



U.S. PRESIDENT'S MALARIA INITIATIVE



# PMI | Africa IRS (AIRS) Project

## Indoor Residual Spraying (IRS 2) Task Order Six

# RWANDA

# END OF SPRAY REPORT

SPRAY CAMPAIGN: SEPTEMBER 19 – OCTOBER 11, 2016

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# ACRONYMS

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<b>AIRS</b>	Africa Indoor Residual Spraying
<b>BCC</b>	Behavior Change Communication
<b>CFV</b>	Control Flow Valve
<b>CHW</b>	Community Health Worker
<b>COP</b>	Chief of Party
<b>CS</b>	Capsule Suspension
<b>CTC</b>	Client Technology Center
<b>DCV</b>	Data Collection Verification
<b>DEV</b>	Data Entry Verification
<b>DOS</b>	Directly-Observed Spraying
<b>ECO</b>	Environmental Compliance Officer
<b>EE</b>	Error Eliminator
<b>EPEDR</b>	<i>Entreprise pour la Protection de l'Environnement et Developement Rural</i>
<b>FIFO</b>	First In First Out
<b>HLC</b>	Human Landing Catch
<b>IEC</b>	Information, Education and Communication
<b>IRM</b>	Insecticide Resistance Management
<b>IRS</b>	Indoor Residual Spraying
<b>M&amp;E</b>	Monitoring & Evaluation
<b>MOH</b>	Ministry of Health
<b>MOP</b>	Malaria Operational Plan
<b>MOPDD</b>	Malaria and Other Parasitic Diseases Division
<b>MPDD</b>	Medical Procurement and Distribution Division
<b>OP</b>	Organophosphate
<b>PMI</b>	President's Malaria Initiative
<b>PMT</b>	Performance Monitoring Tracking
<b>PPE</b>	Personal Protective Equipment
<b>PSC</b>	Pyrethrum Spray Catch
<b>RBC</b>	Rwanda Biomedical Center
<b>REMA</b>	Rwanda Environmental Management Authority
<b>RHCC</b>	Rwanda Health Communication Center
<b>SACCO</b>	Savings and Credit Cooperatives
<b>SEA</b>	Supplemental Environmental Assessment
<b>SOP</b>	Spray Operator
<b>TL</b>	Team Leader
<b>ToT</b>	Training of Trainers
<b>USAID</b>	United States Agency for International Development
<b>WHO</b>	World Health Organization



# EXECUTIVE SUMMARY

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Abt Associates (Abt) supports the implementation of indoor residual spraying (IRS) in Rwanda through the Africa Indoor Residual Spraying (AIRS) project funded by the United States Agency for International Development (USAID) under the President's Malaria Initiative (PMI). The objective of the project is to limit exposure to malaria vectors and reduce the incidence and prevalence of malaria. To achieve this objective, AIRS Rwanda conducted IRS from September 19 – October 11, 2016, with a target of 188,189 structures in 26 sectors in two districts, Nyagatare (14 sectors) and Kirehe (12 sectors) using Actellic 300 capsule suspension (CS) (Organophosphate).

The spray campaign lasted 20 operational days during September 2016 (see Table 1). Below are the key project achievements and highlights.

AIRS sprayed 198,970 out of 200,278 structures found by spray operators in the targeted districts, accounting for a coverage rate of 99.3%. In total, 812,714 residents received protection, including 118,913 (14.6 %) children under five and 13,718 (1.7%) pregnant women.

AIRS Rwanda mobilized 204,715 structures.

AIRS Rwanda trained 4,975 individuals using PMI funds to support IRS activities in the two districts. Of these, 1,322 were spray operators (SOPs) (548 males and 774 females), 312 were team leaders (TLs) (158 males and 154 females), and 2,474 were village Information, Education and Communication (IEC) mobilizers (2,289 males and 185 females). More than half (56.8%) of all SOPs trained to implement IRS were female. Overall, 28.8% (n=1,435) of all IRS trained personnel for the September – October 2016 campaign were female.

AIRS Rwanda used 155,577 bottles of insecticide to spray 198,970 structures in the two PMI target districts, with a utilization ratio of approximately 1:1.3 (bottles to structures sprayed).

AIRS Rwanda sprayed 157 dormitories in 26 schools and three police stations in the target districts, protecting 8,118 residents. Spray operators used 293 bottles of insecticide for these structures.

