 15.

The total population protected by IRS in 2017 was 619,578, protecting 95.3 percent of the target population. Of those protected, 102,501 were children under the age of five and 11,723 were pregnant women.

TABLE 15. IRS COVERAGE: ELIGIBLE STRUCTURES SPRAYED AND POPULATION PROTECTED IN TARGETED AREAS

Districts	Total # of eligible structures found by SOPs	Total # of eligible structures sprayed	% of total structures sprayed (spray coverage)	Population protected	Pregnant women protected	Children under 5 protected	% of population protected	Eligible Rooms	
								Found	Sprayed
KOUMPENTOUM	43,077	42,072	97.7%	146,275	2,975	25,851	97.9%	53,762	52,515
KOUNGHEUL	49,447	46,724	94.5%	157,356	2,912	26,371	94.7%	67,351	63,061
MALEM HODAR	13,367	12,629	94.5%	43,916	873	8,000	95.7%	17,655	16,757
NIORO	56,665	54,937	97.0%	272,031	4,963	42,279	98.1%	131,847	129,567
TOTAL	162,556	156,362	96.2%	619,578	11,723	102,501	97.0%	270,615	261,900

8.5 INSECTICIDE TRANSPORT AND CONSUMPTION

On May 27, 2017, AIRS Senegal received 54,395 bottles of Actellic 300 CS. The pesticides were safely stored at the warehouse before the start of the campaign.

The project staff coded the insecticide boxes before dispatching them to district storerooms and operational site storerooms where bottles were subsequently serialized.

For the dispatching of the insecticide to districts, AIRS Senegal rented watertight trucks per endowment. All environment compliance measures were observed.

A total of 49,098 bottles of organophosphate (Actellic 300CS) were used to spray 156,362 structures (Table 16) with an average of 3.2 structures sprayed per bottle.

TABLE 16. INSECTICIDE USAGE AND SPRAY OPERATOR PERFORMANCE

District	# of bottles/sachets used	# of structures Sprayed	Average # of structures sprayed per bottle/sachets	# of rooms sprayed	Average # of rooms sprayed per /bottle
Koumpentoum	9,568	42,072	4.4	52,515	5.5
Koungheul	11,850	46,724	3.9	63,061	5.3
Malem Hoddar	3,442	12,629	3.7	16,757	4.9
Nioro	24,238	54,937	2.3	129,567	5.3
Total Actellic	49,098	156,362	3.2	261,900	5.3

Overall, PMI AIRS sprayed 156,362 structures and, on average, SOPs sprayed 13.8 structures per day. The project also reports spray coverage by room because historically, the Government of Senegal recorded and reported IRS results by rooms. The total number of rooms sprayed was 261,900 with SOPs averaging 23.2 rooms per day as shown in Table 17.

TABLE 17. RATE OF SPRAY PROGRESS

Districts	Structures sprayed	Rooms sprayed	# of days	# of spray operator days	Average # rooms/day/SOP	Average # structures/day/SOP
Koumpentoum	42,072	52,515	20	2,420	21.7	17.4
Koungheul	46,724	63,061	20	2,996	21.0	15.6
Malem Hoddar	12,629	16,757	10	807	20.8	15.6
Nioro	54,937	129,567	20	5,086	25.5	10.8
Total	156,362	261,900	20	11,309	23.2	13.8

9. ENVIRONMENTAL COMPLIANCE

9.1 PRE-SPRAY ENVIRONMENTAL ASSESSMENT

9.1.1 BACKGROUND

AIRS Senegal operates under a Supplemental Environmental Assessment amendment that was written and approved in 2015. The SEA covers the use of all World Health Organization approved insecticides for IRS including pyrethroids, carbamates, and organophosphates for the period of 2015-2020. It also includes chlorfenapyr, which is currently under WHOPES review for IRS activities and is registered for similar use by the U.S. Environmental Protection Agency. This SEA is applicable for IRS activities in Kaolack, Tambacounda, Kaffrine, and Kolda regions.

In Senegal, all districts have temporarily inaccessible areas, particularly during the rainy season, due to road conditions and long travel distances. To overcome these difficulties, AIRS Senegal identified the more challenging areas to spray first, before the heavy rains began. Areas of high population density and those most accessible were sprayed later. In 2017, all districts were sprayed as planned in June and July during the full rainy season. This period was chosen to cover the peak period of malaria transmission. As in previous years, AIRS Senegal has used camping sites and mobile soak pits in remote areas where operators must travel for more than an hour to reach a spray site.

9.1.2 PRESEASON ENVIRONMENTAL COMPLIANCE ASSESSMENT

In 2017, AIRS Senegal conducted an initial preseason environmental compliance assessment (PSECA) two months prior to the campaign in all four districts evaluating compliance with current environmental regulations and established standards. The initial PSECA generated a worklist of corrective actions that were completed to prepare each site for campaign operations.

9.1.2.1 IDENTIFICATION OF NEW SITES AND CLOSURE OF SOAK PITS IN PREVIOUS SITES NOT SELECTED

In 2017, AIRS Senegal conducted site location assessments and produced detailed analyses for the construction, rehabilitation, and upgrading of the operational sites based on a worklist generated from the smartphone checklist (PSECA). AIRS Senegal's ECO coordinated the decontamination process, in close collaboration with HPNs.

9.1.2.2 OPERATIONAL SITES REHABILITATION

Based on PMI Best Management Practices, the project prepared 24 soak pits at operational sites in the four target districts. AIRS Senegal built locked fencing around soak pit areas to restrict non-IRS personnel and animals. Fixed soak pit areas were distributed as follows per district: Kounghoul (8), Niore (8) and Koumpentoum (8). Note that a few sites shared larger soak pits areas (e.g., Kounghoul 1 and 2). All offices and storage facilities were provided by sector authorities.

TABLE 18. CONSTRUCTION AND REFURBISHMENT OF OPERATIONAL SITES

District	No. of Operational Sites	No. of Fixed and Mobile Soak Pits
Nioro	13	4 new soak pits constructed 4 soak pits refurbished 4 new mobile soak pits constructed (Keur Tapha and Keur Moussa)
Koumpentoum	8	3 new soak pits constructed 5 soak pits refurbished 3 new mobile soak pits constructed (Kouthiagady and Payar)
Koungheul	9	5 new soak pit constructed 3 soak pits refurbished 3 new mobile soak pits constructed (Gainth Pathe)
Malem Hoddar	1 (7 health posts)	8 new mobile soak pits constructed

9.1.2.3 SMARTPHONE ENVIRONMENTAL COMPLIANCE DATA COLLECTION SYSTEM

AIRS Senegal undertook two pre-season environmental inspection trips in the four health districts (initial and final PSECA). The team conducted the initial assessment two months before spraying started and the final assessment after site rehabilitation to obtain clearance (greenlight) to receive insecticide.

AIRS Senegal utilized a smartphone data collection system for the assessments, as in the last two years, to record site characteristics, capture the GPS location, and take pictures of the site (storeroom exterior and interior, storage of pesticide, if present, and condition of soak pit). The checklist and questions loaded onto the smartphone for this assessment were adapted from the checklists recommended in the PMI Best Management Practices Manual.

As a result of the generated worklist, 30 sites, Malem Hoddar (seven health posts), and five central storage facilities in the four target districts met all requirements.

9.1.2.4 MOBILE SOAK PITS

In Senegal, all districts have temporarily inaccessible areas, particularly during the rainy season. In areas where operators must travel for more than an hour to reach a spray site, a mobile soak pit is a useful option for minimizing risk related to the transportation of insecticide, vehicle's accidents, and for potential reduction in cost of operations as well (i.e., fuel).

A training session on MSPs was conducted during both trainer of trainers (SNH) and orientation workshop (SNH & DREEC) as well as during orientation sessions of team leaders, site managers, and storekeepers. Team leaders implemented practical training on MSP use for SOPs prior to the start of spray operations.

Eighteen mobile soak pits were used in health districts of Koumpentoum (one MSP in Kouthiagady and two in Payar), Malem Hoddar (eight in seven health posts), Koungheul (three in Gainth Pathe), and Nioro (two in Keur Moussa and two in Keur Tapha).

Team leaders, pump maintenance technicians, and SOPs were in charge of MSP installation, use, and area restoration in all sites. The maintenance technicians were also in charge of collecting all amounts of returned insecticide and completing related daily inventory forms. SOPs were in charge of rinsing spray tanks and stocking the remaining insecticide and rinsing water for the next spray day. SOPs cleaned boots, helmets, face shields, and gloves in containers with water and soap.

