



PRESIDENT'S MALARIA INITIATIVE



**PMI | Africa IRS (AIRS) Project**  
Indoor Residual Spraying (IRS 2) Task Order Four

**SENEGAL**  
**END OF SPRAY REPORT 2013**

**NOVEMBER 1, 2013**

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# SENEGAL END OF SPRAY REPORT 2013

NOVEMBER 1, 2013

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# ACRONYMS

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AIRS	Africa Indoor Residual Spraying
COP	Chief of Party
DCV	Data Collection Verification
DEC	Data Entry Clerk
DEEC	<i>Direction de L'environnement et des Etablissements Classés</i> (Directorate for the Environment and Classified Factories)
DHMT	District Health Management Team
DMO	District medical officer
DPV	Direction de la Protection des Végétaux (Directorate for Plant Protection)
DQA	Data Quality Assessment
DREEC	<i>Direction Régionale de l'Environnement et des Etablissements Classés</i> (Regional Branch of the Directorate for the Environment and Classified Factories)
EC	Environmental Compliance
ECM	Environmental Compliance Manager
ECO	Environmental Compliance Officer
HPN	Health Post Nurse
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
RHMT	Regional Health Management Team
SNEIPS	<i>Service National de l'Education et l'Information pour la Santé</i> (National Health Education and Information Service)
SNH	<i>Service National de l'Hygiène</i> (National Hygiene Service)
SOP	Spray Operator
UCAD	Université Cheikh Anta Diop de Dakar
USAID	U.S. Agency for International Development

# EXECUTIVE SUMMARY

The President’s Malaria Initiative (PMI) support for indoor residual spraying (IRS) began in Senegal in 2007, when Nioro, Richard-Toll, and Velingara were selected as pilot districts to conduct IRS in Senegal. Three years later in 2010, PMI added Guinguineo, Malem Hodar, and Koumpentoum as beneficiary districts. Due to the low malaria prevalence in Richard Toll, the IRS Steering Committee decided to stop spraying in the district in 2011.

Abt Associates has been implementing the Africa Indoor Residual Spraying (AIRS) project in Senegal since October 2011 in close collaboration with the Senegalese National Malaria Control Program (NMCP), the Ministry of Health and Social Action (central and districts levels), and other key partners such as the Université Cheikh Anta Diop (UCAD), Ministry of Agriculture (Directorate for Plant Protection), and Ministry of Environment (Directorate for the Environment and Classified Factories, or DEEC). These key partners (including AIRS) have a framework for consultation through the IRS Steering Committee to coordinate decision-making and implementation of IRS in Senegal.

During the first AIRS spray campaign in 2012, the program successfully sprayed above 85% of the targeted structures located in six districts using the carbamate class of insecticide. For the 2013 spray round, the IRS Steering Committee decided to discontinue spraying in the districts of Nioro and Guinguineo due to the low burden of the disease, keeping the four districts mentioned above to receive IRS. Results of the 2013 spray campaign, conducted for 49 operational days from July 15 to September 3, appear in Table I.

**TABLE I: SUMMARY OF 2013 IRS CAMPAIGN**

Indicator	Results
Number of districts covered by the PMI-supported IRS campaign	Four districts: Koumpentoum, Kounghoul, Malem Hoddar, and Velingara
Insecticide used	Carbamates
Number of structures sprayed by spray operators	207,116
Number of structures found by spray operators	212,979
2013 IRS campaign spray coverage	97.2%
Population protected by 2013 IRS campaign	690,029
Number of people trained to deliver IRS with US Government funds	933
Total number of people trained with US Government funds	3,973

For this spray round, AIRS Senegal used a total of 65,049 sachets of carbamate insecticide, with an average of 3.2 structures sprayed per sachet.

# RESUME ANALYTIQUE

Au démarrage du Projet en 2007, Nioro, Richard-Toll et Vélingara étaient sélectionnés comme districts pilotes devant bénéficier de l'AID au Sénégal. Trois ans plus tard en 2010, Guinguinéo, Malem Hodar et Koumpentoum ont été ajoutés parmi les districts bénéficiaires du Projet. Mais, en raison du faible taux de prévalence du paludisme à Richard-Toll, le Comité de Pilotage de l'AIRS décida d'arrêter cette intervention dans ledit district en 2011. La même année (2011), le PMI sélectionna le district sanitaire de Koungheul comme devant bénéficier du Projet AIRS, ramenant ainsi le nombre de districts à six (6)..

Abt Associates est chargé de la mise en œuvre du Projet AIRS depuis octobre 2011 en étroite collaboration avec le Programme national de lutte contre le paludisme (PNLP), le Ministère de la Santé et de l'Action Sociale du Sénégal (MSAS, niveaux central et districts), et les partenaires clés tels que l'Université Cheikh Anta Diop (UCAD), le Ministère de l'Agriculture (DPV), et le Ministère de l'Environnement (DEEC). Ces partenaires clés y compris Abt, ont un cadre de concertation à travers le Comité de Pilotage (CP) chargé de coordonner les prises de décisions et la mise en œuvre du Projet AIRS au Sénégal.

Durant la première année de mise en œuvre du Projet par Abt en 2012; six districts étaient ciblés notamment Guinguinéo, Koumpentoum, Koungheul, Malem Hoddar, Nioro et Vélingara. 85 pourcent des structures ciblées ont été traitées avec succès par le projet dans les six districts. Le traitement des structures a été fait avec du FICAM qui est un insecticide de la classe des Carbamates choisi sur la base des résultats du suivi entomologique et de l'autorisation de l'utiliser dans les six districts AID.

Pour la campagne d'aspersion de 2013, le CP a décidé de retirer Nioro et Guinguinéo réduisant à quatre le nombre de districts AID en 2013 comme mentionné plus haut. La campagne d'aspersion a duré 49 jours opérationnels du 15 juillet au 3 septembre 2013 avec les résultats ci-après au Tableau 1.

**TABLEAU 1: RESUME DE LA CAMPAGNE AID 2013**

Indicateur	Résultats
Nombre de districts couverts par le projet AID appuyé par le PMI	4 districts Koumpentoum, Koungheul, Malem Hoddar, et Vélingara
Insecticide utilisé	Carbamates
Nombre de structures traitées par les opérateurs	207,116
Nombre de structures trouvées par les opérateurs	212,979
Couverture de la campagne AID 2013	97.2%
Population protégée par la campagne AID 2013	690,029
Nombre de personnes formées avec le fonds du Gouvernement US pour fournir la PID	933
Effectif total des personnes formées avec les fonds du Gouvernement US	3,973

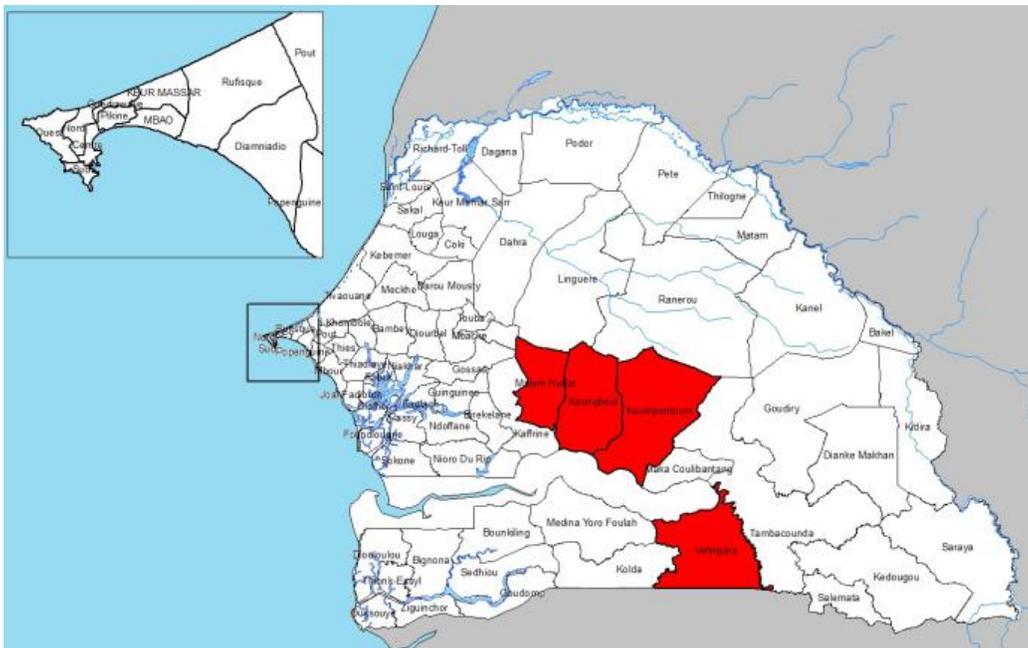
Pour cette campagne 2013, le projet AIRS Sénégal a utilisé au total 65,049 sachets d'insecticide de carbamate avec en moyenne 3,2 structures traitées par un sachet.



# I. COUNTRY BACKGROUND

The NMCP in collaboration with PMI and the Steering Committee identified and selected the following four districts among 16 priority districts with high malaria morbidity and mortality to receive IRS in 2013: Koumpentoum, Kounghoul, Malem Hoddar, and Velingara. The selected districts are located in the central (Malem Hoddar, Koumpentoum, Kounghoul) and southeast (Velingara) parts of Senegal as shown in Figure I.

**FIGURE I. MAP OF SENEGAL PMI IRS DISTRICTS**





## 2. OBJECTIVES FOR 2013 IRS CAMPAIGN

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In close collaboration with the Ministry of Health and Social Action, the NMCP, and other stakeholders, the project sought to achieve in 2013 at least 85% spray coverage in the IRS target districts. It is important to mention that in order to maximize the spray coverage during the peak transmission season with the short-acting insecticide, the Steering Committee decided to start the campaign later than in previous years. This decision increased the challenge of getting to spray sites because the rainy season had begun, however a new objective was made to complete the campaign in 30 days. In addition, 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 Monitoring and Evaluation (M&E) support for the IRS program.
- Carry out logistical assessments as needed, and arrange all procurement, shipping, delivery, and storage of sprayers, spare parts, insecticides, and personal protective equipment (PPE).
- Ensure safe and correct insecticide application, thus minimizing human and environmental exposure to IRS insecticides, in compliance with the Supplemental Environmental Assessment Amendment.
- Coordinate information, education and communication (IEC), behavior change communication, sensitization, and mobilization activities with other stakeholders to raise population's awareness of IRS, and to encourage ownership.
- Assist NMCP in smooth transitioning of select IRS responsibilities to districts including development of communication plans, recruitment of spray personnel, development of training materials, and supervision.
- Promote cost-effectiveness through due diligence and efficiency of operations.

In the work plan, AIRS Senegal set a target of 204,585 structures to be sprayed in 2013, which would cover approximately 667,000 residents. However, after undergoing an enumeration exercise, the target was adjusted to 221,655 structures.

# 3. PREPARATION FOR IRS CAMPAIGN

## 3.1 IRS CAMPAIGN PLANNING

Listed below in Table 2 are the activities AIRS Senegal led or participated in to plan for and organize the 2013 IRS campaign:

**TABLE 2. 2013 IRS PLANNING AND ORGANIZATION**

Areas	Activities implemented
AIRS staff orientation	<ul style="list-style-type: none"> <li>▪ Africa IRS Operations and Logistics Training Workshop, Feb. 2013, Dakar (Senegal)</li> <li>▪ Chief of Party (COP) Annual Conference and IRS COP retreat, June 2013, Washington, DC, USA</li> <li>▪ Finance and administration manager orientation on management procedure, April 2013, Washington, DC, USA</li> </ul>
IRS activities planning	<ul style="list-style-type: none"> <li>▪ Country-level planning, March 2013</li> <li>▪ District-level planning (micro-planning), May 2013</li> <li>▪ Developing spray calendar, May 2013</li> </ul>
Recruitment of seasonal personnel	<ul style="list-style-type: none"> <li>▪ AIRS temporary personnel: finance assistants, logistics assistants, environmental compliance (EC) assistant, data entry clerks</li> <li>▪ AIRS site seasonal personnel: operators (site manager, team leaders, spray operators)</li> <li>▪ Auxiliary staff (drivers, storekeepers, maintenance technicians, washers, water suppliers)</li> </ul>
Personnel capacity-building	<ul style="list-style-type: none"> <li>▪ Developing spray operator's training guide</li> <li>▪ Review of existing training manuals and tools</li> <li>▪ Training AIRS district staff including district coordinators, finance assistants, logistics assistants, EC assistant, data entry clerks</li> <li>▪ Country-level IRS training of trainers</li> <li>▪ Physicians' and nurses' training on IRS related poison management</li> <li>▪ Training environmental staff in regions covering IRS</li> </ul>
Environment	<ul style="list-style-type: none"> <li>▪ Identification and selection of operational facilities at district and secondary sites</li> <li>▪ Soak pit removal in Nioro and Guinguineo</li> <li>▪ Pre-inspection and validation for all IRS sites using smartphones</li> <li>▪ Report development and submission to Home Office for IRS EC</li> <li>▪ Monitoring secondary IRS site rehabilitation using smartphones</li> </ul>
M&E	<ul style="list-style-type: none"> <li>▪ Post-Spray Data Quality Audit (PSDQA)</li> <li>▪ Structure enumeration</li> <li>▪ Recruitment of data clerks for enumeration data entry</li> <li>▪ Updating IRS data collection tools and developing mobilization data collection tools</li> <li>▪ Reviewing IRS database and developing mobilization database</li> <li>▪ Recruitment of data clerks for IRS and mobilization data entry</li> <li>▪ Spray performance monitoring</li> </ul>
Operations	<ul style="list-style-type: none"> <li>▪ Finding secondary sites and field offices</li> <li>▪ Deployment of Abt district personnel</li> <li>▪ Micro planning workshops in the four districts</li> <li>▪ Validation of spray calendars and communication plans</li> <li>▪ Rehabilitation of IRS sites in compliance with environmental standards</li> </ul>

Areas	Activities implemented
	<ul style="list-style-type: none"> <li>▪ Production of training manuals and data collection tools</li> <li>▪ Recruitment of seasonal personnel</li> <li>▪ Seasonal personnel's pre-IRS medical examination</li> <li>▪ Training of spray operators</li> </ul>
Logistics	<ul style="list-style-type: none"> <li>▪ Physical inventory of existing equipment</li> <li>▪ Quantification of insecticide and IRS equipment</li> <li>▪ Equipment checking to determine cleaning and repair needs</li> <li>▪ Needs assessment for local and international procurement</li> <li>▪ Transportation needs assessment</li> <li>▪ Training of logistics assistants and storekeepers</li> <li>▪ Dispatch and delivery of material from the central warehouse to districts and secondary sites</li> <li>▪ Introduction of Spraying Performance Tracking Sheet</li> </ul>
Communication	<ul style="list-style-type: none"> <li>▪ Review of NMCP's IEC plan including IEC plan for IRS</li> <li>▪ Review/development of IEC tools for IRS by NMCP</li> <li>▪ Meetings of NMCP's IEC working group on IRS</li> <li>▪ Production and distribution of IEC materials</li> <li>▪ Validating districts communication plans</li> </ul>
Partnership	<ul style="list-style-type: none"> <li>▪ Initial contact visits with strategic IRS partners: NMCP, Service National de l'Hygiène (SNH), District Health Management Team (DHMT) local authorities, Laboratories of Vector and Parasite Ecology, and Directorate of SOCOCIM Cement Factory</li> <li>▪ Empowering regional environmental officers for pre-IRS EC inspections</li> <li>▪ IEC IRS Strategy Committee mainly composed of NMCP, Service National de l'Éducation et l'Information pour la Santé (SNEIPS) focal persons, and AIRS IEC coordinator</li> </ul>
Administration & Finance, procurement	<ul style="list-style-type: none"> <li>▪ FY13 Budget preparation</li> <li>▪ IRS lease agreements—drafting and signing</li> <li>▪ Recruitment of seasonal personnel</li> <li>▪ IRS operations participants' agreements—drafting and signing</li> <li>▪ Vehicles rent announcement and selection</li> <li>▪ Vehicle lease agreement—drafting and signing</li> <li>▪ Partnership development with micro-finance institutions</li> </ul>

## 3.2 PRE-SPRAY ENVIRONMENTAL ASSESSMENT

### 3.2.1 SENEGAL LAWS AND REGULATIONS

In Senegal, the environment code is embodied in Law no. 2001-01 of January 15, 2001. Additionally, there are international conventions on chemicals management (Stockholm, Basel, Rotterdam Conventions) that Senegal ratified and implemented. In relation to these legal provisions, there are policies and guidelines for IRS environmental assessment.