AIRS Rwanda incinerated all IRS contaminated waste (480 kg), including 37,516 used masks. Incineration took place at two incineration plants - Nyagatare Hospital for waste from Nyagatare and Kirehe Hospital for waste from Kirehe. A total of 155,870 empty insecticide bottles, 813 used gloves, and assorted plastic items (damaged barrels, jerry cans and basins) were sent to the Enterprise pour la Protection de l'Environnement et Développement Rural (EPEDR) recycling plant. AIRS Rwanda donated 12,989 uncontaminated carton boxes to Cards from Africa Company at Samuduha. AIRS Rwanda disposed of other uncontaminated waste such as used dried cell batteries at the Nduba dumping site.

Cone bioassays conducted within one week of spraying showed 100% mortality of susceptible *An. gambiae* s.s. Although the results showed satisfactory application of the insecticide, pirimiphos-methyl has an air borne effect that lasts from a few weeks to several months. Hence, data collected in October 2016 which showed 100% mortality was used to further confirm spraying quality and to provide a baseline. Data collected in November and December 2016, (two and three months post IRS respectively) showed 100%.

**TABLE 1: AIRS RWANDA IRS CAMPAIGN SUMMARY: SEPTEMBER 2016**

Number of districts covered by PMI-supported IRS	2 districts (Nyagatare and Kirehe)
Insecticide	Organophosphate (OP)
Number of structures covered by PMI-supported IRS	198,970
Number of structures targeted by PMI-supported IRS	200,278
Spray coverage	99.3%
Population protected by PMI-supported IRS	812,714 (13,718 pregnant women; 118,913 children under 5 years old)
Dates of PMI-supported IRS campaign	September 19 - October 11, 2016
Length of campaign	20 days
Number of people trained with USG funds to deliver IRS <sup>1</sup>	1,833

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<sup>1</sup> Based on the PMI indicator definition, this includes only spray personnel such as spray operators, team leaders, supervisors, and clinicians.

# I. BACKGROUND

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Rwanda covers an area of approximately 26,338 square kilometers with a population of approximately 11 million people. The entire population is at risk of malaria, including an estimated 1.8 million children under five years and 450,000 pregnant women.<sup>2</sup> The country has two distinct malaria epidemiological strata. In two-thirds of the districts, malaria is characterized by seasonal peaks of transmission, and in the remaining districts, malaria transmission is comparatively stable year-round.<sup>3</sup> Climate and altitude are major factors that influence malaria prevalence in the country. Other contributors are: population density, population movement (especially from areas of low to high transmission), irrigation schemes (especially in the eastern and southern parts of the country), and cross-border movement (especially in the eastern and southeast parts of the country). The high coverage of malaria control interventions in Rwanda has resulted in a significant decline in the burden of malaria nationwide. The Malaria and Other Parasitic Diseases Division (MOPDD) therefore intends to target interventions based on the changing malaria epidemiology, as articulated in the insecticide resistance management (IRM) plan and the Malaria Strategic Plan 2013 -2018.<sup>4</sup>

IRS has featured among the malaria control strategies applied in Rwanda since 2007. Declining malaria incidence since 2008 in some areas prompted adjustments from district-wide blanket IRS coverage to focal spraying targeting high risk areas. Over time, PMI reconsidered the focal targets because of generalized increases in malaria caseloads. However, expansion to cover entire districts depended on the availability of resources.

PMI has funded much of the IRS in Rwanda. In August 2011, PMI contracted Abt to implement IRS in Rwanda under the AIRS Project for a three-year period. This was followed by another three-year task order (the PMI AIRS Project) in September 2014, which has now been extended to September 2018. The September-October 2016 spray campaign was the 16th round implemented since IRS started in Rwanda. In this spray campaign, AIRS Rwanda sprayed all 26 sectors in the two districts of Kirehe and Nyagatare with a total of 188,189 structures targeted for spray. The project also provided technical support in the following activities:

- Training, capacity building, and advocacy at the national and district level as a means of achieving IRS sustainability, including building the capacity of government officials and partners to undertake high-quality IRS;
- Daily and weekly monitoring of the AIRS Rwanda program via supervision of data collection and data entry using the AIRS monitoring and evaluation (M&E) supervisory tools;
- Logistics assessment and coordination of all procurement, shipping, delivery, and storage of spray pumps, spare parts, insecticides, and personal protective equipment (PPE);