Advantages of mobile soak pits included: progressive rinsing was more easily implemented, the average number of structures sprayed per operator increased, and the total number of days needed to complete the spray campaign decreased. Disadvantages of mobile soak pits included: the granular activated carbon had to be imported since it was very expensive locally.

9.1.2.5 THE USE OF TYVEK COVERALLS AND WET WIPES FOR IRS

Tyvek suits were used in Malem Hoddar district during the spray campaign. The quantification of Tyvek suits was based on usage rate of three coveralls per operator for ten days. An important reduction of cost (no water fetching for overalls washing, no washers, and no permanent soak pit to construct) was observed with the use of these Tyvek suits

In 2017, the use of the Tyvek suits was extended to seven health posts of Malem. The number of workers provided with Tyvek suits included 127 seasonal workers (88 SOP, 19 team leaders, 8 local supervisors and seven pumps technicians and five storekeepers). In addition, each operator had a supply of wet-wipes to wipe down their PPE for a mid-day break and at the end of the day thereby allowing them to safely re-hydrate.

From 480 Tyvek suits received, 397 were used by SOPs, team leaders and local supervisors during the 10 days of the IRS campaign.. On average, each operator used up to two Tyvek suits during the 10 days. No intoxication case was observed using wet wipes. Used wipes and Tyveks are collected in plastic bags and stored at a contaminated waste section of the storeroom at the site level, then shipped to the district warehouse.

9.2 INSECTICIDE

9.2.1 INSECTICIDE QUANTIFICATION

The Steering Committee and PMI decided to continue 2017 spray operations in the same four targets districts as in previous years. The insecticide order for 2017 was based on the need assessment to cover the total target.

TABLE 19. ASSESSMENT OF INSECTICIDE NEEDS

District	Koumpentoum	Nioro	Malem Hoddar	Koungheul	Total
Eligible structures*	46,327	63,227	14,358	50,137	174,049
No. of structures per bottle	4.0	2.5	3.2	3.8	
Insecticide bottles needed	11,483	25,260	4,444	13,208	54,395
Insecticide bottles procured					54,395

* Note: The quantification was based on the number of structure including additional health post added in 2017

9.2.2 INSECTICIDE CLASSES

Organophosphates were used in all districts in 2017. Insecticide selection decisions were made by PMI and NMCP along with Senegal's IRS Steering Committee based on entomological and parasitological monitoring data from 2016.

On March 22, 2017, AIRS Senegal received the required official authorization from the Ministry of Environment to import and use Actellic 300 CS for the 2017 IRS campaign. In addition, DREEC requested that a sample be tested by a local institution CERES-LOCUSTOX. One bottle was randomly selected by the DREEC of Kaolack and sent to the laboratory for testing. The Actellic CS300 toxicology report was delivered to AIRS Senegal. The report found 288 g/l of pirimiphos-methyl corresponding to 28.8 percent W/W of pirimiphos-methyl with -4 percent of variation (Normal in the MSDS is 28.3) meaning that the product was good for use. In total, 54,395 pirimiphos-methyl Actellic 300 CS bottles were distributed to the four health districts, 49,098 bottles were used during the campaign, and 5,297 bottles remained after the campaign; out of the 5,297 remaining bottles, 12 bottles are expiring in February 2019, 315 bottles in March 2019, and 4,970 bottles in April 2019.

9.2.3 INSECTICIDE TRANSPORT

9.3 AVAILABILITY OF ANTIDOTES AND MEDICAL TESTS

IRS poison management is the responsibility of the Government of Senegal through the NMCP in collaboration with health facilities in the concerned health districts. The pre-IRS inspection noted the availability of antidotes in all health facilities in the four districts.

9.4 MID-SPRAY ENVIRONMENTAL COMPLIANCE

9.4.1.1 SAFETY AND ENVIRONMENTAL COMPLIANCE

In collaboration with DREEC (Kaffrine, Kaolack, and Tambacounda), AIRS Senegal conducted the mid-spray EC inspections during the spray operations in the four IRS districts. To conduct these inspections, AIRS Senegal used the EC smartphones. Overall, Kaolack, and Tambacounda DREEC conducted six inspection visits and Kaffrine DREEC conducted two inspections.

Major findings during spray inspections were addressed immediately by the DCs with site managers, team leaders, and SOPs.

In July 2017, 285 females underwent a second pregnancy test during the spray round. Four tests proved positive and the project reassigned those pregnant women as site cleaners.

9.5 POST-SEASON ENVIRONMENTAL ASSESSMENT

The AIRS Senegal team in collaboration with DREEC staff conducted post-spray inspections in all four target districts from July 31 to August 5, 2017.

Using smartphones, data were recorded for each of the 30 IRS sites, districts storerooms and warehouse; all forms were uploaded to the cloud database, which is accessible by the ECO from the home office. To prepare for the potential PMI AIRS transition, AIRS Senegal has drafted plans to remove all soak pits after October 22, 2017. Prior to the October 22 transition date, all 24 soak pits will remain closed. The destruction consists of:

- Demolition of soak pit and removal of its content;
- Backfilling and leveling soak pit hole with sand;

- Reusing rubble stones for other purposes like building small dams new soak pits construction by owner;
- Incineration of used activated charcoal.

9.6 IRS WASTE DISPOSAL

At the operational site level, solid waste was inventoried separately into boxes and labeled. At the end of the campaign, all waste items were shipped to the district warehouse. At the district level, solid waste items were separated: 1,592 pairs of gloves and plastic sheets with holes were decontaminated by washing, sun drying, and packaged for disposal; 17,357 used masks; 397 contaminated Tyvek suits; 5200 used wipes; and 49,098 empty Actellic bottles were packaged and transferred to the central warehouse in Kaolack as illustrated in Table 20.

After the inventory, all obsolete electronic waste was delivered to a government-owned agency (State Informatics Agency) called e-waste that specializes in repair and recycling. A certificate will be issued to the project for all dismantled items.

The 2017 IRS campaign generated contaminated solid waste composed of empty plastic bottles, gloves, Tyveks, wipes, and masks. The masks, wipes, and Tyveks will be incinerated by SOCO CIM Cement Plant. This incineration process follows the authorization issued by the Senegalese Ministry of the Environment and Sustainable Development and will be supervised by DEEC.

As there is no indication that PMI AIRS will spray in 2018, all fixed soak pits will be completely closed by early November, because permanent destruction should take place at least three months after the spray season, when the pesticide has broken down through environmental action. As for mobile soak pits, used activated charcoal will be rinsed and sent to SOCO CIM for incineration.

This year, the project plans to recycle Actellic bottles with a recycling factory (TRANSTECH) able to manage empty bottles in accordance with the country's regulations.

TABLE 20. INVENTORY OF CONTAMINATED SOLID WASTE

District	Contaminated items				
	Empty insecticide bottles	Masks	Gloves	Tyvek	Wipes
Nioro	24 238	7 800	592		
Koumpentoum	9 568	3 808	372		
Koungheul	11 850	4669	527		
Malem Hoddar	3 442	1080	101	397	5 200
Total	Bottles : 49098	17 357	1 592	397	5 200

Regarding the disposal of MSPs, all MSPs were stored at AIRS Senegal's district storage facility. The activated carbon will be incinerated by SOCO CIM Industries along with other wastes after the campaign.

10. IRS COUNTRY CAPACITY ASSESSMENT

In 2016, AIRS Senegal conducted training, capacity-building, and advocacy at the regional and district levels as a means of achieving IRS sustainability. The training is described in Section 3.3.1.

Building on achievements in 2015 and 2016, in 2017 AIRS Senegal continued to coach NMCP to increase their responsibilities in IRS implementation including national level IRS planning micro-planning, organization at the district level and after campaign evaluation workshops. NMCP managed the spray campaign's IEC activities with direct funding from PMI, but beyond these activities, NMCP (including regional health teams) was minimally available for IRS implementation and operations management at the district level.

Besides working with NMCP, AIRS Senegal coached regional environmental agents by co-conducting field inspections. Updated checklists for the supervision were shared with SNH and NMCP for validation and AIRS Senegal continued to coach SNH supervisors on the use of smartphone. AIRS Senegal worked closely with SNH agents and DMO on data analysis in the field.