The Directorate of Environment and Classified Factories and its regional branches (Regional Branch of the Directorate for the Environment and Classified Factories, or DREEC) are in charge of implementing this Senegalese Government policy to ensure environmental, and, particularly, human protection from pollution and nuisance. Its activities are structured around the following:

- Pollution and nuisance prevention and control
- Monitoring various institutions and agencies working in the environmental area
- Designating legal authority to address environmentally sound and efficient management

The DEEC certifies the firms that conduct environmental and social impact assessments. The DEEC defines the national environmental compliance policy based on the assessments. Then, the agency conducts supervision of IRS sites to make sure activities are implemented according to:

- The Strategic Environmental Assessment Report and the Environmental and Social Management Plan
- USAID Best Management Practices for IRS

### 3.2.2 SOAK PITS REMOVAL IN NIORO AND GUINGUINEO

As part of 2012 post-IRS activities, the project team decontaminated and restored all soak pit areas in the dropped IRS districts of Nioro and Guinguineo to their original pre-IRS conditions. It was done in compliance with current Food and Agriculture Organization and PMI environmental regulations. One soak pit located in Fass village was the exception. Upon the owner's request, this soak pit was left in place to be used for sanitation purposes. The Environmental Compliance Officer and Program Specialist of the AIRS Senegal project coordinated the decontamination process, under the supervision of the DREEC office in Kaolack and in close collaboration with Heads of SNHs. The decontamination process had three steps:

- Demolish soak pit's washing areas.
- Recover the rubble stone and charcoal.
- Backfill and level soak pits with sand.

The project successfully reused some soak pits materials. AIRS donated the gabion<sup>1</sup> net to use as a ground cover in a runoff stream in Kaymor village to minimize the washing off of the soil. The project used the rubble stones and charcoal recovered from the demolished soak pits to layer the new ones. Some of the materials were given to local communities to reuse the stones in home soak pits. The decontaminated IRS sites in the districts of Guinguineo and Nioro have been safely handed over to their owners.

### 3.2.3 PRE-SEASON ENVIRONMENTAL COMPLIANCE ASSESSMENT (PSECA)

The AIRS Senegal environmental compliance officer (ECO), AIRS environmental compliance manager (ECM), the Senegal COP, and DREEC staff conducted PSECA in all four districts in May 2013. The role of the DEEC and DREEC was to ensure prevention and control of nuisance and pollution as part of IRS implementation. As part of the PSECA, representatives from both central and district levels of DEEC participated in the inspections to evaluate compliance with the current environmental regulations established standards.

#### 3.2.3.1 FINDING NEW SITES

Results of the 2012 post-spray inventory showed that 21 sites could be reused for 2013 IRS and work on 14 new sites would need to be completed, for a total of 35 sites to be in operation in 2013. To identify new sites and validate the existing sites, the ECO and spray coordinator conducted site location assessments and produced detailed analyses for construction, rehabilitation, and upgrading of the operational sites. These analyses were handed over to AIRS district staff.

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<sup>1</sup> Gabions are gravels in woven galvanized wire netting used for water erosion control.

### *3.2.3.2 OPERATIONAL SITES REHABILITATION*

Based on PMI Best Management Practices and World Health Organization standards, the project set up 35 soak pits at the operational sites in the four districts, which included the 21 rehabilitated sites and the 14 newly constructed sites. AIRS Senegal constructed fencing around the soak pit area and then fitted the fence with locks to keep out non-IRS personnel and animals. Soak pit areas were distributed as follows per district: Kounghoul (9), Velingara (13), Koumpentoum (8), and Malem Hoddar (5).

### *3.2.3.3 SMARTPHONE DATA COLLECTION SYSTEM*

The AIRS global project introduced a smartphone data collection system in 2013 to record site characteristics, capture the GPS location, and take pictures of the site (storeroom exterior and interior, storage and condition of pesticide (if present), and condition of soak pit). The checklist and questions that are loaded onto the smartphone for this assessment were adapted from the checklists recommended in the PMI Best Management Practices Manual. Two assessments were required at each site. The first assessment was performed approximately two months prior to spray with the objective of reporting all improvements that need to be done on the site before it is ready for operations. The data gathered during this assessment, including GPS coordinates and pictures, were uploaded through the internet to a project-wide database that could be accessed by the country and Home Office staff. As soon as the data had been uploaded to the database, the system generated work lists (reports indicating specific actions to be taken to improve the status of the operational site), which were emailed to all relevant parties on the project. Once all of the items on the work list were reported as complete, a second inspection was performed, to verify that the site was indeed ready for operations. This data was also uploaded to the database, where it was available to in-country and Home Office staff.

All pre-, mid-, and post-spray inspection reports are available in the online database and can be quickly accessed upon request.

### *3.2.3.4 CONDITIONS OF WASH AREAS AND SOAK PITS*

In May, six weeks before the spraying, the ECM, COP and ECO conducted operation site assessments prior to spraying in 15 sites and found all of them to be in similarly good conditions. The only significant problem encountered was that the wrong size of stone was used to top off the soak pits. The ECO, Technical Manager, and ECO assistant assessed the 15 remaining sites. Two weeks before spraying, the COP and ECO visited all operational sites; all soak pits were reconstructed with smaller stones as is described in the BMP manual. The project handled these issues by mortaring cracks and using finer stone or gravel for the final layer of soak pit areas, instead of the large rocks.

### *3.2.3.5 CONDITIONS OF SPRAY OPERATORS WASH FACILITIES AND STORAGE FACILITIES*

Provisions for spray operator washing were deemed exemplary in Senegal. All sites had facilities for both men and women that were of high quality, with drainage and soak pits, and enclosures that were well built.

The storage facilities are also deemed exemplary in Senegal. Every site had a well-built room with an impermeable floor for pesticide storage, and a separate room for IRS commodities. Signage in general was good, but in some locations was excessive. There were a few sites where the ventilation was inadequate, and some windows were not secure. The project built new windows and added bars on the windows where needed. There was one site where leaks in the ceiling were evident, and that was repaired prior to the spray.

### 3.2.3.6 SPECIAL GEOGRAPHIC CHALLENGES

In each district there were areas with bad access during the rainy season, so the team planned the spraying to start with the remote and inaccessible sites before the rains begin. Those sites were Khelcom in Malem Hoddar; Payar in Koumpentoum; Saly Escale in Koungheul; and Pakour in Velingara.

## 3.3 INSECTICIDE

For the 2013 spray campaign, the NMCP, in collaboration with the Steering Committee, selected the carbamate class of insecticide, mainly based on its lower cost in spite of the lack of adequate residual effect. The AIRS Senegal Project procured the selected class of insecticide using the following criteria to assess quotations:

- Duration of efficacy
- Pesticide registration in Senegal
- Pesticide formulation (wetable granules vs. wettable powder)
- Risk to human health
- Risk to the environment, livestock, and the agricultural trade
- Delivery time
- Cost

After analyzing the various vendor proposals, Abt selected FICAM® VC wettable powder 125 (bendiocarb) for the 2013 spray round. On April 25, 2013, AIRS received the required official authorization from the Ministry of Environment to use this insecticide for the 2013 campaign.

### 3.3.1 INSECTICIDE QUANTIFICATION

AIRS Senegal calculated the amount of insecticide required for the 2013 round based on the number of eligible structures found during the enumeration exercise conducted in March 2013 as shown in Table 3. The average number of structures per sachet is three based on the spray results of the 2012 campaign. Using this information the project calculated that 86,160 sachets of a carbamate insecticide would be required to complete the operations. The enumeration in March 2013 had been incomplete, so AIRS Senegal returned to the field to complete the enumeration in May. Insecticide quantification numbers were based on the first enumeration data (219,266), and thus the total number of structures is less than the final target number of structures (221,655).

**TABLE 3. ASSESSMENT OF INSECTICIDE NEEDS**

District	Koumpentoum	Koungheul	Malem Hoddar	Velingara	Total
Eligible structures	45,012	56,931	32,126	85,197	219,266
No. of structures per sachet	3	3	3	3	3
Insecticide sachets needed	15,004	18,977	10,709	28,399	73,089
Total need plus 20% buffer	18,005	22,772	12,850	34,079	87,706
Stock in place	0	0	0	0	1,946
Insecticide sachets procured					86,160

### 3.3.2 INSECTICIDE TRANSPORT

AIRS Senegal received the insecticide four weeks before the start of the campaign. The project hired a local transportation company to deliver insecticide from Dakar Yoff airport to the central warehouse in Kaolack. The AIRS team trained the vehicle driver and provided the driver with pesticide transportation-related safety measures (emergency and spill plans, spill kit, first aid kit). The insecticide was transported in one 40-foot truck, and the loading process was supervised, certified and photographed by AIRS staff prior to departure.

After the inventory check at the main warehouse, the project staff coded the insecticide boxes before dispatching them to district storerooms where sachets were serialized. The logistics coordinator supervised transportation of the insecticide from the central warehouse to the four district storerooms. Particular measures were required to secure pesticide safe transport when the rainy season began. Drivers received appropriate training and were provided with safety measures for pesticide transport.

## 3.4 LOGISTICS PLANNING AND PROCUREMENT

### 3.4.1 INVENTORY

Based on 2012 post-spray inventory data and decisions made for spray areas for 2013, the logistics coordinator quantified the needs for the 2013 season, and worked jointly with the procurement coordinator on local purchases of IRS supplies and materials.

During the spray campaign, the logistics assistants conducted inventories every 15 days to secure appropriate stock in the districts. The team organized additional dispatch of materials to the secondary sites' storerooms every 10 days, or as needed. Following recommendations from the AIRS project director during his visit to Senegal, the team trained the storekeepers to reconcile the insecticide stock twice per day using the daily monitoring form. This approach allowed recording all physical movements of FICAM for better traceability.

At the end of the spray campaign, all materials and equipment were counted and adequately stored at district level. The decision to store these at the district level had been made by AIRS and district authorities, in order to save transportation costs. All the pesticide was moved to the main warehouse in Kaolack. District coordinators will be responsible for stock balance and regular reconciliation of the inventory during the off season. District coordinators are full-time employees and their offices are open throughout the year.

### 3.4.2 SERVICING OF EQUIPMENT

AIRS Senegal conducted preventive checks of the pumps to ensure that they were all in good operating condition prior to the start of spray operations in all 35 operational sites. The project hired two pump technicians in each site for a two-day servicing of the spray pumps. A large number of pumps still in use were purchased in 2007; many of them had missing pressure gauges, and some were replaced by new ones. In addition, the project serviced and deployed to the districts all fire extinguishers and generators prior to the start of the campaign.

### 3.4.3 PROCUREMENT

To calculate correct quantities of insecticide, IRS equipment, and other supplies required for the 2013 spray season, the AIRS project conducted enumeration of eligible structures. This consisted of identifying compounds, buildings and rooms eligible for spraying. Specifically, the enumeration process helped to estimate the amount of insecticide, considering the ratio of sachets used per structure as 1:3. Enumerating IRS structures made it possible to assess the exact number of spray operators to be recruited for the 2013 campaign in a 30-day period, assuming also that one spray operator can treat 18 rooms per day. Lists of items procured internationally and locally to meet the needs of the 2013 spray round are included in Annex A.

### 3.4.4 DISPATCHING OF COMMODITIES

On June 10, 2013, locally purchased materials and supplies and part of the international procurement had already been delivered to the main warehouse in Kaolack and were ready for deployment to target districts. Three weeks ahead of the campaign start, the project delivered the commodities including the pesticide to the districts. The spray campaign start was staggered over a few days starting with Malem Hoddar district as scheduled on July 15, and rolling out spray operations in other districts on July 17, 2013.

During spray operations, the AIRS technical team members made supervision trips every week 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 shortcomings identified.

## 3.5 TRAINING

The AIRS Senegal team, jointly with the DHMT, SNEIPS and representatives from the NMCP, conducted a series of trainings to refresh the knowledge and skills of various spray personnel in order to prepare for the spray season as shown in Annex B. In total, AIRS Senegal trained 3,973 people, of whom 30.7% were women. The trainings and orientation sessions are described below.

Of the total number of people trained, AIRS Senegal hired 2,764 people (33.8% of whom are female) for the 2013 Spray Campaign (Table 10). The reason for the large difference between the number of people trained and the number of people hired is that AIRS Senegal works with numerous government supervisors who are trained by AIRS Senegal but not hired by the project.

### 3.5.1 TRAINING AIRS DISTRICT PERSONNEL

After recruiting temporary district personnel, AIRS Senegal held a two-day workshop in April 2013 to build organizational and operational capacity of newly hired district staff, including coordinators and logistics and finance assistants, to better execute their assignments at their respective duty stations. The workshop topics included:

- Managerial aspects at district level
- Abt's code of conduct
- District-level activity timeline

- EC measures
- IRS/IEC
- Logistics organization
- Operations' financial procedures
- Data collection organization
- Techniques for spray operations supervision
- Roles and responsibilities of actors

For the logistics assistants, AIRS Senegal defined a safety stock for each item to serve as an alert threshold to refill the stock. The size of the safety stock depended on the type of the item, how fast it is consumed, and the site storeroom's accessibility to the district warehouse.