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<sup>2</sup> 2012 Population and Housing Census, Nov 2012

<sup>3</sup> Trends in malaria cases, hospital admissions, and deaths following scale-up of antimalarial interventions, 2000-2010, Rwanda, (Karema et al, 2012)

<sup>4</sup> Malaria Strategic Plan 2013-2018

- Safe and correct insecticide application to minimize human and environmental exposure to IRS insecticides, in compliance with the Safer Use Action Plan portion of the Supplemental Environmental Assessment (SEA);
- Coordination of IEC, sensitization, and mobilization activities with other stakeholders to raise awareness and acceptance of IRS and to encourage ownership;
- Entomological monitoring, including assessing malaria vector density and species composition in intervention areas, establishing vector feeding time and location, monitoring the quality of insecticide application and insecticide decay rates, and assessing vector susceptibility and mechanisms of resistance;
- Training of sentinel site technicians in entomological techniques;
- Promotion of cost efficiency through due diligence and efficiency of operations; and
- Technical assistance that MOH/MOPDD provides during spray rounds.

Spray campaigns implemented by AIRS Rwanda since 2012 are summarized in Table 2.

**TABLE 2: SPRAY CAMPAIGNS IMPLEMENTED BY AIRS RWANDA SINCE 2012**

Year	Month	Number of Districts	Structures Sprayed	Population Protected	Insecticide Used
2012	Aug/Sep	3	236,610	1,025,181	Pyrethroid
2013	Feb/Mar	3	121,154	522,315	Pyrethroid
	Sep/Oct	3	224,708	957,027	Pyrethroid/ Carbamate
2014	Feb/Mar	3	123,919	512,789	Carbamate
	Sep/Oct	3	173,086	705,048	Carbamate
2015	Feb/Mar	2	127,150	517,194	Carbamate
	Sep/Oct	4	215,981	889,326	Carbamate
2016	Feb/Mar	2	144,947	618,696	Carbamate
	Sep/Oct	2	198,970	812,714	OP

# 2. PRE-SEASON ACTIVITIES

## 2.1 SELECTION OF IRS DISTRICTS AND SECTORS

AIRS Rwanda in collaboration with MOPDD and PMI selected two districts, Kirehe and Nyagatare, for IRS during the September 2016 campaign (see Figure 1 below). The two partners selected the IRS districts based on the malaria burden reported in epidemiological data from health facilities. AIRS Rwanda targeted 188,189 structures for spraying in 26 sectors.