In 2016, DMO and DHMT conducted the district micro-planning workshop with HPN and local authorities usually chaired by the prefect, the highest administrative authority in the district. During micro-planning, AIRS Senegal coached health post chief nurses to develop the spray calendar of health post catchment areas. AIRS Senegal also coached district agents in supervision using smartphone technology to build capacity in IRS implementing stages at the district level.

In 2017, the project increased the capacity of health post level teams to implement community-based IRS, and NMCP would like to build on this achievement to expand IRS in Senegal.

II. GENDER

In 2017, AIRS Senegal maintained and continued all gender activities conducted in 2016; these activities included:

- Establishing a sexual harassment policy for all employees, including seasonal workers to promote a respectful working environment;
- Including “Badjénou gokh” (female volunteers in the community) in all the district meetings related to IRS activities; they worked with local steering committees for SOP recruitment and also helped transmit gender messages to improve women participation in IRS.
- Assigning a gender focal point in each district to better ensure and promote women’s roles in IRS;
- Revising training and mobilization documents to include more pictures and information about women;
- Ensure women have accommodations, both at the sites and at camp sites where they feel safe and comfortable.

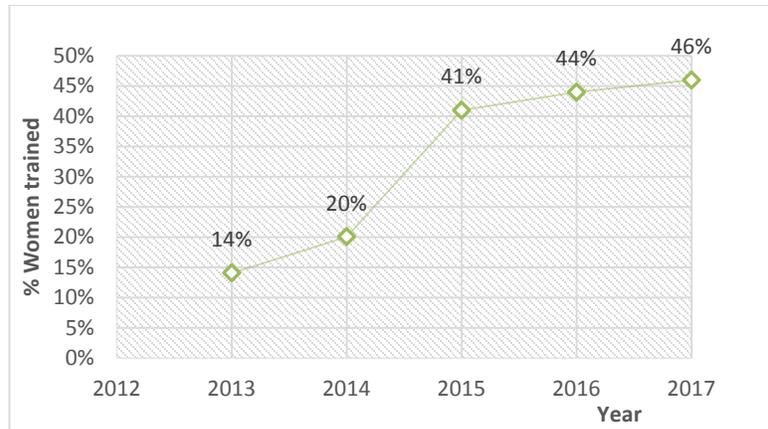
Results:

During IRS planning workshops and other preparatory activities, the project conducted local advocacy activities engaging local authorities to encourage women to apply for all open positions. In 2017, PMI AIRS Senegal was able to increase women’s representation in the spray campaign. In total, AIRS Senegal trained 2,642 persons including 1,204 women representing 46 percent versus 44 percent in 2016. Among 249 persons hired as supervisors, 70 were women (28%) versus 21 percent in 2016.

This year, among the 2,642 trained by PMI AIRS Senegal, 1,144 participants were hired including 387 women, representing 34 percent of staff versus 31 percent in 2016.

Figure 4 shows gender results and the evolution of women’s participation in IRS from 2013 to 2017. From 2013 to 2014, the rate of women participating in the IRS campaign increased from 14 percent to 20 percent, which did not include IEC mobilizers. From 2015 to 2017, women’s participation increased from 41 percent to 46 percent considering IEC mobilizers.

FIGURE 4. EVOLUTION OF WOMEN TRAINED INCLUDING MOBILIZERS FROM 2013 TO 2017 IN IRS OPERATIONS



In addition to these activities, AIRS Senegal initiated a survey for female seasonal workers. The main objective of this study was to understand the social-demographic characteristics of women involved in IRS and to measure qualitatively their perception of IRS work.

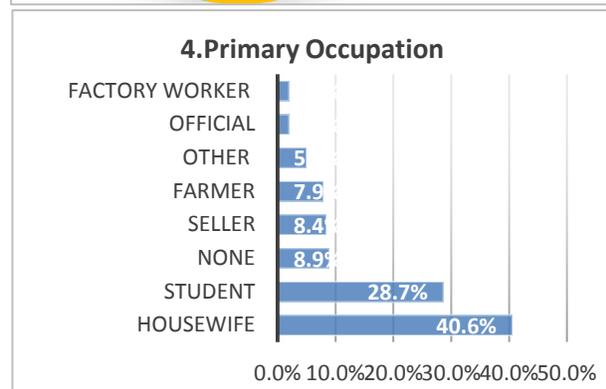
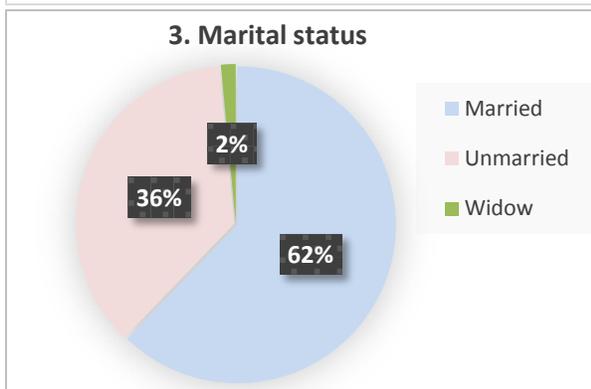
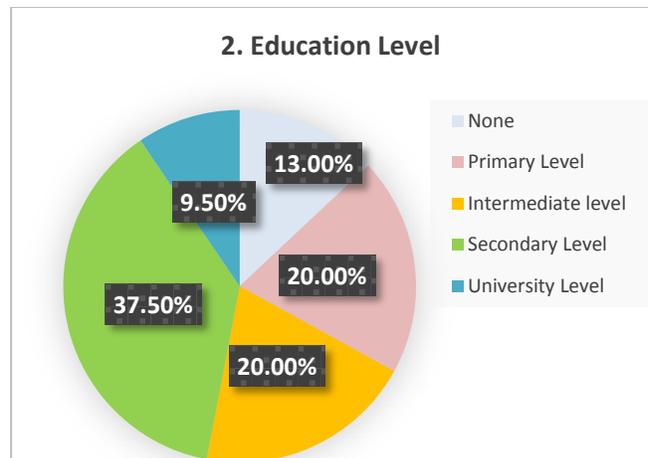
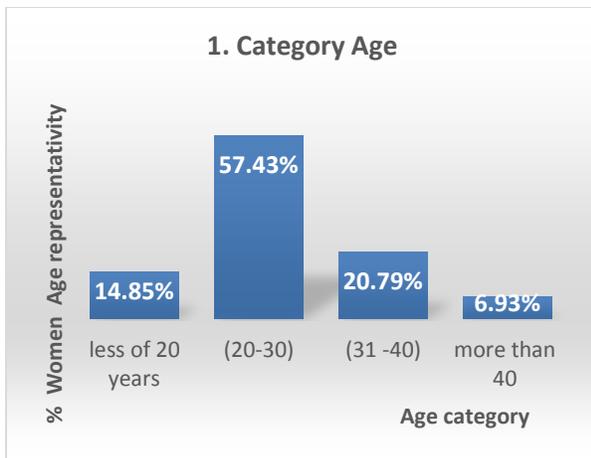
The project conducted the survey in the four IRS districts with a simple random sampling technique and targeted women recruited in IRS operations. Among the 371 women recruited, 202 (54%) were interviewed.

The social-demographic indicators investigated in this case of study included age, education level, occupation, and marital status.

According to the results, the women working in the IRS operations are relatively young and are between 20 and 30 years of age representing 57.43 percent of the total women interviewed (Figure 5 n°1).

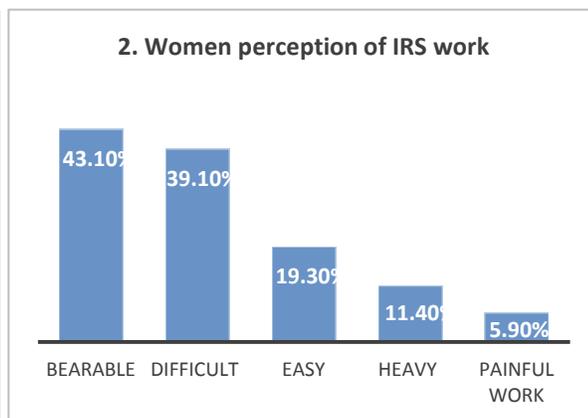
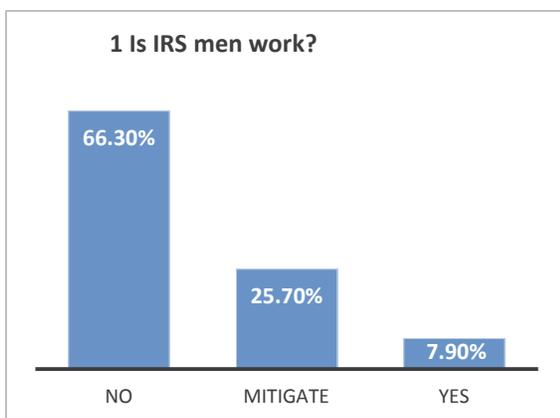
The results of the survey illustrate that 37.5 percent have attained a secondary education level, and women who have attained university and primary levels represent equal percentages (20%) (Figure 5 n°2). Occupations of the targeted women include housewives (40.6%) and students (22.30%) (Figure 5 n°3). Married women represent 62 percent of women working in IRS operations (Figure 5 n°4).