In addition, district coordinators received an orientation on a spray performance tracker that was introduced in 2013 for use in all four districts.

### 3.5.2 TRAINING SNH STAFF NEWLY POSTED IN IRS DISTRICTS

This training took place in Kaolack region on June 3–7, 2013, with the purpose of building the capacity of trainers of spray operators and supervision agents. In total, 64 SNH agents 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
- Environmental compliance safety

### 3.5.3 TRAINERS' ORIENTATION

The AIRS project conducted a trainers' orientation for all districts on June 25–26, 2013. The purpose of the orientation was to share and harmonize methodologies that trainers will use during their workshops with spray operators and supervision agents. AIRS Senegal designed a trainers' training manual highlighting spray operators' skills and the teaching methodology, including the following topics:

- Teaching methodologies and techniques
- Supervisory data collection tools and questionnaires
- Spray performance tracking tools
- EC and safety measures

### 3.5.4 SPRAY OPERATOR TRAINING

The project in close collaboration with the district health offices conducted training sessions of spray operators (SOPs) during the period of July 3–9 simultaneously in four districts. The training covered the following topics:

- Spraying techniques and proper management of insecticide

- Data collection methodology
- Sensitization of beneficiaries on IRS-related safety measures
- Environmental compliance
- Roles and responsibilities of different actors in the field

### **3.5.5 TRAINING FOR SITE MANAGERS AND STOREKEEPERS**

Districts coordinators trained site managers and storekeepers on the purpose and use of the spray performance tracker sheet on July 10, 2013.

### **3.5.6 ORIENTATION OF SITE MANAGERS, TEAMS LEADERS AND COMMUNITY IEC SUPERVISORS**

The AIRS Senegal team conducted one- to two-day orientation meetings for sites managers, team leaders and community IEC supervisors on the following topics:

- Procedures and code of conduct at site level
- Roles and responsibilities of site managers and team leaders, and relationships with SNH supervisors
- IRS supervision activities
- The use of the error eliminator sheet

### **3.5.7 HEALTH POST NURSES' ORIENTATION FOR MOBILIZATION**

The DHMT, under supervision by NMCP, SNEIPS and AIRS staff, facilitated orientation sessions for health post nurses (HPNs) in four districts during the period of June 24–26 to prepare the IEC mobilizers for mobilization and enumeration activities. This orientation included:

- Update on counseling card, a job aid describing essential IRS messages for the IEC mobilizer
- Leaflets on IEC containing more information on IRS for the community
- Messages to be delivered during the mobilization
- Filling out Data Collection Forms
- Supervision of community IEC mobilizers
- Structure identification and data entry
- Ensuring mobilization data quality
- Training methodology

### **3.5.8 TRAINING OF IEC MOBILIZERS**

After the orientation sessions, HPNs under supervision of NMCP, SNEIPS and AIRS staff conducted trainings for IEC mobilizers and community supervisors in the four districts on June 27–29. During the

training, they reviewed IEC data collection tools and lessons learned from the previous spray rounds. Training addressed topics including benefits of IRS; instructions on how to prepare the household before, during, and after spray operations; brochure distribution; environmental and health risks related to the use of insecticide; recording enumeration and mobilization data; and distributing and filling out IRS cards.

### 3.5.9 TRAINING OF REGIONAL ENVIRONMENTAL OFFICERS AND HPN

The project Chief of Party and technical manager conducted EC training for DEEC and DREEC staff and HPNs on April 26–28, 2013 in Kaffrine. The objective was to prepare the trainees to serve as facilitators and be responsible for incorporating environmental compliance education into the trainings of supervisors, team leaders, spray operators, and district health and environmental officers. The topics included the following:

- Country, regional and international legal requirements (e.g., Senegalese Environmental Code)
- Environmental Policy of USAID (Environmental Protection Agency) Environmental Clauses (March 2012–March 2014)
- Pesticide storage and stock management
- Pesticide transportation
- Spraying technique
- Contaminated wastes management
- EC checklists
- PSECA using smart phones
- IRS incident report form
- DREEC inspection missions planning (pre, mid- and post-IRS)

### 3.5.10 TRAINING OF HEALTH WORKERS ON INSECTICIDE POISON MANAGEMENT

IRS poisoning management is the responsibility of the Government of Senegal through the NMCP in collaboration with health facilities in the concerned health districts. The IRS campaign used a two-tier training approach for this topic. First, district medical officers (DMOs) trained in previous years, and AIRS Senegal, trained all new health workers in the PMI IRS districts. The training took place on April 28, 2013 in the health center of Kaffrine. Four DMOs, one deputy district medical officer and one primary care supervisor from each of the four PMI IRS districts attended the course. Koungeul DMO together with the AIRS team provided the training. Second, trained DMOs conducted similar training for the HPNs in health facilities and health posts on the following topics:

- General information on pesticides: routes of entry, mode of action, toxicity towards living organisms, signs of intoxication, treatment
- Carbamates class of insecticide, including FICAM pesticide
- Management tools
- Carbamates-related poisoning referral table (list of places for case management according to the seriousness of the poisoning)
- Notification form for IRS-related poisoning

It should be noted that there were two notification forms: one designed by AIRS and another by the Poison Center. Facilitators clarified the recording and submission processes for the two forms from the point of service delivery to the central reporting point (AIRS Senegal office and district health office).

Prior to the start of spray operations, districts supplied antidotes to the health facilities. Poisoning cases are treated free of charge according to the available stock of prescribed drugs.

## 4. ENUMERATION

As one of the lessons learned from the 2012 spray campaign, AIRS Senegal carried out a very thorough enumeration before this year’s spray campaign. The enumeration occurred from February 20 through March 22, with a “mop-up” activity occurring from May 16 through June 11. This timing ensured that AIRS Senegal had the correct number of target structures well before the start of the spray campaign, and with enough time to procure more insecticide sachets if needed.

Enumeration surveyors collected data on the number of household compounds (concessions), eligible structures, and eligible rooms using a specific enumeration data collection card. This data was then entered into an Access database by data entry clerks (DECs) hired and trained for this exercise. The AIRS Senegal database manager cleaned this data once all Enumeration Forms had been entered.

The enumeration data were important for the following reasons:

- AIRS Senegal gained details about the location of each eligible structure.
- AIRS Senegal would know the appropriate number of sachets needed for each district before the start of the spray campaign.
- The enumeration data provided a “check” or point of comparison for the number of structures found by spray operators during the spray campaign. Thus, if spray operators were over-reporting the number of structures sprayed, the AIRS team would have data as a point of comparison, which would show the discrepancy.

Overall, 221,655 eligible structures were identified during enumeration. Table 4 provides the details of the number of structures enumerated per district.

**TABLE 4. 2013 ENUMERATION DATA VS. 2012 SPRAY DATA**

<b>Districts</b>	<b>2013: Eligible compounds</b>	<b>2013: Eligible structures</b>	<b>2013: Eligible rooms</b>	<b>2012: Eligible compounds</b>	<b>2012: Eligible structures</b>	<b>2012: Eligible rooms</b>
Velingara	23,533	86,360	136,658	21,359	77,337	127,303
Koumpentoum	9,647	45,823	53,431	9,880	42,975	49,650
Malem Hoddar	6,684	32,335	38,888	6,295	29,529	35,670
Koungheul	12,084	57,137	71,068	11,535	54,744	68,653
<b>Total</b>	<b>51,948</b>	<b>221,655</b>	<b>300,045</b>	<b>49,069</b>	<b>204,585</b>	<b>281,276</b>

# 5. IEC ACTIVITIES

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For the 2013 spray round, the IEC component was implemented by districts health offices under the leadership of the NMCP with technical and financial support from AIRS Senegal. After development of IEC plans and tools at the central level, the district health offices took charge of the following activities:

- Planning district IEC activities
- Providing districts with resources for IEC implementation
- Monitoring and coordinating the implementation of IEC activities

Moreover, additional information was provided during CDD (departmental development committee) meetings in the districts of Guinguineo and Nioro following IRS withdrawal from the 2013 spray campaign. These meetings, under the leadership of administrative authorities, aimed to explain to the residents the reasons for the withdrawal and importance of bed net use. Because Senegal is working to achieve universal coverage of bed nets, the use of insecticide-treated bed net has been emphasized as one the recommendations after IRS withdrawal. AIRS Senegal contributed by educating local leaders on the required environmental safety measures after the closing of washing and soak pit areas, including rehabilitation of soak pits. During the meetings, the AIRS team also emphasized the importance of creating sentinel sites for monitoring and planning for IEC activities to follow up on results of IRS.

## 5.1 PREPARATIONS

During the preparation phase, the NMCP IEC committee and other stakeholders, in collaboration with AIRS, undertook various activities to develop a solid communication and mobilization strategy and implementation plan for the IRS campaign. The NMCP led two large workshops at the early stage of IRS planning. The first was the NMCP communication plan review workshop, which resulted in the development of the IRS communication plan. This meeting brought together all NMCP IEC stakeholders, region- and district-level IEC officers, and the health reporters network (a group of journalists working in health areas).

The second NMCP workshop was dedicated to IEC tools; here, participants developed and reviewed the following communication and job-aid tools for the IEC mobilizer: brochures, counseling cards, checklists and training guides.

Overall, the major IEC activities that the NMCP led in preparation for the 2013 spray season included the following:

- Development of national IEC policy and guidelines
- Validation of district IEC plans
- HPNs' orientation for IEC mobilizers' training
- IEC mobilizers' training by HPNs
- Supervision of IEC, and conduct of the mobilization
- Coordination and monitoring of mobilization data collection and reporting to the district health offices and the AIRS office in Dakar

## 5.2 IEC MOBILIZER RECRUITMENT AND TRAINING

In close communication with the local leaders, HPNs led the identification and recruitment process of IEC mobilizers. Most of them had served as surveyors (*relais*) earlier in the year during the structure enumeration exercise for the 2013 campaign. Traditionally, they are selected from an already existing cadre of community health workers who are well known for their work in the communities.

HPNs under the supervision of the district health office conducted training sessions for mobilizers from June 24 through 30, 2013. Table 5 shows the IEC cadres trained for the 2013 spray campaign by district. Among the trained mobilizers, those selected as community supervisors were the best and most dedicated trainees, who demonstrated dynamism in their daily work and leadership in the community, and who had some level of education. In addition to being trained in mobilization skills, they received an orientation on team management, supervision of mobilization tasks, and data collection for enumeration.

**TABLE 5. IEC MOBILIZATION IMPLEMENTERS TRAINED**

District	Mobilizers		Community Supervisors		HPNs (Supervisors)	
	M	F	M	F	M	F
Malem Hoddar	96	120	12	9	10	8
Koungheul	105	206	12	1	15	4
Koumpentoum	184	108	24	6	8	2
Velingara	440	294	53	12	11	8
	825	728	101	28	44	22
Total	1,553		129		66	

## 5.3 IEC ACTIVITIES

For the 2013 spray round, it was planned that DHMTs would lead IEC activities for the PMI IRS campaign, including planning, training and supervision. IEC mobilizers were implementers of various community outreach activities, including community and advocacy meetings, and door-to-door mobilization. IEC mobilizers conducted home visits in each district 24 to 48 hours before spraying.

Overall, IEC activities went well in all four districts, as the results in Tables 7, 8 and 9 demonstrate. The acceptance level for IRS was high, and spray operators did not face systematic denials from beneficiaries to enter and spray their houses. However, in some areas the mobilizers reported refusals. Most of these cases were managed by local teams, but in Koumpentoum the Prefet was personally involved to clarify the IRS process and settle the refusal cases. DMOs and local authorities also actively participated in resolution of refusal cases as reported from Koungheul, where a team composed of the DMO, the AIRS district coordinator, and the SNH supervisor visited a commune to explain the importance of IRS and negotiate acceptance with the locals. In Medina Gounass, the DMO of Velingara played a crucial role in discussing with the religious leaders the time for spraying, and acceptance of SOPs from other areas to spray houses of this village.

However, IEC mobilizers reported the following challenges during the distribution of IRS cards:

1. Vendor delivered the IRS cards with delay.
2. Some IEC mobilizers did not have clear understanding on who are eligible to receive the IRS cards. Consequently, they distributed the IRS cards to householders instead of heads of compounds. This led to IRS card stockouts in some areas.

3. Some IRS cards were not filled out correctly by mobilizers.

To address these issues, the project provided detailed instructions to the health post nurses and community supervisors on to whom to distribute the IRS cards. The mobilizers collected back most of incorrectly distributed IRS cards from compounds so each compound only had one IRS card and one IRS number. These cards could not be redistributed because all cards had already been filled in with a household number.

## 5.4 IEC COORDINATION

Coordination at the central level was marked by the regular meetings between the NMCP, SNEIPS and AIRS as part of the IEC committee.

At the district level, the DHMT closely coordinated IEC work for IRS, together with the health education officer and the AIRS team.

## 5.5 IEC SUPERVISION

From July 30 to August 4, 2013, the AIRS IEC coordinator, jointly with NMCP representatives, conducted systematic comprehensive supervision visits to observe door-to-door mobilization, the availability and dissemination of IEC materials, and data collection and reporting concerning the enumeration. The supervisors also observed the level of involvement of DHMT in the IEC and enumeration work.

DHMTs and HPNs supervised the mobilization activities regularly and also ensured daily monitoring through the community supervisors. They also supervised and checked data collection and reporting for the enumeration activity that was done by the same IEC mobilizers. Table 6 demonstrates steps for mobilization data flow from the community level to the AIRS Senegal M&E manager and COP. The challenges that the project faced during the mobilization and IEC work were shortage of HPNs at the health posts who could work as IRS mobilizers, and late submission of the summary mobilization data by HPNs.

**TABLE 6. MOBILIZATION DATA FLOW**

<b>Actors</b>	<b>Tasks</b>	<b>Frequency</b>
IEC mobilizers	<ul style="list-style-type: none"> <li>• Fill in the data sheet</li> <li>• Distribute the card IRS to the compound after recording</li> </ul>	Daily
IEC community supervisor	<ul style="list-style-type: none"> <li>• Checks figures on the data sheet</li> <li>• Checks the physical existence of IRS card in the compound</li> <li>• Completes the data summary sheet</li> </ul>	Daily
HPN/IEC district coordinators	<ul style="list-style-type: none"> <li>• Collect and verify the data provided by community supervisors</li> <li>• Send the data sheet to AIRS data clerk</li> </ul>	Daily
Data clerk	<ul style="list-style-type: none"> <li>• Enters data</li> <li>• Sends the records to the database manager</li> </ul>	Daily
Database manager	<ul style="list-style-type: none"> <li>• Centralizes and analyzes the records sent by data clerk</li> <li>• Verifies and corrects errors in the database</li> </ul>	Daily

<b>Actors</b>	<b>Tasks</b>	<b>Frequency</b>
M&E manager	<ul style="list-style-type: none"> <li>Analyzes, reviews and validates the data</li> <li>Summarizes and generates results</li> </ul>	At the end of the campaign
COP	<ul style="list-style-type: none"> <li>Reviews and disseminates reports</li> </ul>	At the end of the campaign

Mobilizer training was not carried out as planned, because the numbers of participants who attended the training and their educational level were lower than expected. Therefore, the trainers had to adjust the program.