**FIGURE 1: MAP OF RWANDA SHOWING THE TWO IRS TARGET DISTRICTS**

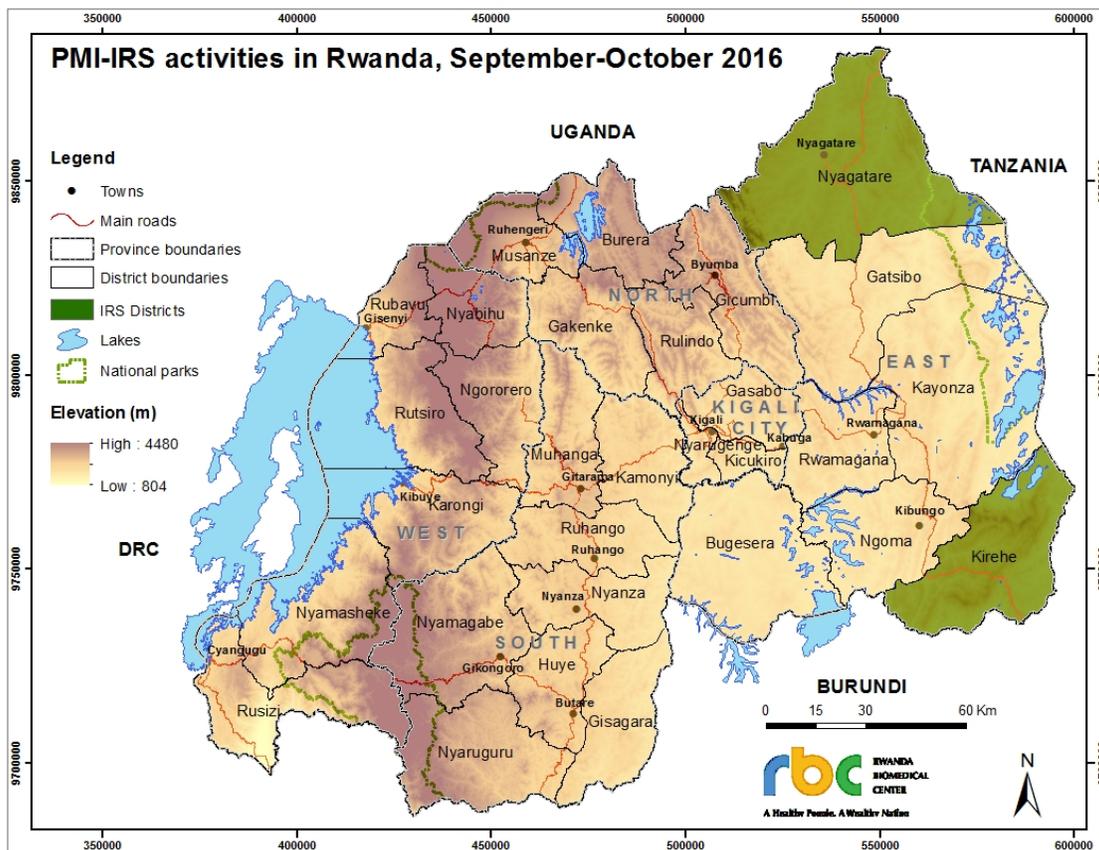


Table 3 contains a summary of the target structures and population in the 26 sectors.

**TABLE 3: TARGET STRUCTURES FOR SEPT 2016 IRS ROUND**

District	Number of Sectors	Number of Target Structures	Target Population		Total Target Population
			Females	Males	
Kirehe	12 of 12	82,946	176,219	163,506	339,725
Nyagatare	14 of 14	105,243	223,205	211,848	435,053
<b>Total</b>	<b>26 of 26</b>	<b>188,189</b>	<b>399,424</b>	<b>375,354</b>	<b>774,778</b>

## 2.2 DISTRICT PLANNING MEETINGS

Following the selection of the target sectors in the two IRS districts, AIRS Rwanda intensified collaboration and coordination with stakeholders. In July 2016, AIRS Rwanda held micro-planning meetings with district and sector authorities in the two districts and 26 sectors. MOPDD facilitated invitations to counterparts from local government, district hospitals, and health centers. Among the key issues for discussion were recruitment of IRS seasonal staff, identification of operation sites, provision of storage space for IRS materials at the operation sites, and supervision at the sector level. MOPDD/MOH endorsed the required support expected from the local government counterparts and in each district. AIRS Rwanda organized a one-day planning meeting with local leaders to discuss and develop an IRS operational plan and to agree on the roles and responsibilities of each of the partners. The issues discussed during the micro-planning meetings included:

- Recruitment of IEC mobilizers and SOPs;
- Community mobilization plan for IRS;
- Role of districts/sectors in the provision of IRS operational site offices and stores;
- Role of local leaders in supervision of IRS activities during the IRS operations; and
- Participation at weekly meetings at the sector level.

The meeting attendees also split each of the sectors with many SOPs and vast distances into two operation sites. In each of the two districts, three sectors were split into two operation sites each.

In total, 75 participants (49 males and 26 females) attended micro-planning meetings in Kirehe and Nyagatare districts.

## 2.3 INSECTICIDE SELECTION

AIRS Rwanda used an OP, Actellic 300 CS, during the September-October 2016 IRS campaign in the two districts. This was the first time using this insecticide in these districts. AIRS Rwanda based the selection on data from insecticide susceptibility assays in 2015. The susceptibility assays showed that the predominant local vector species (i.e. *Anopheles gambiae*) exhibited varying levels of susceptibility to the different classes of insecticides. Within the OP class, the local vector species in the IRS target districts sites showed 100% mortality rates.

In a bid to manage the development of insecticide resistance, specifically pyrethroid resistance, the Rwanda IRM<sup>5</sup> plan states that spraying should be phased to a carbamate for two years followed by OP (pirimiphos methyl, Actellic 300CS) for two years. The main strategy is rotation in the mid-term of four years, with IRS graduating from sector-wide spraying to focalized cell-level spraying by 2017. A switch to carbamates began in September 2013 in only one district. AIRS Rwanda fully implemented use of carbamate in all IRS districts starting February 2014 and continued in the subsequent IRS campaigns, up to and including the February 2016 IRS campaign (see Annex A, MoH Letter on Insecticide Choice for 2016/2017, and Annex B, Insecticide Resistance Tests Results).