FIGURE 5. SOCIAL-DEMOGRAPHIC CHARACTERISTICS INDICATORS OF WOMEN WORKING IN IRS OPERATIONS



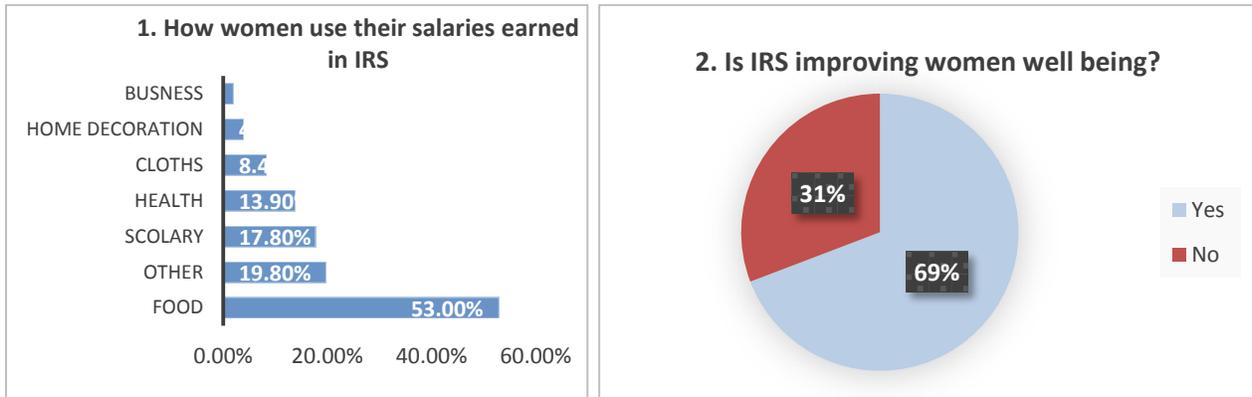
The AIRS Senegal team attempted to qualitatively measure women’s perception of IRS work. The survey results illustrate that 66.30 percent of the total number of women sampled don’t believe that IRS is for only for men (figure 6 n° 1) and 43.10 percent think that IRS workload is bearable for women (figure 6 n° 2).

FIGURE 6. WOMEN PERCEPTION OF THE IRS WORK



Results show that 53 percent of women sampled used their salaries to procure foods (Figure 7n°1) and 69 percent reported that IRS improved their well-being (Figure 7n°2).

FIGURE 7. IMPROVEMENT OF WOMEN'S CONDITIONS



In summary, this study shows that IRS employed young women who are housewives (no official job), and have a basic education level. According to the National School of Public health and Social Development/ Ecole Nationale de Développement Sanitaire et Social (ENDSS 2016), studies on employment in Senegal, the majority of women in the working-age population represent 52.0 percent, but are poorly represented in the labor force, representing only 34.3 percent of the population economically active. This situation is related to the gender barriers (women discrimination, early marriage in rural area). A separate document will presented with all data.

12. LESSONS LEARNED

- Periodic and regular meetings with AIRS Senegal, PMI, NMCP, SNH, and UCAD contributed to better IRS implementation in terms of management, leadership, and coordination of workshops and training activities;
- Letters of commitment signed by SOPs helped avoid SOP drop-out after IRS training;
- Settlement camp sites and MSP pilot sites contributed to reducing travel time for spray teams, which led to increased performance;
- The inclusion of local authorities in IRS operations planning, supervision, and end-of-spray evaluation contributed to the success of mobilization and IRS acceptance by the population.

13. RECOMMENDATIONS

- Incorporate community contributions into the financial planning of district IRS activities.
- Discuss with IRS Steering Committee how to extend IRS community involvement to:
 - Promote a dynamic of sustainability and ownership of the strategy;
 - Share approaches and results with the regions, districts, and stakeholders;
 - Hold workshops/meetings to improve cost efficiency strategies;
 - Discuss alternative approaches to refusal cases in urban areas. Anticipate communication plans in areas where refusal cases are high;
 - Recruit helpers for households preparation (e.g. young volunteers association);
 - Evaluate for possible scaling up of community-based IRS new model;
 - Consider the findings from the satisfaction surveys about the socio-anthropological and socio-economic aspects of an IRS campaign.

ANNEX A. AIRS SENEGAL PROCUREMENT AND POST-SPRAY STOCK BALANCE

Procurement											
Item	Qty	Dispatching				Balance in Warehouses					Total Balance
		Koung heul	Koump entou m	Maïem Hodda r	Nioro	Koung heul	Koump entou m	Maïem Hodda r	Nioro	Kaolac k	
Towels	1242	346	278	83	513	0	0	3	0	22	25
Socks	1242	254	333	142	513	0	16		14	0	30
Soap 300g	486	140	100	0	152	0	0		0	94	94
Soap 125g	10044	2016	1524	1080	3078	324	0	560	612	2346	3842
Bleach	66	12	16	12	26	0	0		0	0	0
Liquid Detergent	163	37	36	7	36	0	0	1	0	47	48
Powder Soap	8185	2320	1760	160	2760	80	160	48	107	1185	1580
Grease Pot 1kg	0	0	0	0	0	0	0	0	0	0	0
Adhesive Tape LM	100	20	15	12	35	0	0	0	0	6	6
Toothbrush	51	9	16		26	0	0	0	0	0	0
Markers	189	43	39	35	61	0	0	0	0	13	0
Inner Folder	7530	2000	2000	500	3030	0	0		481	0	481
Flap Folder	1960	500	500	200	760	0	0	0	0	0	0
Black Pencil	2310	566	408	284	882	0	0	12	27	170	209
Eraser	2310	566	408	284	870	266	79	49	133	182	709
Note Pad	1157	301	236	150	461	31	0	0	27	9	67
Calculator	234	58	52	46	61	58	50	44	57	16	225
Log Book	41	11	10	7	13	0	0	0	0	0	0
Ruler 30 cm	87	14	13	5	20	14	13	5	17	35	84
Chalk Box	325	45	48	35	65	46	0	21	20	134	221
Pencil Sharpener	1267	266	203	143	435	9	0	16	54	220	299
Shower Cap	130	34	32	0	58	2	3	4	0	6	15
International Procurement											
Face Shield	788	258	202		328	23	43		18	0	84
Nose Mask w/Filter	22560	6240	240	1800	10080	1421	240	720	2387	4200	8960
Organophosphate	54395	13208	11483	4444	25260	1700	1915	0	1682	0	5297
Head lamps	858	195	157	113	332	194	152	112	332	61	851

The remaining balance of unused bottles of insecticide after the 2017 spray campaign is 5,297 bottles, out of which 12 bottles are expiring in February 2019, 315 bottles in March 2019, and 4,970 bottles in April 2019.