From the management side, the DHMT did not take the lead in the mobilization and IEC activities in the districts as had been expected, but rather contributed as participants. The main reason for this was that IRS had not been included in districts' annual work plans. As an example, IEC mobilization supervision activities were not implemented as planned. The role expected from the Regional Health Management Team (RHMT) was to provide support to IEC activities through supervision of training of IEC mobilizers' trainers and supervision of IEC activities. Only the Kolda region RHMT carried out supervision for implementation of IEC activities, and the Kaffrine region RHMT supervised training of IEC supervisors and mobilizers. In other regions, RHMTs provided no supervision of training and sporadic or no supervision during the mobilization efforts. One of the strong recommendations from the national IRS evaluation meeting was to add IRS activities including IEC in the district annual work plans in order to secure higher level of responsibility and ownership for this component.

**TABLE 7. IRS SENSITIZATION RESULTS (HOME VISITS)**

<b>Districts</b>	<b>Males</b>	<b>Females</b>	<b>Total</b>
Koumpentoum	33,204	40,697	73,901
Koungheul	23,016	32,790	55,806
Malem Hoddar	13,865	18,513	32,378
Velingara	65,500	75,122	140,622
Total	135,585	167,122	302,707

**TABLE 8. OTHER IEC ACTIVITIES IMPLEMENTED**

<b>Districts</b>	<b># radio spots</b>	<b># radio programs</b>	<b># of roadshows</b>	<b># of launch days</b>	<b># of advocacy meetings/days</b>	<b># of social mobilization</b>	<b>CDD* Meetings</b>
Koumpentoum	387	06	2	01	11	00	01
Koungheul	50	10	05	00	00	00	
Malem Hoddar**	00	00	06	00	00	00	01
Velingara	180	28	08	00	00	06	
Total	617	44	21	01	11	06	02

\* CDD - Comité départemental de développement (Departmental Development Committee meeting)

\*\* Malem Hoddar has no local radio station.

**TABLE 9. IRS CAMPAIGN COMMUNICATION MATERIALS**

<b>Item</b>	<b>No. distributed at district level</b>
Counseling cards	1,852
Flyers	51,528
Trainer's guide	81
IEC mobilizer's manual	1,852
IRS cards	42,561

## 6. IMPLEMENTATION OF IRS ACTIVITIES

### 6.1 SPRAY CAMPAIGN LAUNCH CEREMONY

Although there was no official launch ceremony at the national level for the 2013 campaign, the Prefet of Koumpentoum district took the initiative to organize a launch ceremony in a selected community in order to promote and increase IRS acceptance. The ceremony took place July 16. Chaired by the Prefet and attended by all local administrative bodies, community leaders, village chiefs, youth associations and community workers/IEC mobilizers, the event helped to raise awareness about the needs of this community, in addition to providing promotion and education on the importance of IRS.

### 6.2 SPRAY OPERATIONS

The spray campaign began on July 15 in the district of Malem Hoddar, and on July 17 in the other three districts (Koungheul, Koumpentoum and Velingara). It lasted for 49 days and was officially completed on September 3. During the last two weeks of preparation and the first two weeks of spray operations, the project director, the director of operations, and the M&E specialist from the AIRS home office visited Senegal supporting the country team in overall management of IRS operations and M&E. In total, 1,082 seasonal workers including SOPs, site managers, team leaders, washers, store keepers, assistant logisticians, accountants, repair technicians, security guards, drivers, and others were deployed to the 35 sites in PMI districts, as demonstrated in Table 10. The 35 sites are distributed as followed: 13 in Velingara, 8 in Koumpentoum, 9 in Koungheul, and 5 in Malem Hoddar.

**TABLE 10. NUMBER OF PEOPLE HIRED**

Position	Male (M)	Female (F)
IEC mobilizers	825	728
IEC community supervisors	101	28
Total M/F	926	756
<b>Sub-total</b>	<b>1,682</b>	
SOPs	503	48
Operational site managers	31	4
Team leaders	108	11
Data entry clerks	14	6
Storekeepers	29	4
Storekeeper assistants	5	1
Finance assistants	2	2
Logistics assistants	3	1
Maintenance technicians	56	0
Washers	0	66
Guards	60	0
Drivers	92	0
Water fetchers	0	36

Total M/F	903	179
<b>Sub-total</b>	<b>1,082</b>	
Total M/F	1,829	935
<b>Total Hired</b>	<b>2,764</b>	

Each site operation was composed of two to five teams, each having four to five SOPs. They worked six days per week, with average hours of operation from 7 a.m. to 2 p.m. The teams adjusted their hours daily based on the weather conditions. Cars were arranged to transport SOPs to and from spray villages. After returning to the operational site, they returned the PPE, unused insecticide and empty sachets, cleaned themselves, and went home in the same cars that had transported them during the day. In some remote operational sites, SOPs camped overnight in project-supplied tents.

Prior to the start of spray operations, 962 seasonal workers, including SOPs, team leaders, site managers, washers, and storekeepers, underwent a general medical examination to assess their medical fitness for IRS activities. All female personnel underwent pregnancy tests. At the end of the campaign, spray personnel received an additional medical examination, from which no adverse effects were reported.

To minimize health risks and eliminate exposure to the insecticides, all SOPs received complete sets of personal protective equipment that included helmets, face shields, nose and mouth masks, long-sleeved cotton overalls, rubber gloves, pairs of cotton-rich stockings, robust gum boots, and neck covers.

## 6.2.1 OPERATIONS SUPERVISION

Supervision of the IRS campaign involves identification of potential problems, immediate correction of inadequacies, and problem-solving, leading to improved program performance and helping to secure a successful campaign. The IRS steering committee reviewed and validated the comprehensive IRS supervision checklist and supervision manuals developed in 2012 for the use by all supervisors during the 2013 spray operations as listed in Table 11. AIRS, in collaboration with the NMCP and other stakeholders, developed a supervision plan that is summarized below and in Table 12.

**TABLE 11. IRS-RELATED MANUALS USED FOR 2013 CAMPAIGN**

Manuals	New/reviewed
Supervision manual	Reviewed
Training of trainers manual	New
Operator booklet	Reviewed
District coordinator guide	New
Guide for logistics assistant	Reviewed
Storekeeper manual	Reviewed
Manual for pump repair technician	Reviewed
Guide for training on environment	Reviewed
Insecticide shipping guide	Reviewed
Manual on pesticide intoxication case management for physicians	Reviewed
Manual on pesticide intoxication case management for HPN	Reviewed
Guide for IEC mobilizers' trainer	New

Manual for IEC mobilizers	New
Manual on data collection	Reviewed

### 1. Implementation Level

At the implementation level, each site had on average three to four spray teams. Every team leader directly supervised the work of three to five spray operators. Site managers were in charge of overseeing team leaders' performance and also observing the work of spray operators and other actors on the site, including washers and security guards.

SNH assigned one local supervisor per each site. After one week of supervising a given site, supervisors were rotated to another operational site. At the end of the day, a debriefing meeting was organized with the team leader, site manager and SNH supervisor to share the findings of the day and lessons learned and make recommendations for the next day.

### 2. National level

Representatives from the SNH regional offices and the central level performed supervision visits, assessing the progress made and problems identified during the campaign as well as observing the work done by local SNH staff at the site level.

### 3. AIRS supervision

Supervision has always been implemented during the period of spray operations. However, in 2013, the approach and the frequency of supervision have been enhanced during the spray round. As a result, it significantly improved working relationship between the AIRS Senegal team, DHMT and local SNH. Specifically, all AIRS Senegal technical staff worked in the field during the length of the campaign, performing close supervision and coaching in all aspects of the operations. They specifically focused on the supervision of the spraying techniques, EC, IEC mobilization, stock management and handling of the insecticide. In addition, SNH officers were widely dispatched in each district conducting daily supervision in each operational site. These close and consistent supervision visits have been one of the key factors of success of this IRS round. During the time in the field, AIRS Senegal team also provided coaching to the SNH officers and DHMT on how to conduct proper supervision using checklists that the project developed and address issues on the spot.

Enhanced supervision has allowed addressing and/or adjusting immediately all shortcomings reported compared to last year. Besides aspects above mentioned, i.e. seeing over spraying techniques, EC, IEC mobilization, stock management and handling of insecticide, supervision also focused on:

- Making sure spray calendars are implemented as planned and monitoring spray operators' daily performances to prevent any voluntary slowdown in operations by spray operators
- Strengthening working relationships between various actors in the field
- Management of refusal cases in close collaboration with local authorities

Supervision much impacted on the following:

- Sticking to spray progress timing in operational sites
- Spray teams performance versus daily target (e.g. in Medina Gounass reporting performances over 25 rooms per day)
- No complaint from beneficiaries reported to authorities

- Many refusal cases were managed successfully and the households accepted spray during supervision

Compared to last year, authorities' ownership was much illustrated this year as with the Prefet of Koumpentoum who made awards for outstanding actors in this campaign.

**TABLE 12. SPRAY OPERATIONS SUPERVISION AND MONITORING SCHEDULE**

<b>Actors</b>	<b>Frequency</b>	<b>Supervised areas</b>
District SNH staff	Daily visit during the entire period of spraying	Spraying techniques, environmental safety and compliance, spray operators' behavior IEC messages delivered Spray performance Spray organization in the field
SNH (regional and central)	2 visits for central-level and 3 for regional-level SNH	Spraying techniques, environmental safety and compliance, spray operators' behavior, supervision of SNH supervisors, IEC
Abt national and Field Office	Daily visit during the entire period of spraying	Spraying techniques, environmental safety and compliance, spray operators' behavior, supervision of SNH supervisors, management of storekeepers, IEC message delivered Spray performance
NMCP	2 visits during the campaign	Field organization, environmental safety and compliance, interpartner relationships, supervision of SNH supervisors, IEC component
PMI/USAID	3 visits during the campaign	Field organization, interpartner relationships, supervision, management of storekeepers, availability and status of materials stock, IEC Spray performance
DHMT	5 visits for IEC mobilization; 11 visits for spray operations	IEC, spray operations and beneficiaries' impressions IRS operations in joint supervision with Abt staff
Local leaders (prefet, mayors, etc.)	Sporadic visits throughout the campaign	IEC mobilization, oversight of entire IRS operations

## 6.2.2 SPRAY PERFORMANCE TRACKING SHEET

In 2012, AIRS Senegal tested the spray performance tracking sheet in two districts (Velingara and Nioro), found it satisfactory, and rolled out the tool to all four districts in 2013.

This tool allowed daily tracking of SOP performance and the use of insecticide. After analyzing the data, site managers communicated feedback to the team leaders and provided recommendations and corrections to make if needed. They also shared the performance results with the DHMT and other partners on a daily basis.

The site manager was in charge of recording the performance data. Each site manager also worked with the storekeeper to input insecticide use information on a daily basis. This information was available to the district coordinator, who shared it with the DMO. The DMO submitted this data to the IRS coordinator at the NMCP central office. In addition, the AIRS operational manager synthesized the data and shared it every week with all partners including PMI, the NMCP, the SNH, the District and the

Home Office. This tool was highly appreciated by all stakeholders visiting the operations during the campaign.

### 6.2.3 MID-SPRAY ENVIRONMENTAL COMPLIANCE

The AIRS global project uses eight checklists established for spray inspections to ensure compliance with environmental requirements and performance standards; AIRS Senegal used seven of them for the following areas:

1. IRS EC Inspection
2. Spray Operator Morning Mobilization
3. End of Day Cleanup
4. Transport Vehicle Inspection
5. Spray Operator Performance
6. Storekeeper Performance
7. Homeowner Preparation

The spray environmental inspections took place in two rounds during the period from July 16 through August 21, 2013 using smartphones. National and regional-level representatives of DEEC conducted six inspection visits, in total during this period as shown in Table 13.

**TABLE 13. DEEC INSPECTION VISITS**

Government level	Organization	# of visits	Supervised activities
National	DEEC	1	EC: Mid-spray inspection by the Director of the Environment
Regional	DREEC	5	EC: Pre-spray (1), mid-spray (3) and post-spray inspection(1) Spray operations

Major findings from spray inspections were addressed immediately through orientation meetings with site managers, technical leaders, and SOPs.

During the inspection, the following topics were emphasized to increase attention to the IRS rules concerning spray operators:

- Prohibiting SOPs from eating, drinking, or smoking at work (to avoid dermal exposure, inhalation, or ingestion exposure)
- Ensuring that workers washed their hands and faces with soap and a large quantity (about half a gallon, or 2 liters) of clean water after spraying and before eating, smoking, or drinking (to avoid dermal exposure, inhalation, or ingestion exposure)
- Washing of coveralls by the washers to avoid dermal exposure, inhalation, or ingestion exposure

- Advising workers to wash the affected area(s) with soap and water immediately in cases of accidental spillage of insecticide on the skin (to avoid prolonged dermal exposure)
- Advising spray operators and washers to immediately inform the supervisor or team leader about any adverse side effects of the insecticide (to seek health care early)
- Advising parents, guardians, or home care providers to prevent children from coming into contact with sprayed surfaces after returning to the home (to avoid the transitory side effects of the insecticide)

During the 2013 spray round, three insecticide-related adverse events were reported, including one with a spray operator and two with beneficiaries. All cases were minor and were managed by health nurses with no lasting effects. Incident reports were submitted to PMI.

Four road accidents were also reported involving nine injured people (all males). Most of these injuries involved scratches of arms and legs, though a few head injuries and fractures requiring hospitalization. All injured recovered well. Incident reports were submitted to PMI.

This year AIRS Senegal experienced several car accidents due to the following factors:

- Road quality: accidents occurred on wet, sliding roads due to rain and many of the hired drivers did not have significant experience driving in such conditions; in addition, they were not complying with speed limit.
- Raining season: most of vehicles the project used did not adapt tires for wet road conditions.
- Some of the drivers were too young and inexperienced, and did not fully comply with safe driving instructions.

The project took the following actions to minimize the incidents in the future: recommended to site managers and SNH supervisors who are using the vehicles to monitor the speed limit compliance; requested vehicle vendors to assign more experienced drivers for difficult routes; issued warning to drivers for non-compliance of driving rules, the next step will include termination from the operations work.