## 2.4 LOGISTICS NEEDS AND PROCUREMENT

The central AIRS Rwanda warehouse at the Kicukiro Small Scale Industrial area in Kigali served as the hub for storage of IRS commodities, including housing insecticides before distribution to the target districts. AIRS Rwanda reviewed the inventory records from the previous IRS campaign and assessed logistics needs in April-May 2016, including:

- Available stock of materials, consumables, and equipment;
- Transport arrangements, including vehicle hiring for spray operations and supervision;
- Estimate of insecticide, PPE, and spray equipment required to meet the needs of spraying; and
- Mobilization and distribution of equipment, materials, and supplies (see Annex C).

### 2.4.1 INTERNATIONAL PROCUREMENT

Internationally procured commodities included 173,964 bottles of OP insecticide (Actellic 300 CS) from Syngenta and other IRS commodities. Table 4 shows the items and quantities AIRS Rwanda procured internationally.

**TABLE 4: INTERNATIONAL PURCHASES**

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used	Quantity in Stock after the Campaign
Insecticide	0	173,964	173,964	155,870	18,094 <sup>6</sup>
Dust Mask	8,970	44,520	53,490	37,516	15,974
First Aid Kits	4	138	142	123	19
Boots	1,969	204	2,173	215	1,958
Face shields visor	1,675	1,700	3,375	1,643	1,732
Head gear (Bracket)	2,686	1500	4,186	2,454	1,732
USAID/PMI – (logo)	0	1,000	1,000	1,000	0
Lance	100	100	200	200	0
Pressure gauge	48	100	148	98	50

<sup>5</sup> Rwanda Strategic Plan for Insecticide Resistance Management in Malaria Vectors (2013–2017)

<sup>6</sup> Insecticide Expiry is May 2018

The insecticide stock balance whose expiry date is May 2018 is stored in the central warehouse and based on the first in first out (FIFO) policy will be used as the first stock in the September 2017 spray round.

## 2.4.2 LOCAL PROCUREMENT

Local procurement involved an open competitive tendering process in which AIRS Rwanda issued a solicitation for quotes for services and materials. The AIRS Rwanda procurement committee based its selection on the lowest cost and technically acceptable bid according to the criteria in the solicitation for the quotations. The services/items procured locally included the following:

- Transportation services for IRS planning, operations, and supervision;
- Printed materials for IEC, IRS data collection, and commodity tracking;
- Operation site refurbishment materials, including materials for soak pits; and
- Food vendors for SOP breakfasts and training.

Please see Annex C for the detailed list.

## 2.4.3 MATERIAL DISTRIBUTION TO THE DISTRICTS AND OPERATION SITES

AIRS Rwanda retained IRS materials, such as coveralls, boots, helmets, gloves, masks, and pumps, in district storage facilities. AIRS Rwanda distributed additional IRS materials to district warehouses to meet additional needs. Other items including respiratory masks and gloves were distributed from the central warehouse to all district stores in August 2016. Insecticide was distributed in September 2016. A total of 4,579 coveralls; 2,169 boots; 2,396 complete helmets; 50,889 respiratory masks; 167,988 OP bottles and 1,667 spray pumps were distributed from the central warehouse to the districts. AIRS Rwanda further distributed materials and equipment to operational sites based on number of structures and number of support staff.

## 2.5 HUMAN RESOURCE REQUIREMENTS

The project recruited and deployed 216 support staff, who provided support during the IRS operations in the two districts. Seasonal staff comprised: two district IEC assistants, 17 data clerks, two M&E assistants, two data cleaners, three district storekeepers, 32 sector store keepers, three logistics assistants, two pump technicians, three finance assistants, 32 sector coordinators, 83 sector supervisors, 33 sector IEC assistants, and two office cleaners.