ANNEX B. PEOPLE TRAINED FOR 2017 CAMPAIGN

Categories of people trained	Training for IRS Implementation																				Other trainings		TOTAL		TOTAL GENERAL
	Mobilization		Trainers' Training		Spray Operators' Training		Data Entry		Logistics & Finance Training		Technical Maintenance		IRS related poisoning management		PPE Cleaning		Fire Safety		Transport Safety		M	F			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F					
MDO														0	0							0	0	0	
New SNH Supervisors			15	0																		15	0	15	
DEEC/DREEC			3	0																		3	0	3	
Nurses/Midwives														17	8							17	8	25	
SNH Supervisor of SOPs			71	0																		71	0	71	
Mobilizers	415	768																				415	768	1183	
Mobilization supervisors	77	41																				77	41	118	
SOP					438	207																438	207	645	

Substitutes Operators					83	29															83	29	112	
Operational Site Manager					28	2																28	2	30
Team Leader					78	53																78	53	131
Data Entry Clerks							13	14														13	14	27
Storekeepers					30	10																30	10	40
Finances/Logistics Assistants									5	2												5	2	7
Maintenance Technicians											36	1										36	1	37
Washers															0	62						0	62	62
Drivers																		66		0	66	0		66
Water suppliers					0	7																0	7	7
Guards																	63	0				63	0	63
TOTAL M/F	492	809	89	0	657	308	13	14	5	2	36	1	17	8	0	62	63	0	66	0	1438	1204	2,642	
TOTAL/ Training	1301		89		965		27		7		37		25		62		63		66		2,642			

ANNEX C: INDICATOR MATRIX WITH RESULTS

Last Updated: 16 aout 2017

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component I: Establish cost-effective supply chain mechanisms and execute logistical plans								
I.1 Procurement								
I.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I;100%	I;100%	I;100%	I;100%	I;100%
I.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I;100%	I;100%	I;100%	I;100%	I;100%
I.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I;100%	I;100%	I;100%	I;100%	I;100%

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
1.1.4 Number and percentage of local procurements for PPE delivered 14 days before the start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1;100%	1;100%	1;100%	1;100%	1;100%
1.1.5 Successfully completed spray operations without an insecticide stock-out	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
1.2 In-Country Exemption and Custom Clearance Process								
1.2.1 Complete exemption and clearance process within the minimum 2 weeks	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Not completed ³	Completed	Completed	Completed	Completed
1.3 In-Country Logistics, Warehousing, and Training								
1.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<i>Data source:</i> Training records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign By Gender	35 ⁴ ; 100% M: 28 F: 7	33 ⁵ M: 22 F:11	34 ⁶ ; 100% M: 23 F:11	32 ⁷ ; 100% M: 22 F: 12	42 ⁸ ; 100%	44 ⁹ ; 100% M:33 F:11

³ Delay receiving DEEC authorization and longer customs procedures than usual

⁴ 3 logistics assistants, 28 warehouse site managers, 3 district warehouses managers, 1 central warehouse manager

⁵ 2 logistics assistants, 27 warehouse site managers, 3 district warehouses managers, 1 central warehouse manager

⁶ 3 logistics assistants, 27 warehouse site managers, 3 district warehouses managers, 1 central warehouse manager

⁷ 3 logistics assistants, 24 warehouse site managers, 3 district warehouses managers, 1 central warehouse manager, 1 central warehouse assistant (The number of sites decreases between the time of target setting and implementation in 2016.

⁸ 4 logistics assistants, 32 warehouse site managers, 4 district warehouses managers, 2 central warehouse manager

⁹ 4 logistics assistants, 34 warehouse site managers, 4 district warehouses managers, 2 central warehouse manager

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
1.3.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	25 ¹⁰ ; 100%	31 ¹¹	31 ¹² ; 100%	28 ¹³ ; 90.3%	37 ¹⁴ ; 100%	39 ¹⁵ ; 100%
1.3.3 Submit up-to-date inventory records 30 days after the end of each spray campaign	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
2.1.1 Annual PMI AIRS country work plan developed and submitted on time	<i>Data source:</i> Project records <i>Reporting frequency:</i> Annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed

¹⁰ 21 warehouses sites, 3 district warehouses , 1 central warehouse

¹¹ 27 warehouses sites, 3 district warehouses , 1 central warehouse

¹² 27 warehouses sites, 3 district warehouses , 1 central warehouse

¹³ 24 warehouses sites, 3 district warehouses , 1 central warehouse

¹⁴ 33 warehouses sites, 3 district warehouses , 1 central warehouse

¹⁵ 34 warehouses sites, 4 district warehouses , 1 central warehouse

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.1.2 Percentage reduction in project operational expenses per structure from the previous year, excluding insecticide costs	Data source: Project financial records Reporting frequency: Annually	By Spray Campaign	5%	10% ¹⁶	5%	7% ¹⁷	5%	9%
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations								
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the PMI Contract Officer's Representative team	Data source: Project records – submitted SEAs/ letter reports Reporting frequency: Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation	Data source: Project records – Training reports Reporting frequency: Each spray season	By Spray Campaign By Gender	1,000 ¹⁸ M: 730 F: 270	1000 ¹⁹ M:730 F: 270	925 ²⁰ M:675 F: 250	924 ²¹ M: 651 F: 273	1228 ²² M: 865 F: 363	1186 ²³ M: 822 F: 364

¹⁶ cost comparison 2014 vs. 2015 : reducing costs per spraying day through households sprayed; structures sprayed; rooms sprayed, person protected and the number of vehicles used

¹⁷ Cost comparison 2015vs. 2016: reducing costs per spraying day through households sprayed; structures sprayed; rooms sprayed, person protected and the number of vehicles used. The referred costs are based on spray planning and spray operations costs for the same period from January to August (2015 Vs 2016).

¹⁸539 spray operators, 91 substitute operators; 27 operational site managers; 109 team leaders; 31 storekeepers; 30 pump technicians; 58 washers; 73 drivers; 42 guards.

¹⁹ 539 spray operators 91 substitute operators; 27 operational site managers; 109 team leaders; 31 storekeepers; 30 pump technicians; 58 washers; 73 drivers; 42 guards

²⁰ 487 spray operators; 98 substitute operators; 27 operational site managers; 98 team leaders; 31 storekeepers; 28 pump technicians; 52 washers; 58 drivers; 46 guards

²¹ 498 spray operators; 93 substitute operators; 24 operational site managers; 100 team leaders; 29 storekeepers; 28 pump technicians; 49 washers; 55 drivers; 48 guards

²² 656 spray operators; 132 substitute operators; 33 operational site managers; 132 team leaders; 38 storekeepers; 34 pump technicians; 65 washers; 74 drivers; 64 guards

²³ 645 spray operators, 112 substitute operators; 30 operational site managers; 131 team leaders; 40 storekeepers; 37 pump technicians; 62 washers; 66 drivers; 63 guards

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.2.3 Number of health workers receiving insecticide poisoning case management training	Data source: Project records – Training reports	By Spray Campaign	46 ²⁴	46 ²⁵	51 ²⁶	19 ²⁷	70 ²⁸	25 ²⁹
	Reporting frequency: Each spray season	By Gender	M: 27 F: 19	M: 27 F: 19	M: 30 F: 21	M: 6 F: 13	M: 22 F: 48	M: 17 F: 8
2.2.4 Number of adverse reactions to pesticide exposure documented	Data source: Incident report forms	By Spray Campaign	0	0	0	0	0	1
	Reporting frequency: Each spray campaign	By Residential/occupational exposure	0	0	0			
2.2.5 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	Data source: Project records – Reports submitted by district environmental officers	By Spray Campaign	55 ³⁰ ; 100%	55 ³¹ ; 100%	58 ³² ; 100%	48 ³³ ; 83%	77 ³⁴ ; 100%	77 ³⁵ ; 100%
	Reporting frequency:	By Soak Pit	23 soak pits	23 soak pits	27 soak pits	20 soak pits	33 soak pits, 11 MSP	24 soak pits, 18 MSP

²⁴ 46 ICP

²⁵ 46 ICP

²⁶ 51 ICP

²⁷ 19 ICP

²⁸ 70 ICP

²⁹ 25 ICP

³⁰ 23 soak pits, 32 warehouse

³¹ 23 soak pits, 32 warehouse

³² 27 soak pits, 31 warehouse

³³ 20 soak pits, 28 warehouses (There are less than targeted due to the combination of certain soak pits upon review before the beginning of the campaign.)