#### 6.2.4 INDEPENDENT PMI EVALUATION OF THE AIRS SPRAY CAMPAIGN

The Global Environment Management Support, a USAID-funded program, through Cadmus Group contracted Dr. Moulaye Farota to conduct an independent EC evaluation of IRS activities in Senegal during the period from July 29 to August 7, 2013. Dr. Farota, PMI Senegal Adviser Dr. Mame Birame Diouf, and the USAID ECO Assistant, accompanied by the AIRS Senegal ECO, traveled to the spray districts. They met with beneficiaries, districts coordinators, district medical officers and HPNs. Dr. Farota visited the SOCOIM Industries cement plant, which AIRS used as an incineration facility for the solid wastes generated, and evaluated the plant as having high hygiene and safety standards.

General recommendations included the following:

- Strengthen social mobilization in every district;
- Instruct mobilizers and spray operators to ensure that the beneficiaries provide feedback on messages transmitted to verify the level of understanding;
- Ensure maintenance of spray hoses (manometers, nozzles) in order to keep them operational and avoid cases of insecticide seepage.

### 6.3 LOGISTICS AND STOCK MANAGEMENT

Stock management is essential to the success of an IRS campaign. To avoid the same mistakes as in 2012, this year the project established a schedule for biweekly inventories at site level, including review of the stock management documents (goods issue/receipt slips, stock cards, and inventory records). The AIRS team carried out unexpected visits to storerooms to audit the documentation and compare stock cards with physical stocks.

To ensure close and precise monitoring of the insecticide, storekeepers filled out the pesticide monitoring form that was submitted to logistics assistants on a daily basis. Logistics assistants reported this information in their weekly forms to the AIRS Senegal logistics coordinator.

# 7. POST-SPRAY ACTIVITIES

## 7.1 GENERAL 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. Table 14 below provides details on each post-spray activity.

**TABLE 14. POST-SPRAY ACTIVITIES**

Activities	Responsible Party	Results
Post-IRS medical examination	DMO	Completed in three districts (except for Velingara district, where health workers were not able to provide examination until the demobilization was completed)
Site-level IRS evaluation	HPNs, SOPs' site managers, team leaders and SOP, religious and community leaders, elected officials and AIRS	Completed
District-level IRS evaluation	DHMT, HPNs, site coordinators, district authorities, religious and community leaders, local elected officials and AIRS	Completed
National-level IRS evaluation	Country-level partners, local elected leaders, UCAD, SNH, SNEIPS, DMOs, AIRS, local media	Completed
IRS sites closeouts	AIRS district staff	Completed
AIRS Senegal retreat	All project staff	Completed
Data cleaning and archiving	M&E team	Cleaning is completed, archiving is in progress

At the post-spray evaluation meetings, participants identified the following strengths and limitations of the 2013 spray campaign planning and implementation.

### Strengths

- Addressing major challenges/recommendations from 2012 IRS campaign
- Closely supervising of spray operations at all levels provided by all stakeholders and partners (AIRS Senegal and Home Office, SNH, NMCP, regional and district health offices, DEEC/DREEC, UCAD, USAID/PMI)
- Conducting comprehensive enumeration of structures and rooms for accurate assessment of human resources and logistics needs, mainly insecticide
- Distributing insecticide and other equipment prior to the IRS start
- Finding and upgrading new sites according to IRS standards

- Sharing of spray performance tracking sheets, and daily performance monitoring
- Coordinating spray calendars with home visit schedules to ensure home visits occur within 48 hours before spray.
- Involving local governments in the evaluation workshops for better IRS ownership and future devolution.
- Strengthening commitment from key stakeholders (SNH, districts, NMCP)
- Increasing community contribution to IRS (some sites made available for free, health committees covered the transportation cost of IEC mobilizers and first aid care for road accidents)
- Improving management of refusal cases
- Improving data reliability due to introduction of the error verification and elimination system at the operational level
- Improving coordination at all levels for quick strategic decisions and management actions
- Simplifying data collection during the EC inspections via smartphone and accessibility to EC information through the “cloud-based” database
- Effectively involving DREEC and DEEC agents in the IRS campaign implementation
- Consolidating achievements through the EC inspections conducted by Peter Chandonait, the AIRS ECM, during the preparation phase and by Global Environmental Management Support Project consultant Dr. Moulaye Farota during spraying.

### Limitations

The weak points observed during the campaign were related to the capacity of MOH and particularly to the DHMT to implement IRS activities along with the routine activities of the health center. Another limitation was the low education level of seasonal workers. It was noticeable among some spray operators and IEC mobilizers when filling out data collection forms. Finally, coordination and technical contribution from DHMTs and RHMTs in IRS operations were significantly less than planned and discussed earlier.

- Inadequate distribution of IRS cards
- No IRS annual work plan at district level
- Misconduct of some drivers and spray operators (to be excluded from future IRS recruiting )
- Low educational level of some IEC mobilizers
- Limited time available for regional health teams’ comprehensive involvement in the campaign
- Non-implementation of all the IEC supervision activities planned by some districts

## **7.2 DEMOBILIZATION LOGISTICS**

Following completion of spray operations, the project moved the leftover insecticide, equipment and PPE from the 35 operational sites to the district-level warehouses and then to the central warehouse in Kaolack. Annex A has the post-spray inventory of the equipment and supplies in the central warehouse.

### 7.3 POST-IRS INSPECTIONS

The AIRS Senegal team in collaboration with the DREEC staff conducted post-spray inspections in all four PMI IRS districts from August 22 to 29, 2013 and from September 17 to 22.

Using smartphones, the ECO uploaded in the database all forms that inspectors completed for each of the 35 IRS sites. The project successfully prepared all 35 sites for the off-season: 34 soak pits were covered and locked, and one soak pit was eliminated (the site will not be used for the next year's operations).

A post-spray environmental compliance assessment was completed and documented. The safety signs on soak pit doors are in place, and grass is growing around the soak pits, which show no signs of polluted soil or contamination.



Inside view: Soak pit, carpeted

### 7.4 WASTE MANAGEMENT

The 2013 IRS campaign had generated contaminated solid wastes of 1,350 kgs composed of empty sachets and masks by the end of the campaign. The solid waste was incinerated by SOCO CIM Cement Plant on October 1, 2013. Annex C includes a contaminated solid wastes movement notification form. This elimination process follows the authorization (# 0001910 MEDD/DEEC/DPN) to incinerate issued July 8, 2013 by the Senegalese Ministry of the Environment and Sustainable Development, supervised by DEEC. Prior to the incineration, the solid waste including packaging materials, torn gloves, and used disposable nose masks was packaged in World Health Organization-recommended yellow bin liners, and stored in the central warehouse.

At operational site level, solid wastes are packed separately in boxes, numbered and closed. At the end of the campaign, all wastes are shipped to the district warehouse. At the district level, solid wastes are separated by items; gloves and plastic sheets with holes are decontaminated by washing, and dried up and packed, ready for disposal. All masks, empty sachets are packed and shipped to the central warehouse in Kaolack. Traditionally, contaminated plastic solid wastes (gloves, plastic sheets used to cover beneficiaries property) are considered as common garbage. After the decontamination, the wastes are either disposed in dumpsites or recycled by plastic manufactures such as Sodiaplast. In Kaolack, waste gloves (260 Kgs) were disposed of in the public waste disposal site. All other solid waste (607 Kgs) was sent to Sodiaplast for recycling.

Empty sachets and masks, which cannot be decontaminated, were packed in boxes of the size recommended by the SOCO CIM Cement factory and shipped to Rufisque for incineration by the factory.

## 8. ENTOMOLOGY

PMI contracted UCAD to provide entomological monitoring of PMI-funded IRS in the country. For the 2013 campaign, UCAD conducted cone bioassays with susceptible strains of *An. gambiae* s.s in three districts (Koumpentoum, Malem Hoddar, and Koungheul) and with the wild population of *An. gambiae* s.s., in the district of Malem Hoddar. The purpose of the tests was to assess the quality of the spraying and the efficacy of the insecticide during spraying. The results vary from district to district and by type of the wall surface (mud or cement). The data collected in August and September as shown in Tables 15–23 demonstrates good quality of the spraying. The residual efficacy of the insecticide one month after treatment was still high.

**TABLE 15. NUMBER OF ROOMS USED FOR CONE BIOASSAY, KOUMPENTOUM, AUGUST**

Village	Control		Exposed		
	M*	C**	M*	C**	Other
Kouthiaba	0	1	3	2	-
Altou Fass*	-	-	-	-	-
Fass Gounss	1	0	2	3	-
Village I	1	0	2	3	-
Koumaré	1	0	3	2	-

\*M = Mud; \*\*C = Cement.

**TABLE 16. CONE BIOASSAY RESULTS, KOUMPENTOUM, AUGUST**

Villages	Control					Exposed					
	Number of mosquitoes			Mortality rate 24h (%)		Number of mosquitoes			Mortality rate 24 h (%)		
	M	C	Other	M	C	M	C	Other	M	C	Other
Koutiaba	0	40	0	-	0%	87	61	-	100%	100%	
Pass Koto	-	-	-	-	-	-	-	-	-	-	-
Fass Gounass	41	-	-	4,8%	-	59	94	-	100%	100%	
Darou Salam 2	41	-	-	4,8%	-	59	91	-	100%	100%	
Koumare	41	-	-	4,8%	-	90	60	-	100%	100%	

**TABLE 17. NUMBER OF ROOMS USED FOR CONE BIOASSAY, KOUNGHEUL, AUGUST**

Village	Control		Exposed		
	M	C	M	C	Other
Touba Kougheul	1	-	3	2	-
Keur Sérigne Diébel	1	-	2	3	-
Ida Mouride#	-	-	-	-	-
Touba Aly Mbenda	-	1	4	1	-
Pakala ##	1	-	2	-	-

#: No tests carried out for lack of specimens

## : For lack of specimens, only 2 rooms in a mud house were tested,

**TABLE 18. CONE BIOASSAY RESULTS, KOUNGHEUL, AUGUST**

Villages	Control					Exposed					
	Number of mosquitoes			Mortality rate 24 h (%)		Number of mosquitoes			Mortality rate 24 h (%)		
	M	C	Other	M	C	M	C	Other	M	C	Other
Keur Sérigne Diebel	40	-	-	0%	-	62	89	-	100%	100%	-
Pakala	16	-	-	06%	-	54	-	-	100%		-
Touba Aly Mbenda	-	40	-	05%	10%	119	30	-	100%	100%	-
Ida Mouride	40	-	-	10%	-	60	90	-	90%	96%	-
Touba Kougheul	40	-	-	0%	-	89	61	-	100%	100%	

**TABLE 19. NUMBER OF ROOMS USED FOR CONE BIOASSAY, MALEM HODDAR, AUGUST**

Village	Control		Exposed		
	M*	C**	M*	C**	Other
Taiba	-	1	2	3	-
Makka Bella	1	-	3	2	-
Niahène	-	1	2	3	-
Dianké Souf	-	1	3	2	-
Ndioum Nguinth	1	-	1	3	-

**TABLE 20. CONE BIOASSAY RESULTS, MALEM HODDAR, SEPTEMBER**

Villages	Control					Exposed					
	Number of mosquitoes			Mortality rate 24 h (%)		Number of mosquitoes			Mortality rate 24 h (%)		
	M	C	Other	M	C	M	C	Other	M	C	Other
Ndioum Nguinth	39	-		3%		29	91	-	100%	100%	
Dianké Souf		39			5%	89	60		99%	100%	
Makka Bella	40	-		2,5%	-	90	60		72%	100%	
Taiba		40			2,5%	60	90		88%	94%	
Niahène		40			7,5%	30	121		71%	98%	

**TABLE 21. CONE BIOASSAY RESULTS, WILD POPULATION OF AN. GAMBIAE S.L., MALEM HODDAR, SEPTEMBER**

Villages	Control					Exposed					
	Number			Mortality rate 24 h (%)		Number			Mortality rate 24 h (%)		
	M	C	Other	M	C	M	C	Other	M	C	Other
Ndioum Nguinth	-	-	-	-	-	-	-	-	-	-	-
Dianké Souf		45			2%	96	31		78%	74%	
Makka Bella	38	-		1%	-	86	64		74%	100%	
Taiba		38			8%	56	94		71%	91%	
Niahène	-	-	-	-	-	-	-	-	-	-	-

**TABLE 22. NUMBER OF ROOMS USED FOR CONE BIOASSAY, VELINGARA, AUGUST**

Village	Control		Exposed		
	M	C	M	C	Other
Sinthian Koundara		1	2	3	
Kael bessel	1		1	4	
Nemataba		1	3	2	
Bonkonto		1	4	1	
MadinaDianghette	1		4	1	

**TABLE 23. CONE BIOASSAY RESULTS, VELINGARA, SEPTEMBER**

Village	Control				Exposed					
	Number		Mortality rate 24 h (%)		Number			Mortality rate 24 h (%)		
	M	C	M	C	M	C	Others	M	C	Others
Bonkonto	-	-	-	-	-	-	-	-	-	-
Kael Bessel	40	-	7,5%	-	30	120	-	100%	98%	-
Madina Dianghette	40	-	0%	-	90	30	-	89%	90%	-
Nemataba	-	40	-	0%	90	60		100 %	100%	-
Sinthian Koundara	-	40	4%	-	-	90	-	-	94%	-

# 9. MONITORING AND EVALUATION

AIRS Senegal identified lessons learned from the 2012 spray operations and made improvements to the M&E system for the 2013 campaign to:

- Emphasize accuracy of both the data collection and the 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 and better IRS operations.
- Improve data sharing with NMCP in anticipation of NMCP ownership of IRS M&E by sharing spray progress on a daily and weekly basis and the NMCP representative making field visits with the M&E team to better learn the system and spray database.
- Ensure IRS data security and storage for future reference through establishment and enforcement of proper protocols.

## 9.1 DATA COLLECTION

The data collection closely followed the process described in the country work plan. The project employed 20 DEC's to enter mobilization and spray data from operations in the four intervention districts. AIRS Senegal established four data entry centers with three DEC's sitting in Malem Hoddar, four in Koumpentoum, five in Koungheul, and eight in Velingara. Each of the DEC's received a laptop that contained the AIRS Senegal Access database. DEC's entered Spray Operator Forms into the Access database and transmitted the results to the central office within 24 hours of the receipt of the data. The networking access built into the database, which used the Microsoft Access program, was able to provide automated real-time updates of spray progress reports both locally and at the AIRS Home Office. Once entered, the paper forms were filed and archived at the data entry site.

## 9.2 DATA QUALITY ASSURANCE

### 9.2.1 DATA COLLECTION/IN-FIELD VERIFICATION

Data quality assurance activities were instituted for both data collection and data entry verification through newly developed supervisory tools and the standard database audit checks. Our data quality assurance efforts significantly reduced the number of errors found on Daily Spray Operator Forms and in the M&E database, improving the overall quality of the data and IRS results. Table 24 below describes how many Data Quality Assurance Forms were used throughout the campaign and the corresponding percentage of structures verified.