³⁴ 33 soak pits, 11 MSP, 33 warehouse

³⁵ After the adoption of Community- based IRS, soak pits in Malem Hoddar were changed to MSPs and some large wash areas were shared by 2 sites with separate commodities for each site (barrels, basins)

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	<i>Each spray season</i>	By Storehouse	32 warehouses	32 warehouses	31 warehouses	28 warehouses	33 warehouses	35 warehouses
2.3 Conduct Communications Activities and Community Mobilization³⁶								
2.3.1 Number of radio spots and talk shows aired	Data source: Project records Reporting frequency: Per spray campaign	By Spray Campaign	NA	NA	TBD	NA	NA	NA
2.3.2 Number of IRS print materials disseminated	Data source: Project records Reporting frequency: Semi-annually	By Spray Campaign By Type of printed material and message(s)	NA	NA	TBD	NA	NA	NA
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	Data source: Mobilization Data Collection Forms Reporting frequency: Daily per mobilization conducted	By Spray Campaign By Gender	NA	NA	TBD	NA	NA	174,726 M:70,353 F: 104,373
2.4 Spray Targeted Structures According to Technical Specifications								
2.4.1 Number of structures targeted for spraying	Data source: Previous spray campaign data, enumeration data (targets); Daily SOP forms (results) Reporting frequency: Daily per spray campaign	By Spray Campaign	136,473	133,252	133,252	128,185	174,049	162,556

³⁶ This section is managed by NMCP

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.4.2 Number of structures sprayed with IRS	Data source: Daily SOP forms Reporting frequency: Daily per spray campaign	By Spray Campaign	116,002	130,170	113,264	124,757	147,942	156,362
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	85%	97.7%	85%	97.3%	85%	96.2%
2.4.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	371,296	514,833	514,833	496,728	650,093	619,578
		By Gender	M: 183,517 F: 187,779	M: 254,643 F: 260,190	M: 254,643 F: 260,190	M: 245,184 F: 251,544		M: 306,455 F: 313,123
		By pregnant women	Pregnant women: 8,778	Pregnant women: 9,936	Pregnant women: 9,936	Pregnant women: 9,951		Pregnant women: 11,723
		By children <5 years old	children<5: 71,171	children<5: 89,574	children<5: 89,574	children<5: 82,768		children<5: 102,501
Component 3: Ongoing Monitoring and Evaluation and Quality Control Measures								
3.1 Submit PMI-approved M&E plan to PMI/SENEGAL for approval	Data source: Project records Reporting frequency: Semi-annual	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
3.2 Conduct a post-spray data quality audit within 90 days of completion of spray operations	Data source: Spray operations reports	By Spray Campaign	NA	NA	Completed	Completed	N/A	N/A

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	Reporting frequency: Per spray campaign							
Component 4: Contribute to Global and Country-Level IRS Policy Setting and Develop and Disseminate Experiences and Best Practices								
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By Guideline/checklist/tool	23 ³⁷ 15 guidelines 8 checklists	25 ³⁸ 18 guidelines 7 checklists	25 ³⁹ 18 guidelines 7 checklists	26 ⁴⁰ 18 guidelines; 8 checklists	26 ⁴¹ 18 guidelines; 8 checklists	26 ⁴² 18 guidelines; 8 checklists
4.2 Number of articles/best practices documents published	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	2	2	2	2	2	2

³⁷ 15 guidelines, 8 check-lists

³⁸ 18 guidelines; 7 checklists

³⁹ 18 guidelines; 7 checklists

⁴⁰ 18 guidelines; 8 checklists

⁴¹ 18 guidelines; 8 checklists

⁴² 18 guidelines; 8 checklists

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
4.3 Number of best practice presentations given at national/ regional/international workshops and conferences	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	3 ⁴³	2 ⁴⁴	5 ⁴⁵	6 ⁴⁶	TBD	1 ⁴⁷
4.4 Number of enterprises engaged through public-private partnerships	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign	4 ⁴⁸	4 ⁴⁹	5 ⁵⁰	4 ⁵¹	4 ⁵²	5 ⁵³

⁴³ | Hot spots strategy, | Evaluation of hot spots strategy, | Lessons learned from IRS 2014

⁴⁴ | Hot spots strategy, | Lessons learned from IRS 2014

⁴⁵ | Hot spots strategy, | Lessons learned from IRS 2014, | mHealth, | Zip ties, | MSP

⁴⁶ 3 presentations at Cape Town, | at EC training in Dakar, | at Tanzania during F&A training, | during COP workshop

⁴⁷ | | IRS Alternative New Model in Touba Gueyenne

⁴⁸ Anti-Poison Center, SOCOCIM, SODIAPLAST, E-déchets,

⁴⁹ Anti-Poison Center, SOCOCIM, SODIAPLAST, E-déchets,

⁵⁰ Anti-Poison Center, SOCOCIM, SODIAPLAST, E-déchets, ECOMAR

⁵¹ Anti-Poison Center, SOCOCIM, ECOMAR, CERES LOCUSTOX

⁵² Anti-Poison Center, SOCOCIM, ECOMAR, CERES LOCUSTOX

⁵³ Anti-Poison Center, SOCOCIM, CERES LOCUSTOX, TRANSTECH, SENECARTOURS

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component 5: Contribute to the collection and analysis of Routine entomological and epidemiological data⁵⁴								
5.1 Support entomological monitoring activities and insecticide resistance strategies								
5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location)	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	NA	NA	46	28	47	46 ⁵⁵
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	NA	NA	16 ⁵⁶ ; 100%	16; 100%	16; 100%	16; 100%
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	NA	NA	46 ⁵⁷ ; 100%	Not Available	47; 100%	46; 98%

⁵⁴ This section is managed by UCAD (University Cheikh Anta Diop)

⁵⁵ Currently, 16 in IRS districts, 7 in control districts, 2 in Kedougou and 2 in Velingara, 2 in Niayes, 5 in Richard Toll and 12 in Ferlo. Activities will continue until 1 December 2018

⁵⁶ IRS districts sentinel sites

⁵⁷ All country sentinel sites for IRS entomology monitoring and entomological surveillance

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	NA	NA	15; 100%	Not Available ⁵⁸	26; 100%	Not Available
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	NA	NA	20	20	40 ⁵⁹	50 ⁶⁰
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	NA	NA	80 ⁶¹	Not Available	40	Not Available
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign By Type of Insecticide	NA	NA	75 ⁶²	Not Available	TBD	Not Available

⁵⁸ Activities are planned on September and October 2016.

⁵⁹ Ten rooms per district and four districts

⁶⁰ Ten rooms per district four Niore, Malem Hodar and Koungheul and 20 rooms for Koumpentoum

⁶¹ Bioassays are planned to be done for at least 6 months.

⁶² Five insecticides for 15 sentinel sites

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.2 Support Epidemiological Malaria Data Collection and Analysis								
5.2.1 Collect routine epidemiological data	Data source: <i>Project Reports</i> Reporting Frequency: Annually	By Spray Campaign	NA	NA	Completed	N/A	NA	NA
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI AIRS Project	Data source: Epidemiological reports Reporting frequency: Annually	By Spray Campaign	24 ⁶³	24 ⁶⁴	24 ⁶⁵	24 ⁶⁶	NA	NA

⁶³ 12 IRS health posts, 12 Non-IRS health posts

⁶⁴ 12 IRS health posts, 12 Non-IRS health posts

⁶⁵ 12 IRS health posts, 12 Non-IRS health posts

⁶⁶ 12 IRS health posts, 12 Non-IRS health posts

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component 6 (Cross-cutting): Capacity Building, Knowledge Transfer, Gender Inclusion								
6.1 Increasing the Role of Women and Addressing Gender Barriers								
6.1.1 Number of people trained to deliver IRS in target districts *	Data source: Project records – Training reports	By Spray Campaign	896 ⁶⁷	893 ⁶⁸	818 ⁶⁹	793 ⁷⁰	1093 ⁷¹	1,017 ⁷²
	Reporting frequency: Semi-annually	By Gender	M: 767 F: 131	M: 662 F: 231	M: 605 F: 213	M:565 F:228 29%	M: 765 F: 328	M: 718 F: 299
		Percentage of Women Trained	14,6%	26%	26%		30%	29.4%
6.1.2 Total number of people trained to support IRS in target districts	Data source: Project records – Training reports	By Spray Campaign	1,394	1287	1,508	1,034	1,988	2,642
	Reporting frequency: Semi-annually	By Gender	M: 1,296 F: 98	M: 890 F: 397	M: 1,041 F: 467	M: 731 F:303	M: 1412 F: 576	M: 1,438 F: 1,204
		Percentage of women trained	7.0%	31%	31%	29%	29%	46%

⁶⁷ 24 Regional health agents,, 42 SNH, 539 spray operators, 109 substitutes, 109 team leaders, 27 site managers, 46 nurses

⁶⁸21 Regional health agents , ISLAP, 4 DREEC/DEEC,55 SNH, 539 spray operator, 91 substitutes, 109 team leader, 27 site manager, 46 nurses,