**TABLE 24. NUMBER OF SUPERVISORY TOOLS USED**

M&E supervisory tools	Structures verified	Percent verified
Error Eliminator	212,979	100
Data Collection Verification	1,765 compounds	3.6
Data Entry Verification	7,552 lines	1.2

### *Error Eliminator*

AIRS supervisors, team leaders, and site managers used the Error Eliminator (EE) daily to detect and correct common errors on Spray Operator Forms before they were transported to the data center. The same thing was done by IEC supervisors on the mobilizer form. Common errors included arithmetic mistakes and failure to complete all data items on the Data Collection Forms.

### *Data Collection Verification Form*

AIRS senior management, local supervisors, and SNH Supervisors used the Data Collection Verification (DCV) tool to interview households to verify spray coverage data; 1,765 compounds were visited using the DCV form, and 130 different types of errors were identified and corrected. The most frequent types of errors were: related to the counting of rooms and particularly compounds with verandas; and the population count (the number of people found during spray operations is different from the number of people found during the verification process). Corrections were done by cross checking the data recorded on the spray operator forms to the data recorded on the IRS spray cards in the field. Staff performed these verification visits within approximately two days of spray, and identified errors in enough time to correct mistakes and notify spray operators and team leaders to prevent repeat errors.

## **9.2.2 DATA ENTRY VERIFICATION**

### *Data Entry Verification Form*

The M&E and database managers and the database supervisors used the Data Entry Verification tool to verify that the data entered into the database matched the data on the Daily Spray Operator Forms. They found far fewer errors this year compared to last year as a result of the in-field supervisory verification tools (i.e., Error Eliminator and DCV tools). This year, 7,552 lines were verified using the Data Entry Verification Form and 92 errors were identified and corrected. The data entry clerk was re-trained if required.

### *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 would verify all data entered into the database daily. Daily, the Database Manager would send errors to the DECAs and Database Supervisors for immediate cleaning. Moreover, Senegal double-entered spray data for the first time this year. This practice let AIRS Senegal check and correct for any DECAs once all the spray data had been entered.

AIRS Senegal created reports of how these supervisory tools were used, and common errors; these reports were shared with the Home Office regularly, which allowed the Home Office to follow up on any problems with data collection or data inconsistencies.

Improved data entry allowed AIRS Senegal to produce the Weekly Spray Reports with the most up-to-date data. The Weekly Spray Reports, written by the M&E Manager, presented data on various spray indicators, such as spray progress, populations protected, and insecticide stocks. The data from these reports were taken from the database, hence the importance of DEC speed and accuracy. The Weekly Spray Progress Reports were then sent to PMI Senegal, NMCP and partners, and PMI Washington by the COP. This reporting method allowed AIRS Senegal, the Home Office, PMI Senegal, and PMI Washington to monitor spray progress, adjust the campaign as needed, and immediately report to the client any issues that arose.

## 9.3 SPRAY RESULTS

All AIRS Senegal performance indicators are presented in a Monitoring and Evaluation Plan matrix in Annex D. Details of some key IRS indicators, such as number of structures sprayed, people protected, and insecticide-treated net availability and use, are provided in the following sections of the report.

### 9.3.1 SPRAY DATA

The total number of structures found by spray operators was 212,979 and the number of structures sprayed was 207,116. With that, the overall spray coverage is 97.2%, as shown in Table 25.

The total population protected by IRS in 2013 is 690,029, protecting 97.7% of the population. Of these, 126,888 children under the age of five years and 15,592 pregnant women were protected.

**TABLE 25. IRS COVERAGE: ELIGIBLE STRUCTURES SPRAYED AND POPULATION PROTECTED IN TARGETED AREAS**

District	Total # of eligible structures found by SOPs	Total # of eligible structures sprayed	% of total structures sprayed	Population protected	Pregnant women protected	Children under 5 protected	% of population protected	Eligible rooms	
								Found	Sprayed
Vélingara	80,812	78,284	96,9%	277,433	6,407	49,091	97,6%	143 257	139 842
Koumpentoum	44,645	44,227	99,1%	141,905	3,520	26,912	99,2%	53 363	52 885
Malem Hoddar	31,425	30,467	97,0%	95,978	1,995	17,843	96,9%	38 438	37 390
Koungheul	56,097	54,138	96,5%	174,713	3,670	33,042	97,1%	71 510	69 064
Total	212,979	207,116	97,2%	690,029	15,592	126,888	97,7%	306 568	299 181

### 9.3.2 INSECTICIDE CONSUMPTION AND MOSQUITO NET USE

A total of 88,109 insecticide sachets were distributed to the districts, and 65,049 were used to spray 207,116 structures (Table 22). On average, one sachet covered 3.2 structures, and spray operators sprayed 13 structures per day. The stock balance at the end of the campaign was 23,060 unused sachets, and no damaged sachet.

**TABLE 26. INSECTICIDE USAGE AND SPRAY OPERATOR PERFORMANCE**

District	Number of sachets Issued	Number of sachets Used	Number of structures Sprayed	Average number of structures sprayed per sachet	Number of rooms Sprayed	Average number of rooms sprayed per sachet
Koumpentoum	18,000	12,356	44,227	3.6	52,885	4.3
Koungheul	22,928	15,117	54,138	3.6	69,064	4.6
Malem Hoddar	12,480	8,600	30,467	3.5	37,390	4.3
Vélingara	34,701	28,976	78,284	2.7	139,842	4.8
Total	88,109	65,049	207,116	3.2	299,181	4.6

Overall, AIRS Senegal sprayed 207,116 structures with the average rate of structures per day sprayed ranging from 11 to 15. The project also reports spray coverage by room because historically the Government of Senegal records and reports IRS results by room. The total number of rooms sprayed was 299,181, with the average number sprayed per day 18 or 20 depending on the district, as shown in Table 27.

**TABLE 27. RATE OF SPRAY PROGRESS**

Districts	Structures sprayed	Rooms sprayed	# of days	# of spray operator days	Average # rooms/day	Average # structures/day
Koumpentoum	44,227	52,885	35	2,916	18	15
Koungheul	54,138	69,064	36	3,765	18	14
Malem Hoddar	30,467	37,390	30	2,058	18	15
Velingara	78,284	139,842	47	6,847	20	11
Total	207,116	299,181				

## 9.4 POST-SPRAY DATA QUALITY AUDIT

This section documents an M&E activity that was implemented midway between the 2012 and 2013 campaigns and, therefore, the results were not completed until after the submission of the 2012 AIRS Senegal End of Spray Report. In 2013 AIRS Senegal ran a PMI-supported Post-Spray Data Quality Audit (PSDQA) whose primary objective was to validate the spray coverage and the percentage of people protected reported by AIRS Senegal for the 2012 spray campaign. With the results, we also identify lessons learned and institute improvements for data collection/entry in future IRS campaigns.

Through a four-stage sampling design, we selected a representative sample and surveyed 500 eligible structures in four target districts. The audit found that 93.4% [91.22; 95.58] of sampled structures (n=467) reported a visit by a mobilizer with IEC messages before the spray. Of these, 74.37% could present their IRS card (n=349).

Spray coverage audit data show that 94.43% [92.42; 96.44] of structures were sprayed compared to the 98.26% coverage reported in the 2012 End of Spray Report. Since there is a statistically significant difference between the two spray coverage calculations, we can conclude that the actual spray coverage is lower than what was reported for the 2012 campaign. Migratory populations and the use of semi-permanent structures in some target areas, the transition of storage granaries to sleeping structures, and spray operator data collection inaccuracies may have contributed to the difference between the 2012 spray coverage results and post-spray audit.

The discrepancy between the reported spray coverage and the PSDQA findings can be explained, in part, by the fact that in 2012, AIRS Senegal did not complete enumeration. As a result, their geographical information was incomplete prior to spraying, and there was confusion on the part of spray operators in regard to village names. Hence, the 2012 spray data had geography errors. The audit team found that actual village size differed from spray campaign data. Since the PSDQA uses spray campaign geography and data in designing the sample, these issues negatively impacted sample selection. Furthermore, AIRS Senegal sprays in areas with semi-permanent structures and nomadic populations.

# 10. IRS COUNTRY CAPACITY ASSESSMENT

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AIRS Senegal carried out a capacity assessment exercise using the IRS Country Capacity Framework developed by the AIRS Home Office team. The purpose of the assessment was to evaluate the overall level of capability and capacity of Senegal government and independent local entities to carry out the technical, operational and management functions to implement IRS programs. After the Home Office reviewed the preliminary results, the AIRS Senegal team shared the draft presentation with the NMCP coordinator and PMI for feedback and recommendations. On September 20, 2013 AIRS Senegal presented the results to the IRS steering committee. During the meeting it was recognized that NMCP will not be able to implement the entire IRS program activities based on the nature of the program. IRS implementation is mostly a campaign that requires full attention of district health personnel for a long period of time, which may heavily impact other health programs for this reason. The group produced three general IRS categories that will require further assistance:

- Strengthen the capacity of the NMCP in the area of inventory, quantification and procurement.
- The management and implementation of IRS activities at all levels.
- Data management.

The duration of the meeting did not allow time for finalizing an IRS transition plan as expected. However, the steering committee proposed that NMCP review the assessment results using the AIRS framework. A meeting will be organized to discuss and harmonize both NMCP and AIRS results before final recommendations for the transition plan will be made.

## II. GENDER ASSESSMENT

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From March 16 to 29, 2013, Cultural Practice, LLC conducted a review of gender issues related to the AIRS project in Senegal with the following purpose:

- Identify key gender-based constraints and opportunities with regard to spray operations.
- Provide recommendations for developing appropriate interventions to offset existing gender-based differences and/or disparities.
- Set overall and intermediary annual benchmarks for women's employment in labor categories in which they are underrepresented.

AIRS Senegal has been taking gender issues into account since the start-up of the country program. The 2012 IRS campaign results showed that out of the total of 1,651 people trained, 218 (13.20%) were women compared to 1,439 men trained (86.80%). In 2013, the project trained 3,973 people total, including 939 females (31.7%), which is an increase of 18.5% compared to in the 2012 spray campaign. The report is yet to be finalized. AIRS Senegal may consider for the next spray round the following activities to increase women's participation in IRS:

- Increase advocacy for women's recruitment for IRS activities during planning meetings and any other meeting opportunities including local leaders and community-based organizations, specifically, women and youth associations.
- Use women SOP to encourage other women.
- Create incentives for a greater level of women's employment by addressing topics of value to them in conjunction with the IRS, such as an employment opportunity, or learning new skills.

## 12. LESSONS LEARNED

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- The enumeration of IRS-eligible structures and rooms made it possible to have a consistent and accurate denominator among the strategic partners PMI/NMCP/SNH. It also helped to establish realistic targets per district and per site.
- In 2013, the project revised the planning approach for the needs assessment, quantification of insecticide, and distribution schedule. As a result, AIRS Senegal purchased sufficient quantities of equipment and insecticide in a timely manner, and distributed them to all sites two weeks prior to the start of spray operations. Improved inventory management made it possible to avoid stock-outs. This approach to the pesticide stock management will be enhanced and reinforced during the trainings for the 2014 campaign.
- The presence of AIRS Senegal teams in the field (two per district) for supervision purposes during the entire campaign—with systematic use of the SNH supervision grid, spray operations monitoring, and addressing on the spot most of the issues that arose—significantly helped to improve SOPs' performance. The project will continue to use this approach for supervision in 2014.
- The use of smartphones for collecting and transmitting environmental compliance data resulted in much greater environmental compliance transparency, and allowed the COP, Operations Manager, ECO, ECM, and Technical Coordinators to be much more aware of site conditions than had previously been possible. The system was still in its pilot phase during the Senegal campaign, but it is expected to be even more useful next year when revisions and refinements have been made to the database and report forms.
- Putting in place the Spray Performance Tracking Sheet tool at each site has allowed a visual daily monitoring of SOP performance and of pesticide use among the SOPs themselves and their supervisors at all levels. In addition, the tool created competition among spray teams at the same site (Koungheul 1 and 2) and between the sites within the same district. It was a successful experience and the team will continue using the performance tracking sheet in the next campaign.
- Using prepaid cards for fuel supply saved money and time, thus avoiding any disruption in fuel supply during the 2013 IRS campaign. For the few difficulties encountered in Koumpentoum where the fuel supply partner does not operate, there will be alternative solutions to consider.
- Introducing the Error Eliminator form to supervisors at all levels (operational site managers, team leaders, SNH supervisors, IEC community supervisors, HPNs and AIRS teams) made it possible to detect and correct errors on a daily basis before sending the information to the data clerks for entry. In 2014, the use of this form will be required for all supervisors and extended to all data collected at site level.
- Implementing the 2013 IRS campaign in the rainy season and during the fasting period of Ramadan allowed us to have better knowledge of inaccessible areas during this period in the year. This information will be useful for the selection of adequate vehicles and drivers, and also for planning the work around the country holidays (End of Ramadan) and the day following the Destiny Night (Lailat Ul-Qadr). The project will also strive to initiate the operations way ahead of the rainy season to minimize challenges related to transportation and holidays.