⁶⁹ 3 DREEC/DEEC,54 SNH, 487 spray operator,98 substitutes, 98 team leader, 27 site manager, 51 nurses

⁷⁰ 3MDO, 3 DREEC/DEEC,53 SNH, 498 spray operator,93 substitutes, 100 team leader, 24 site manager, 19 nurses

⁷¹ 4 DREEC/DEEC,66 SNH, 656 spray operator,132 substitutes, 132 team leader, 33 site manager, 70 nurses

⁷² 3DREEC/DEEC, 71 supervisors (70 SNH and 1 HPN), 645 spray operator, 112 substitutes, 131 team leader, 30 site manager, 25 nurses

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.1.3 Number of women recruited for IRS employment	Data source: Project records – Recruitment reports Reporting frequency: Semi-annually	By Country	186 ⁷³	287 ⁷⁴	452 ⁷⁵	278 ⁷⁶	716 ⁷⁷	1,015 ⁷⁸
		By Percentage of women recruited	21%	30%	30%	36%	36%	38%
6.1.4 Number of people trained as IRS Training of Trainers	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign	42 ⁷⁹	42 ⁸⁰	54 ⁸¹	53 ⁸²	66 ⁸³	71 ⁸⁴
		By Gender	M: 40 F: 2	M: 45 F: 0	M: 50 F: 4	M:53 F:0	M: 54 F:0	M: 71 F: 0
		Percentage of women trained	4.7%	0%	7.4%	0%	0%	0%

⁷³ Estimated number of women recruited based on percentage of women recruited last year: 21% of 885

⁷⁴ 148 spray operators, 25 team leaders, 4 site managers, 9 storekeepers, 58 washers, 5 water suppliers, 8 data clerks, 4 logistics +financial assistant managers, 25 cleaners, 1 pump technician

⁷⁵ Estimated number of women recruited based on percentage of women recruited last year: 30% of 1,508

⁷⁶ 154 spray operators, 24 team leaders, 3 site managers, 9 storekeepers, 49 washers, 5 water suppliers, 10 data clerks, 1 logistics +financial assistant managers, 22 cleaners, 1 pump technicians

⁷⁷ Estimated number of women recruited based on percentage of women recruited last year: 36% of 1,988

⁷⁸ 645 spray operators, 131 team leaders, 30 site managers, 40 storekeepers, 62 washers, 7 water suppliers, 27 data clerks, 7 logistics +financial assistant managers, 29 cleaners, 37 pump technicians

⁷⁹ 42 SNH agents

⁸⁰ 42 SNH agents

⁸¹ 54 SNH agents

⁸² 53 SNH

⁸³ 66 SNH

⁸⁴ 70 SNH, 1 HPN

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.1.5 Total number of people hired to support IRS in target districts	Data source: Project records – Contracts signed	By Spray Campaign	1,077 ⁸⁵	961 ⁸⁶	901 ⁸⁷	886	1,159 ⁸⁸	1,144
	Reporting frequency: <i>Semi-annually</i>	Gender	M: 851 F: 226	M: 674 F: 287	M: 631 F: 270	M: 607 F: 279	M: 800 F: 359	M: 757 F: 387
		Percentage of women hire	21%	30%	30%	31%	31%	34%
6.1.6 Number of women hired in supervisory roles in target districts (this number includes site supervisors, team leaders, M&E assistants, and others who supervise seasonal staff)	Data source: Project records – Contracts signed	By Spray Campaign	14 ⁸⁹	45 ⁹⁰	189 ⁹¹	40 ⁹²	243 ⁹³	70 ⁹⁴
	Reporting frequency: <i>Semi-annually</i>	Percentage of women hired	9%	21%	21%	21%	21%	28%
6.1.7 Number of staff	Data source: Project records –	By Spray	19 ⁹⁵	17 ⁹⁶	19 ⁹⁷	1,052 ⁹⁸	1,988	2,657 ⁹⁹

⁸⁵ people to be recruited in 2016

⁸⁶ 539 spray operators, 109 team leaders, 27 site managers, 31 storekeepers, 58 washers, 42 guards, 73 drivers, 5 water suppliers, 17 data clerks, 5 logistics +financials assistants, 25 cleaners, 30 pump technicians

⁸⁷ 487 spray operators, 98 team leaders, 27 site managers, 31 storekeepers, 52 washers, 46 guards, 58 drivers, 17 water suppliers, 22 data clerks, 6 logistics +financials assistants, 29 cleaners, 28 pump technicians

⁸⁸ 656 spray operators, 132 team leaders, 33site managers, 38 storekeepers, 65 washers, 64 guards, 74 drivers, 28 water suppliers, 27 data clerks, 7 logistics +financials assistants, 35 cleaners,

⁸⁹ Estimated number of women hired in supervisory roles based on percentage of women hired last year: 9% of 153 (87 team leaders, 21 site managers, 17 data clerks, 25 storekeepers, 3 logistics assistants)

⁹⁰ 25 team leaders, 4 site managers, 9 storekeepers, 1 pump technician, 2 data clerk supervisors, 4 logistics+ financial assistants,

⁹¹ Estimated number of women hired in supervisory roles based on percentage of women hired last year: 21% of 901

⁹² 24 Team leaders, 3 site managers, 9 storekeepers, 1 pump technician, 2 data clerk supervisors, 1 logistics and financial assistant

⁹³ Estimated number of women hired in supervisory roles based on percentage of women hired last year: 21% of 1,159

⁹⁴ 53 Team leaders, 2site managers, 10 storekeepers, 1 pump technician, 2 data clerk supervisors, 2 logistics and financial assistant

⁹⁵ Permanent staff Dakar and district

⁹⁶ 1 COP, 1 TM, 1 IEC Officer, 1 Proc Officer., 1 driver, 1 Admin Asst., 1 Accountant, 1 Log coord., 1 ECO, 1 M&E Mgr, 1 database Mgr, 4 districts coord., 1 IT Specialist, 1 OM

⁹⁷ Permanent staff Dakar and district

⁹⁸ 18 permanent staff; 1034 seasonal staff

⁹⁹ 15 permanent staff; 26421 seasonal staff

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
(permanent and seasonal) who have completed gender awareness training	Training reports Reporting frequency: <i>Semi-annually</i>	Campaign Gender Percentage of women hired	M:11 F: 8 42%	M: 9 F: 8 47%	M:11 F: 8 42%	M:742 F:310 29%	M: 1412 F: 576 29%	M: 1447 F: 1,210 46%
6.2 Capacity Building								
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – Training reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign By Gender Percentage of Women Trained	24 ¹⁰⁰ M: 19 F: 5 20.8%	21 ¹⁰¹ M:15 F: 6 28.5%	54 ¹⁰² M:39 F: 15 28.5%	53 M:53 F:0 0%	66 ¹⁰³	71 ¹⁰⁴
6.2. Implement all activities outlined in their yearly Capacity Building Action Plan	Data source: Project records – Capacity assessment reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
6.2.3 Senegal government implements at least one aspect of the IRS program	Data source: Project records – Memoranda of Understanding Reporting frequency: Semi-	By Spray Campaign	NA	NA	TBD	NA	TBD	Completed ¹⁰⁵

⁹⁹ 18 permanent staff; 1034 seasonal staff

⁹⁹ 15 permanent staff; 26421 seasonal staff

¹⁰⁰ 7SNH (3BRH, 4 SBRH), 3DREEC, 6 (3BREIPS, 3MCR) , 8 Districts (MDO, IRS focal point)

¹⁰¹ 7SNH (3BRH, 4 SBRH), 3DREEC, 3BREIPS , 8 Districts (MDO, IRS focal point)

¹⁰² 54 SNH

¹⁰³ 66 SNH

¹⁰⁴ 70 SNH, 1 HPN

¹⁰⁵ IEC/Mobilization completed

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results						
			Year 1		Year 2		Year 3		
			Target	Results	Target	Results	Target	Results	
independently	annually								

ANNEX D: ENVIRONMENTAL MITIGATION AND MONITORING REPORT (EMMR)