## 13. RECOMMENDATIONS

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- Obtain better community involvement via local governments (IRS to be included in local government budgets).
- Be more specific with contract terms for vehicle owners as regards working hours in IRS.
- Incorporate community contributions in to the financial planning of district IRS activities
- Recruit IEC mobilizers with a better educational level to improve the quality of collected data.
- Establish an operational site in Sinthiang Koundara (Velingara).
- Improve the process of distribution of IRS cards.
- Relocate the insecticide room in Koumpentoum out of the main building prior to next spray round.
- Use improvements that will be done by the home office to the IRS EC database and reports for mid- and post-IRS phases.
- Instruct mobilizers and SOPs to collect feedback from the beneficiaries on IRS messages received to verify the level of comprehension.
- Ensure maintenance of spray pumps (pressure gauges, nozzles) in order to keep them operational and avoid insecticide leakage.
- Avoid keeping fuel in the storage area.
- Automate compilation of spray operator performance worksheet by SMS
- Build NMCP capacity in IRS management

# ANNEX A. AIRS SENEGAL

## PROCUREMENT AND POST-SPRAY STOCK BALANCE

Procurement											
Items	Qty	Dispatching				Balance in District Central Warehouses				Balance in Main Warehouse	Total Balance
		Malem Hoddar	Koungheul	Koumpentoum	Velingara	Malem Hoddar	Koungheul	Koumpentoum	Velingara		
<b>LOCAL PROCUREMENT</b>											
T-shirts	3,700	490	772	770	1626	43	00	00	180	42	265
Polo Shirts	150	17	23	21	30	00	00	00	00	16	16
Caps	150	17	23	21	30	00	00	00	00	10	10
Towels	1,008	156	274	236	447	14	00	00	00	00	14
Socks	2,222	280	550	454	876	15	00	00	240	143	398
Soap 500g	1,819	300	540	480	780	18	36	90	00	211	355
Soap 250g	8,970	1,150	2,180	1,840	3,720	144	684	36	686	889	2439
Bleach	106	15	27	24	39	00	00	01	08	10	19
Liquid Detergent	116	15	27	24	39	01	09	04	00	11	24
Powder Soap	3,059	1,580	2,940	2,640	4,220	160	00	560	1,320	109	2149
Teflon	154	20	36	32	52	13	22	16	31	14	83
Grease Pot 1kg	62	10	18	16	26	07	16	15	21	00	59
Adhesive Tape LM	160	20	20	20	20	07	03	07	11	00	28
Laundry Brush	77	17	19	18	37	77	19	18	37	05	156
Flat Wrench	70	12	20	18	28	12	20	18	28	172	250
Universal Pliers	49	11	20	18	24	11	20	18	24	02	75
Gas Tongs	70	12	20	18	28	12	20	18	28	106	184
Plastic Apron	69	36	68	64	92	20	31	30	53	29	163
Toothbrush	567	70	134	108	247	00	00	46	107	66	219
Steel Glue Epoxy	157	20	36	32	52	02	22	00	37	19	80
Plastic Sheet Rolls	57	08	12	11	16	4	7	4	2	25	42
Local Brooms	59	16	22	17	09	16	22	17	09	00	64
Ceiling Fans	32	07	00	08	13	06	09	13	00	07	35
Adhesive Paper	154	20	36	32	52	00	00	00	00	00	00
Plastic Bags	49,192	9,000	10,720	9,600	19,760	300	500	210	600	00	1610

Procurement											
Items	Qty	Dispatching				Balance in District Central Warehouses				Balance in Main Warehouse	Total Balance
		Malem Hoddar	Koungheul	Koumpentoum	Veingara	Malem Hoddar	Koungheul	Koumpentoum	Veingara		
Measure Tape	45	05	09	08	13	04	00	08	13	00	25
Markers	325	50	87	90	98	00	00	00	00	00	00
Folders	2,200	250	500	500	500	00	00	00	00	00	00
Inner Folder	1,760	500	500	500	500	00	00	00	00	00	00
Flap Folder	2,843	396	601	644	1,294	00	00	00	00	00	00
Black Pencil	4,654	477	754	768	1,568	35	00	21	144	00	200
Eraser	4,654	477	754	768	1,568	89	30	00	272	00	391
Note Pad	2,843	396	601	643	1,294	03	00	00	55	00	58
Calculator	179	34	58	52	82	85	60	50	82	01	278
Log Book	43	06	12	09	16	00	00	00	00	01	01
Ruler 30 cm	86	10	14	13	18	00	00	00	00	02	02
Clip A4	1,280	161	291	259	464	154	269	247	464	00	1134
Chalk Box (color)	35	05	09	08	13	00	00	00	00	00	00
Chalk Box (white)	35	05	09	08	13	00	00	00	00	00	00
Binder	80	20	20	20	20	12	08	15	16	00	51
Stapler	95	14	22	20	30	14	21	14	31	02	82
Pencil Sharpener	4,383	465	712	752	1,392	87	168	46	72	00	373
Archive Box D4											
Shower Cap	137	18	34	32	46	00	00	00	00	00	00
Scissors	75	10	18	17	25	10	18	17	25	05	75
<b>INTERNATIONAL PROCUREMENT</b>											
Spray Ops Bag	1,000	100	153	126	280	87	155	116	294	500	1152
Face Shield	837	45	303	246	471	00	00	00	00	00	00
Face Shield Bracket	104	45	276	226	471	155	247	197	411	1,324	2334
Nose Mask w/o Filter	4,080	685	3,365	1,015	115	280	2,598	240	00	00	3118
Nose Mask w/Filter	27,360	6,260	5,520	8,840	15,360	708	1,720	3,541	6,279	30	12278
Nozzle 8002	249	66	134	116	257	47	64	106	210	3,476	3903
Pesticide	88,109	12,480	22,928	18,000	34,701	00	00	00	00	23,060	2360

# ANNEX B. PEOPLE TRAINED FOR 2013 CAMPAIGN

Categories of people trained	Training for IRS Implementation										Other Trainings										Total General				
	Trainers' Training		SOP Training		Data Entry		Logistics & Finance Training		Technical Maintenance		Poisoning Management		PPE Cleaning		Fire Safety		Transport Safety		Mobilization		Enumeration		By gender		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
DREEC	2	2																					2	2	4
District Coordinators	3	1																					3	1	4
DMO	5	0																					5	0	5
Nurses											25	23											25	23	48
SNH Supervisor of Spray Operators	64	0																					64	0	64
IEC Mobilizers																			825	728			825	728	1,553
IEC Community Supervisors																			145	50			145	50	195
Enumeration Supervisors																					145	47	145	47	192
Enumeration Surveyors																					530	203	530	203	733
Spray Operator			503	48																			503	48	551
Substitutes Operators			89	14																			89	14	103
Operational Site Manager			31	4																			31	4	35
Team Leader			108	11																			108	11	119

Categories of people trained	Training for IRS Implementation										Other Trainings										Total General				
	Trainers' Training		SOP Training		Data Entry		Logistics & Finance Training		Technical Maintenance		Poisoning Management		PPE Cleaning		Fire Safety		Transport Safety		Mobilization		Enumeration		By gender		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Data Entry Clerks					30	16																	30	16	46
Storekeepers							29	4															29	4	33
Storekeeper Assistants							5	1															5	1	6
Finance Assistants							2	2															2	2	4
Logistics Assistants							3	1															3	1	4
Maintenance Technicians									56	0													56	0	56
Washers												0	66										0	66	66
Drivers																	92	0					92	0	92
Guards														60	0								60	0	60
Total by gender	74	3	731	77	30	16	39	8	56	0	25	23	0	66	60	0	92	0	970	778	675	250			
Total	77		808		46		47		56		48		66		60		92		1748		925		2,752	1,221	3,973

# ANNEX C. CONTAMINATED SOLID WASTES MOVEMENT NOTIFICATION FORM



## NOTIFICATION SHEET FOR CONTAMINATED SOLID WASTES MOVEMENT 2013 IRS CAMPAIGN

1. PRODUCER	NOTIFICATION NUMBER : 01/2013
<p>Designation: Masks, Empty FICAM Sachets            Organization: Abt Associates Inc. /IRS Program            Address : Immeuble Abdoulaye SECK, Rue de Fatick X            Bd. du Sud-Point E/ Dakar-Fann, SENEGAL            Contact Details : (221) 33 859 43 60            BP : 25 656 Dakar-Fann            Chief of Party: Dr. Adama KONE</p> <p>I hereby certify that the information provided on this form is accurate and in good faith</p> <p>Date : 03/10/2013            Stamp &amp; Signature : </p> <p><b>Abt Associates Inc. Africa IRS</b>            Rue de Fatick X Boulevard            du Sud-Point E Immeuble A. Seck 4<sup>e</sup> Eta.            TEL: 33 859 43 60            B.P.-25656 Dakar Fann - SENEGAL</p>	<p>IRS Campaign : 2013            Quantity Submitted : 1,350kg            Designation and composition of wastes : Masks,            Empty FICAM Sachets            Chemical Characteristics :            Packaging :            Type : Cardboards. Number : 441            Place of production : Health districts of Msiem            Hodar, Koungheul, Koumpentoum and Velingara</p>
<p>2. ORGANIZATION/CONVEYOR</p> <p>Designation : Masks, Empty FICAM Sachets            Driver : <i>Alpha Amadou Barry</i>            Driving License : N° <i>079658</i>            Address : HLM 1            Contact Details : <i>(921) 77 353 00 61</i>            Organization/Conveyor : <i>Alpha A. Barry</i>            Address : HLM 1            Contact Details : <i>(221) 77 353 00 61</i>            E-mail :</p> <p>I hereby certify that the information provided on this form is accurate and in good faith</p> <p>Date : 08/10/2013            Stamp &amp; Signature : </p>	<p>Way of Transportation : Vehicle            Registration Document :            Date of shipment : September 29, 2013</p>
<p>3. ELIMINATOR</p> <p>Designation : Masks, Empty FICAM Sachets            Organization : SOCOCIM Industrie            Managing Director :            Address : <i>BP 29 Rufisque</i>            Phone : <i>33835 8888</i>            E-mail : <i>business.dept@soccim.com</i></p> <p>I hereby certify that the information provided on this form is accurate and in good faith</p> <p></p>	<p>Authorization N°: 01910/MEDD/DEEC/DPN            dated July 8, 2013            Quantity delivered : 1,350kg            Delivery date: September 30 2013            Storage place : SOCOCIM Industrie warehouse            Final destination : Incineration in boilers</p> <p>Date : 08/10/2013            Stamp &amp; Signature : </p>

# ANNEX D: INDICATOR MATRIX WITH YEAR 2 RESULTS

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target	Results	Target	Results	Target	Results

**Component 1: Establish cost-effective supply chain mechanisms including procurement, distribution and storage of IRS-related commodities and execute all aspects of logistical plans for IRS-related activities.**

1.1 Procurement											
1.1.1 Number and percentage of international insecticide procurement orders delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<p>[<i>Numerator</i>: Number of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations]</p> <p>[<i>Denominator</i>: Total number of international insecticide procurements]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] x 100</p>	Y1, Y2, Y3	<p><i>Data source</i>: Project records—ex: international procurement documents, air way bills, commercial invoices</p> <p><i>Reporting frequency</i>: Each spray season (annual/semi-annual)</p>	By spray campaign	AIRS	1; 80%	4; 25%	1; 100%	1;100%	#TBD; 100%	
1.1.2 Number and percentage of international procurement orders for equipment, including PPE, at port of entry, 30 days prior to start of spray operations	<p>[<i>Numerator</i>: Number of international procurements for equipment, including PPE, at port of entry, 30 days prior to start of spray operations]</p>	Y1, Y2, Y3	<p><i>Data source</i>: Project records</p> <p><i>Reporting frequency</i>: Each spray season (annual/semi-annual)</p>	By spray campaign	AIRS	1; 85%	1; 100%	1; 100%	1; 100%	#TBD; 100%	

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target	Results	Target	Results	Target	Results
received at port of entry, 30 days prior to start of spray operations	<p><i>[Denominator: Total number of international procurements for equipment, including PPE]</i></p> <p><i>Calculation: [Numerator ÷ Denominator] x 100</i></p>										
1.1.3 Number and percentage of local PPE procurement orders that are delivered to the main warehouse 14 days before the start of spray operations	<p><i>[Numerator: Number of local PPE procurements delivered 14 days before the start of spray operations]</i></p> <p><i>[Denominator: Total number of local PPE procurements]</i></p> <p><i>Calculation: [Numerator ÷ Denominator] x 100</i></p>	Y1, Y2, Y3	<p><i>Data source: Project records—ex: delivery notes, goods receiving notes, inventory control cards</i></p> <p><i>Reporting frequency: Each spray season (annual/semi-annual)</i></p>	By spray campaign	AIRS	1; 80%	1; 100%	1; 100%	1; 100%	#TBD; 100%	
1.1.4 Successfully completed spray operations without an insecticide stock-out	Milestone: (Achieved/Not Achieved)	Y1, Y2, Y3	<p><i>Data source: Project records—ex: inventory control cards</i></p> <p><i>Reporting frequency: Each spray season (annual/semi-annual)</i></p>	By spray campaign	AIRS	Achieved	Not achieved	Achieved	Achieved	Achieved	

1.2 In-country Logistics, Warehousing, and Training

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target	Results	Target	Results	Target	Results
1.2.1 Number and percentage of logistics, warehouse managers, and storekeepers trained in IRS supply chain management	<p>[<i>Numerator</i>: Total number of logistics and warehouse managers trained in IRS supply chain management using AIRS Project resources]</p> <p>[<i>Denominator</i>: Total number of AIRS logistics and warehouse managers]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] x 100</p>	Y1, Y2, Y3	<p><i>Data source</i>: Routine training records</p> <p><i>Reporting frequency</i>: Semi-annually</p>	<p>By spray campaign</p> <p>By gender</p>	PMI	N.A.; 100%	51	38	43 <sup>2</sup>	TBD	
1.2.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<p>[<i>Numerator</i>: Number of base stores where physical inventories are verified by up-to-date stock records]</p> <p>[<i>Denominator</i>: Total number of base stores audited]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] x 100</p> <p>(See PIRS for details on sample size for operational audits.)</p>	Y2, Y3	<p><i>Data source</i>: Project records —ex: inventory control cards</p> <p><i>Reporting frequency</i>: Each spray season (annual/semi-annual)</p>	By spray campaign	AIRS	7; 85%	7; 100%	7; 85%	5; 100%	#TBD; 100%	

<sup>2</sup> There are 33 storekeepers, 6 storekeeper assistants and 4 logistics assistants

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target	Results	Target	Results	Target	Results
1.2.3 Submit up-to-date inventory records to AIRS Home Office 30 days after the end of each spray campaign	Milestone: (Completed/Not Completed)	Y2, Y3	<i>Data source:</i> Project records—ex: warehouse inventory control cards  <i>Reporting frequency:</i> Each spray season (annual/semi-annual)	By spray campaign	AIRS	N.A.	N.A.	Completed	Not completed	Completed	

**Component 2: Implement safe and high-quality IRS programs and provide operational management support.**

**2.1 Planning and Design of IRS Programs**

2.1.1 Annual IRS country work plan developed and submitted on time	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Annually		AIRS	Completed	Completed	Completed	completed	Completed	
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**2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations**

2.2.1 SEA/letter report submitted on time <sup>3</sup>	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	<i>Data source:</i> Project records—submitted SEAs/letter reports  <i>Reporting frequency:</i> Each spray campaign	By spray campaign	AIRS	Completed	Completed	Completed	Completed	Completed	
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<sup>3</sup> In Year 1, SEAs were due 30 days prior to the start of spraying and letter reports were to be submitted 14 days before the start of spraying. In Year 2 and Year 3, due dates agreed upon with Washington-PMI will be noted in each country-specific Monitoring and Evaluation Plan to assess indicator 2.2.1.

2.2.2 Number and percentage of soak pits and warehouses/storerooms inspected and certified by an environmental officer/AIRS Environmental Compliance Officer prior to spraying	[Numerator: Number of soak pits and/or storehouses inspected and certified by AIRS Environmental Compliance Office]  [Denominator: Total number of project soak pits and/or storehouses]  Calculation: $[Numerator \div Denominator] \times 100$	Y1, Y2, Y3	Data source: Project records—Reports submitted by environmental officers  Reporting frequency: Each spray season	By spray campaign  By soak pits and warehouses/storerooms	AIRS	83  100% inspected and approved prior to spraying	83  100%	35 soak pits 33 warehouses; <sup>4</sup> 100%	35 soak pits 33 warehouses 100%	100%	
2.2.3 Number of government environmental and health officers trained in IRS environmental compliance	Total number of government environmental and health officers trained in IRS environmental compliance using AIRS Project resources	Y1, Y2, Y3	Data source: Project training reports  Reporting frequency: Semi-annually	By spray campaign  By gender	AIRS	N.A.	82 M: 79 F: 3	54 M: 48 F: 6	57 <sup>5</sup> M: 32 F: 25	TBD	

<sup>4</sup> Central warehouse 1, districts central stores 4, secondary stores in operational sites 28.

<sup>5</sup> 4 DREEC; 5DMO; 48Nurses.

2.2.4 Total number of spray personnel who attend a training in environmental compliance and personal safety standards in IRS implementation using AIRS Project resources, includes all staff who received environmental compliance training—spray operators, team leaders, washpersons, storekeepers, etc.	Total number of spray personnel who attend a training in environmental compliance and personal safety standards in IRS implementation using AIRS Project resources, includes all staff who received environmental compliance training—spray operators, team leaders, washpersons, storekeepers, etc.	Y1, Y2, Y3	<i>Data source:</i> Project records—Training reports  <i>Reporting frequency:</i> Each spray season	By spray campaign  By gender	AIRS	1609	1210 M: 1043 F: 167	1105 M: 928 F: 177	1121 <sup>6</sup> M: 973 F: 148	TBD	
2.2.5 Number of health workers receiving insecticide poisoning case management training	Total number of clinical personnel trained in insecticide poisoning case management using AIRS Project resources	Y2, Y3	<i>Data source:</i> Project records—Training reports  <i>Reporting frequency:</i> Each spray season	By spray campaign  By gender	AIRS	59	120 M: 89 F: 31	43 M: 32 F: 11	53 <sup>7</sup> M: 30 F: 23	TBD	
2.2.6 Number of adverse reactions to pesticide exposure documented	Total number of incidents of pesticide exposure reported that resulted in a referral for medical care	Y1, Y2, Y3	<i>Data source:</i> Incident report forms that are required for each incidence of pesticide exposure  <i>Reporting frequency:</i> Each spray season	By spray campaign  By residential/occupational exposure	AIRS	0	10	0	3 M: 1 F: 2	0	
2.2.7. Number of vehicular accidents reported	Total number of vehicular accidents reported	Y1, Y2, Y3	<i>Data source:</i> Vehicular incident report forms that are required for each accident	By spray campaign	AIRS	0	2	0	4	0	

<sup>6</sup> 551 spray operators; 103 substitute operators; 35 operational site managers; 119 team leaders; 33 storekeepers + storekeepers warehouse; 6 storekeeper assistants; 56 maintenance technicians; 66 washers; 92 drivers; 60 guards.

<sup>7</sup> 5DMO; 48Nurses

			Reporting frequency: Each spray season								
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### 2.3 Support Entomological Monitoring Activities and Insecticide Resistance Strategies<sup>8</sup>

2.3.1 Number of sentinel sites supported by the AIRS project	Total number of entomological sentinel sites supported by the AIRS project	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By spray campaign	AIRS	N.A.	N.A.	N.A.		TBD	
2.3.2 Number and percentage of entomological monitoring sentinel sites measuring all five primary PMI entomological indicators	<i>[Numerator:</i> Number of entomological monitoring sites measuring all five primary PMI entomological indicators]  <i>[Denominator:</i> Number of entomological monitoring sentinel sites]  <i>Calculation:</i> [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By spray campaign	AIRS	N.A.	N.A.	N.A.		TBD	
2.3.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	<i>[Numerator:</i> Number of entomological monitoring sites measuring at least one secondary PMI indicator]  <i>[Denominator:</i> Number of entomological monitoring sites]  <i>Calculation:</i> [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By spray campaign	AIRS	N.A.	N.A.	N.A.		TBD	

<sup>8</sup> PMI directly supports UCAD for IRS entomological monitoring; entomological activities are not supported by Abt in Senegal.

2.3.4 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	<p><i>[Numerator:</i> Number of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control]</p> <p><i>[Denominator:</i> Number of insecticide resistance testing sites]</p> <p><i>Calculation:</i> [Numerator ÷ Denominator] x 100</p>	Y1, Y2, Y3	<p><i>Data source:</i> Entomological reports</p> <p><i>Reporting frequency:</i> Annually</p>	<p>By spray campaign</p> <p>By type of Insecticide</p>	AIRS	N.A.	N.A.	N.A.		TBD	
2.3.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Total number of wall bioassay studies conducted in established sentinel sites to evaluate quality of IRS spraying activities	Y1, Y2, Y3	<p><i>Data source:</i> Entomological reports</p> <p><i>Reporting frequency:</i> Per spray campaign</p>	By spray campaign	PMI	N.A.	N.A.	N.A.		TBD	
2.3.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Total number of wall bioassay studies conducted at monthly intervals in established sentinel sites to evaluate the rate of insecticide decay on sprayed surfaces	Y1, Y2, Y3	<p><i>Data source:</i> Entomological reports</p> <p><i>Reporting frequency:</i> Per spray campaign</p>	By spray campaign	PMI	N.A.	N.A.	N.A.		TBD	
2.3.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Total number of vector susceptibility tests conducted to gauge the effectiveness of individual insecticides proposed for use in spray operations	Y1, Y2, Y3	<p><i>Data source:</i> Entomological reports</p> <p><i>Reporting frequency:</i> Per spray campaign</p>	<p>By spray campaign</p> <p>By type of Insecticide</p>	PMI	N.A.	N.A.	N.A.		TBD	

#### 2.4 Conduct Communications Activities and Community Mobilization

2.4.1 Number of radio spots and talk shows aired	Total number of radio spots and talk shows aired in target spray districts to stress the safety and benefits of IRS, ensure successful spray coverage, timely vacating of premises and adherence to IRS safety precautions by community members	Y1, Y2, Y3	<i>Data source:</i> Project records— ex: payment receipts  <i>Reporting frequency:</i> Semi-annually	By spray campaign	AIRS	N.A.	N.A.	368 <sup>9</sup>	661: 617 spots 44 talk shows	TBD	
2.4.2 Number of IRS print materials disseminated	Total number of IRS educational materials developed, printed and distributed to community members in target spray districts using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Semi-annually	By spray campaign  By type of printed material and message(s)	AIRS	N.A.	20,274 <sup>10</sup>	65,236 <sup>11</sup>	97,874 <sup>12</sup>	TBD	
2.4.3 Number of people reached with IRS messages via door-to-door mobilization	Total number of adults reached with IRS message during pre-spray community, door-to-door mobilization	Y1, Y2, Y3	<i>Data source:</i> Mobilization Data Collection Forms  <i>Reporting frequency:</i> Daily per mobilization conducted	By spray campaign  By gender	AIRS	N.A.	417,971 M: 162,050 F: 255,921	366,646 M: 175,990 F: 190,656	302,707 M: 135,585 F: 167,122	TBD	

<sup>9</sup> 320 spots & press releases, 48 radio programs

<sup>10</sup> 5,250 posters, 12,650 flyers (French & Wolof), 2,160 IEC mobilizer manuals, and 214 trainers' guides.

<sup>11</sup> 1,646 counselling cards, 50,000 posters, 13,500 compound cards, 90 trainers' guides.

<sup>12</sup> 1,852 counseling cards, 51,528 flyers, 81 trainers' guides, 1,852 IEC mobilizer manuals; 42,561 IRS cards.

2.5 Spray Targeted Structures According to Technical Specifications											
2.5.1 Number of structures targeted for spraying <sup>13</sup>	Total number of structures found in targeted spray districts by spray operators	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By spray campaign	PMI	295,000	312,938	204,585	212,979	TBD	
2.5.2 Number of structures sprayed with IRS <sup>14</sup>	Total number of structures sprayed in targeted districts	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By spray campaign	PMI	250,750 (85% of 295,000)	306,916	173,897 (85% of 204,585)	207,116	TBD	
2.5.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	[Numerator: Total number of structures sprayed in targeted districts ]  [Denominator: Total number of structures in targeted areas found by spray operators]  Calculation: [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By spray campaign	PMI	85%	98%	85%	97.2%	85%	
2.5.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Total number of people residing in structures sprayed (Actual numbers are collected during spray operations; population estimates are not used.)	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By spray campaign  By number of pregnant women  By number of children <5 years old	PMI	1,000,000	1,095,093  pregnant women: 26,263  children under 5: 220,463	667,000	690,029  pregnant women: 15,592  children <5: 126,888	TBD	

<sup>13</sup> The yearly targets for this indicator are from the applicable work plan. The yearly results are the number of structures found by SOPs during the spray campaign.

<sup>14</sup> The target per year for this indicator is based on 85% of the number of structures to be targeted as noted in the applicable work plan.

**Component 3: Provide Ongoing Monitoring and Evaluation and Quality Control Measures.**

3.1 Submit Monitoring and Evaluation Plan (MEP) to PMI- Senegal	<i>Milestone:</i> (Completed/Not Completed)	Y1, Y2, Y3	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Semi-annual		AIRS	Completed	Completed	Completed	Completed	Completed	
3.2 Submit a post-spray data quality audit report to the AIRS M&E specialist in the home office within 60-180 days of completion of spray operations	<i>Milestone:</i> (Completed/Not Completed)	Y1, Y2, Y3	<i>Data source:</i> Spray operations reports  <i>Reporting frequency:</i> Per spray campaign	By spray campaign	AIRS	Completed	Complete	N.A.	N.A.	TBD	
3.3 Submit a country-specific Eligible Structure Definition Document to local PMI advisors and NMCP	<i>Milestone:</i> (Completed/Not Completed)	Y1	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Semi-annually		AIRS	Completed	Completed	N.A.	N.A.	N.A.	N.A.

3.4 Supply chain review conducted by RTT	Milestone: (Completed/Not Completed)	Y1, Y2	Data source: RTT supply chain review reports  Reporting frequency: Semi-annually	By spray campaign	AIRS	Completed	Completed	N.A.	N.A	TBD	
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**Component 4:**

**Contribute to Global IRS Policy-Setting and Country-Level Policy Development of Evidence-Based IRS; Disseminate Experiences and Best Practices.**

4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Total number of implementation guidelines, process checklists and program tools related to IRS operations developed or refined using the technical and/or financial resources of the AIRS Project	Y1, Y2, Y3	Data source: Project records—Activity reports  Reporting frequency: Semi-annually	By Guideline/checklist/tool	AIRS	16  10 guidelines 6 checklists	16  10 guidelines 6 checklists	17  11 guidelines 6 checklists	21  8 checklists 13 guidelines		
4.2 Number of articles or best practice documents published	Total number of project-related oral and poster presentations delivered in national, regional and/or international meetings related to IRS	Y2, Y3	Data source: Project records—Activity reports  Reporting frequency: Semi-annually	By IRS Technical Area	AIRS		N.A.		N.A		
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Total number of project-related oral and poster presentations delivered in national, regional and/or international meetings related to IRS	Y2, Y3	Data source: Project records—Activity reports  Reporting frequency: Semi-annually	By IRS Technical Area	AIRS	N.A.	N.A.	N.A.	N.A		

**Component 5 (Cross-cutting): Capacity Building, Knowledge Transfer, Gender Inclusion.**

**5.1 Capacity Building (Gender Inclusion)**

5.1.1 Number of people trained in IRS implementation	Total number of personnel trained in IRS implementation using AIRS Project resources. This figure only includes spray personnel such as spray operators, team leaders, supervisors, clinicians; it excludes data clerks, IEC mobilizers, drivers, washers, porters, pump technicians, security guards, etc.	Y1, Y2, Y3	<i>Data source: Project records—Training reports</i>  <i>Reporting frequency: Semi-annually</i>	By spray campaign  By gender  Percentage of Women trained	PMI	1,505	1,221  M: 1,103 F: 118,10%	917  M: 825 F: 92,10%	933 <sup>15</sup>  M: 825 F: 100, 10.8%	TBD	
5.1.2 Number of people trained to deliver or support IRS in target districts <sup>16</sup>	Total number of people trained using AIRS Project resources to implement/support elements of IRS in target districts.  This figure includes all cadre that serve a role in IRS.	Y1, Y2, Y3	<i>Data source: Project records—Training reports</i>  <i>Reporting frequency: Semi-annually</i>	By spray campaign  By gender  By role (e.g., spray operator, storekeeper)  Percentage of women trained	AIRS	3,515	1,657  M: 1,439 F: 218, 13.2%	2,799  M: 2,379 F: 420, 15%	3,973  M: 2,752 F: 1,221 30.7%	TBD	

<sup>15</sup> 4 DREECs, 4 district coordinators; 5 DMOs; 48 nurses; 64SNH; 551 spray operators; 103 substitutes operators; 35 site managers; 119 team leaders

<sup>16</sup> See Annex B for the breakdowns of the training targets as presented in the 2012 and 2013 AIRS Workplan, and 2012 End of Spray Report.

5.1.3 Number of personnel trained as IRS implementation trainers	Total number of personnel trained in Training of Trainers for IRS delivery	Y1, Y2, Y3	<i>Data source:</i> Project records—Training reports  <i>Reporting frequency:</i> Semi-annually	By spray campaign  By gender  Percentage of women trained	AIRS	95	90 M: 88 F: 2, 2%	59	64 <sup>17</sup>  M:64 F: 0 0%	TBD	
5.1.4 Number of government environmental and/or health officials trained in IRS oversight	Total number of national and sub-national/district government environmental and/or health officials who are trained in oversight of IRS implementation using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Project records—Training reports  <i>Reporting frequency:</i> Semi-annually	By spray campaign  By gender  Percentage of women trained  Type of government official (e.g. ,environmental/health)	AIRS	N.A.	82  M: 79 F: 3, 3.6%  SNH, DREEC	31  M: 29 F: 2, 6%	121 <sup>18</sup>  M: 96 F: 25, 20.6%	TBD	
5.1.5 AIRS conducted a capacity assessment	AIRS Senegal program conducted an assessment of IRS capacity among national and sub-national/district government health officials.	Y1, Y2	<i>Data source:</i> Project records—Capacity assessment reports  <i>Reporting frequency:</i> Semi-annually		AIRS	Completed	In Process	Completed	In progress	TBD	
5.1.6 Number of capacity-building MOUs signed by AIRS, NMCP and partners/institutions	Total number of Memoranda of Understanding (MOU) on provision of local capacity-building finalized and signed	Y1, Y2, Y3	<i>Data source:</i> Project records—MOUs  <i>Reporting frequency:</i> Semi-annually	By spray campaign	AIRS	1 MOU Draft	1 MOU Draft	2	1	TBD	

<sup>17</sup> 64 SNH

<sup>18</sup> 4 DREEC, 5 DMO, 48 Health Nurses, 64 SNH.

between AIRS, the National Malaria Control Program, and other local partners and institutions											
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