Mitigation Measure	Status of Mitigation Measures	Outstanding issues related to required conditions	Remarks
Ia. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	The inspection of vehicles was done one week before spraying campaign. COP, ECO and district staff helped by respecting the established standards. A certificate of completion was delivered to all vehicles	Some vehicles that had were not used during the campaign because some of them have technical deficiencies before the campaign. They have been changed and the new ones were inspected prior to their used	The District Coordinators all received comprehensive training on environmental safety measures. Logistic assistants were also trained and assisted with vehicle selection and training of drivers
Ib. Driver training	Drivers were trained according to PMI AIRS BMP recommendations. Drivers were issued certificates of training completion. Cautious driving while transporting chemicals and SOPs (speed limit to 60km/h) was emphasized to all drivers. In case of a driver change, his replacement was immediately trained. Overall 66 drivers were trained before signing contracts	The drivers are usually illiterate so they do not take notes during orientation. The training was conducted in a local language.	The training was focused on illustration with pictograms for better understanding. Distribute brochures with pictograms for a better understanding of recommendations

Ic. Cell phone, personal protective equipment (PPE) and spill kits on board during pesticide transportation.	Each vehicle was equipped a spill kit and drivers were provided with PPE. The team also ensured that drivers had a cellphone on them. Because of the limited literacy level of drivers, this year it was recommended bto r supervisors to ask for the detailed items in the kit box rather than ask about the kit.. Supervisors also made feedback to drivers for immediate corrections.	PPE provided will be worn only in case of spillage . Wearing boots make the driving difficult because the drivers do not usually wear them and they were not comfortable driving with boots.	
Id. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	For the 2017 campaign, the spraying was done in 20 days. First pregnancy test was between June 01 and June 11 in all districts . 337 were tested for pregnancy and 7 cases were positive Second pregnancy test was done in July 03 - 13 for all districts except Malem (campaign duration was ten days). Second Pregnancy test proved 4 positive cases.	Women with positive pregnancy tests prior to the trainings were not recruited. Pregnant women were reallocated to cleaners' position	
Ie. Health fitness testing for all operators	Health fitness testing was done before the training of the operators: 1,050 seasonal personnel (including 337 females) were examined as part of the pre-IRS medical check-up.		
If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	All workers who would potentially come in contact with the pesticides were trained on the appropriate use of PPE.		

	<p>1,119 operations personnel were trained on PPE use (645 SOPs, 112 substutes, 131 team leaders, 30 site managers, 40 storekeepers, 37 maintenance technicians, 62 washers, 66 guards, 66 drivers, 7 logistics and accounting assistants). In addition, 70 SNH, IHPN and 3 DREEC staff were trained.</p>		
<p>Ig. Training on mixing pesticides and the proper use and maintenance of spray pumps.</p>	<p>The presentation of pumps to be used and the demonstration on the procedures to be followed for the mixing of insecticide were included in the operators training modules. The operators were trained on the progressive rinsing system of equipment and minor breakdown repairs.</p> <p>1,076 operations personnel were trained on mixing pesticide and spray pumps (70 SNH, 1 HPN, 3 DREEC, 645 spray operators, 112 substutes, 131 team leaders, 30 site managers, 40 storekeepers, 37 maintenance technicians and 7 logistics and accounting assistants). A total of 1,017 inspections took place.</p>	<p>A Goizper pump representative was part of the TOT training and also supervised the use of pumps during the first few days of the campaign.</p>	
<p>Ih. Provision of adequate facilities and supplies for end-of-day cleanup,</p>	<p>During the final PSECA inspections, all washing areas were inspected and validated one week before the start of the campaign. All other supplies for rinsing took place during this inspection. A total of 1,041 inspections took place.</p>		<p>There are some sites which have water shortage problem but we have recruited people to provide enough supply on daily basis</p>

1i. Enforce spray and clean-up procedures.	<p>Clean-up procedures were emphasized during the training, especially since last year the applicators themselves have been required to wash their pumps. The applicators were supervised by the team leaders and local supervisors during the rinsing phase.</p> <p>This year, a total of 1,041 end-of-day cleanup inspections were carried out:</p>		Both SNH local supervisors and team leaders are responsible and must closely be supervising SOPs during progressive rinsing of their pumps.
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	Mobilizers were trained on key messages of information.		
2b. Prohibition of spraying houses that are not properly prepared.	<p>Ensure a better awareness of the beneficiaries of the preparation of rooms (carry belongings outside or putting heavy items in the center of the room)</p> <p>Respect scheduled dates of a given village - IEC mobilizers and SOPs will coordinate activities</p>		Household preparation is a big section of SOP and IEC training to better harmonize message.
2c. Two-hour exclusion from house after spraying	This is part of the information messages by the mobilizers and refreshed by SOP. The supervision sheet provides a questionnaire in this sense to see whether the message has gotten through.		

<p>2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside.</p>	<p>Instructions were provided by the mobilizers and the SOPs. The supervision sheet provides a questionnaire in this sense to see whether the message has gotten through. Of the 1017 inspections submitted, 19 households indicated not being informed of this instruction.</p>		<p>All health clinics' addresses and phones were available in all operational sites.</p>
<p>3a. Indoor spraying only.</p>	<p>This aspect was highlighted during the operators training.</p>		<p>The eaves are also to be sprayed</p>
<p>3b. Training on proper spray technique</p>	<p>Training of trainers was carried out to ensure the teaching quality Of the 1017 inspections conducted, 53 of 78 all instances of errors in mixing pesticide reported in only Ida Mouride site's ; 4 cases of correct spraying distance not respected; and 2 instances of not spraying recommended surfaces reported</p>		<p>Need to demonstrate with real insecticide how to do the mixing during TOT. Need to emphasize on the spray speed and the spraying distance to ensure quality.</p>
<p>3c. Maintenance of pumps</p>	<p>Preventive maintenance was included in the planning, and during the campaigns, maintenance technicians assured the functionality of pumps Out of 1017 inspections, 73 (7.1%) cases of leaking pumps were reported. Pumps were strictly managed by the spray operators: each applicator was responsible of his/her own pump</p>	<p>Lack of willingness by some spray operators to wash their own pump. Strengthening on washing pumps by SOPs and rigorous maintenance of the pumps by technicians as needed Some SOPs were not careful pressuring pumps, which resulted in damage of pumps parts (Goizper).</p>	<p>Each SOP should sign a commitment with regards to the pump management.</p>

4a. Choose sites for disposal of liquid wastes, including mobile soak pit sites, according to PMI BMPs.	All sites were provided with soak pits for the disposal of liquid waste. Camping sites had MSP for washing pumps, gloves and helmet All soak pits were inspected and validated prior to the start of the campaign For the 1041 inspections submitted, there were just 2 instances of the soak pits not draining properly.		
4b. Construct fixed and mobile soak pits with charcoal to adsorb pesticide from rinse water.	This principle was used for the construction of soak pits : 24 fixed soak pits and 18 MSP were used		
4c. Maintain soak pits as necessary during season.	All Soak pits were temporary covered by a layer of cement after the campaign	This year all soak pits will be destroyed 3 months after the end of spraying season	
4d. Inspection and certification of solid waste disposal sites before spray campaign.	A cement factory (SOCOCIM), approved by DEEC, agreed to the incineration of solid waste from the campaign. A plastic materials recycling factory (TRANSTECH) agreed to collect plastic waste for recycling.	It is very hard to have SOCOCIM agreement for incineration	
4e. Monitoring waste storage and management during campaign.	The waste was regularly inventoried and sent to the central level before disposal at the end of IRS campaign 17,357 used masks, 49,098 empty Actellic bottles, 397 Tyvek suits and 5,200 wipes were packaged and transferred to the central warehouse		
4f. Monitoring disposal procedures post-campaign.	Waste disposal will be done under the supervision of the environmental compliance officers from the DEEC and Abt ECO.	Obtaining the approvals from the Ministry of Environment tends to be very challenging with the lack of decisions	An agreement with the targeted partners (Ministry of Health, SOCOCIM) must be set -up during the life of the project

5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	An insecticide daily tracking sheet is used by the storekeeper. Team leaders were required to return all the bags / empty bottles at the end of the day.		
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	The spray performance displayed at each site allowed a daily tracking of the applicators performance and the use of the insecticide.		
5c. Visual examination of houses sprayed to confirm pesticide application.	SOPs used chalk to mark the treated structures. After structures were marked as sprayed, 871 Data Collection Verification forms of confirmed pesticide applications were submitted with 1.5 % of errors detected.		
5d. Perform physical inventory counts during the spray season.	An pesticide inventory was scheduled one month before the starting of the campaign An inventory was carried out every 10 days by site storekeeper and the assistant logistics coordinator during the spray season		