The staff that implemented IRS operations in the sectors included: 1,255 SOPs, 312 TLs, 113 washers, 170 cell IEC mobilizers, and 2,474 village IEC mobilizers. Sixty-five security guards provided IRS support at the sector level. AIRS Rwanda recruited staff at the district level with assistance from local authorities and health centers, including the District Vice-Mayors, District Health Directors, sector authorities, and Health Center Chiefs. Of the 4,605 people AIRS Rwanda hired as seasonal staff, 28.4% (n=1,309) were female. More than half of hired SOPs (58.2%) were female, including 312 TLs (49.4%). Table 5 enumerates the IRS seasonal support staff by gender and district. In February 2016, 28.0% (n=989) of all seasonal staff were female, and (55.4 %) of SOPs and TLs were female. The percentage of female SOPs is high relative to other cadres of seasonal staff because SOPs come from the community health workers (CHWs) pool at the village level - in each village, two of the three CHWs are female.

**TABLE 5: SEASONAL IRS STAFF HIRED**

Staff Position	Total		% Females Hired
	Male	Female	
District IEC Assistants	1	1	50%
Data Clerks	11	6	35%
M&E Assistants	0	2	100%
Data Cleaners	0	2	100%
District Storekeepers	2	1	50%
Sector Storekeepers	12	20	59%
Logistics Assistants	1	2	67%
Finance Assistants	1	2	67%
Sector Coordinators	19	13	41%
Sector Supervisors	45	38	46%
Sectors IEC Assistants	19	14	42%
Spray Operators	525	730	58%
Team Leaders	158	154	49%
Cell IEC Mobilizers	102	68	40%
Village IEC Mobilizers	2,289	185	7%
Security Guards	64	1	2%
Washers	44	69	61%
Pump Technicians	2	0	0%
Cleaners	1	1	50%
<b>Total</b>	<b>3,296</b>	<b>1,309</b>	<b>28.4%</b>

## 2.6 IRS TRAINING

AIRS Rwanda reviewed the IRS training curriculum and other training materials and customized them to the Rwandan context. In addition, AIRS Rwanda identified appropriate training sites. The training covered the following key topics:

- Introduction to malaria control;
- IRS planning and logistics management;
- Spray techniques and processes;
- Environmental compliance and personal safety;
- Advocacy and social mobilization;
- IRS monitoring and evaluation;
- Supervision of IRS activities;
- Gender in IRS;
- m-Health; and
- IRS facilitation skills.

Trainings for different cadre of staff were conducted separately, (see Annex H).

### 2.6.1 TRAINING OF TRAINERS

AIRS Rwanda organized and conducted a five-day refresher training of trainers (ToT) in collaboration with MOPDD from August 29 to September 2, 2016. MOPDD opened the ToT and facilitated some of the sessions, including introduction to malaria control and management of adverse effects. Although most participants completed the ToT in February 2016 and other previous IRS rounds, the training approach was modified to include skills in handling the OP insecticide. The ToT emphasized the steps of insecticide mixing (Actellic 300 CS), use of the control flow valves (CFVs), spraying techniques, and supervision. A session on mobile phone supervision highlighted m-Health functionalities, such as daily reporting for performance monitoring tracking (PMT) and mobile application supervisory checklists.

The ToT also incorporated TL training on: a) how to facilitate TL trainings at sector levels, especially on supervision of spray techniques, b) team leadership skills, c) how to use the Directly Observed Spraying (DOS) checklist in supervising the spray quality, and d) how to provide feedback to the SOPs after supervision.

The training consisted of both theory and practical sessions, including group discussions, demonstrations, lectures, and question-and-answer methods. The participants included 32 IRS sector coordinators and 126 IRS sector supervisors. After the ToT, the participants went to different training sites in the IRS target districts to conduct IRS training for SOPs and TLs. AIRS Rwanda based the number of trainers on the number of training participants at each training site.

**FIGURE 2: IRS TOT PRACTICAL TRAINING SESSION**



## 2.6.2 SPRAY OPERATOR AND TEAM LEADER TRAINING

AIRS Rwanda organized and conducted the SOP and TL trainings for five days during the period September 12-17, 2016 in close collaboration with district and sector authorities. In the two target districts, either sector authorities provided or AIRS Rwanda rented training sites. AIRS Rwanda rented three training venues in Nyagatare district (Rukomo, Mimuri, and Nyagatare). Sector authorities provided the other 11 training venues in Nyagatare and all 12 in Kirehe for free. The major objective of the training was to equip the SOPs and TLs with the skills to conduct quality IRS.

Before training, all the SOPs and TLs went through a medical examination in their respective district hospitals to ensure that they were medically and physically fit to perform IRS activities. The hospitals screened all females for pregnancy. These workers included SOPs, TLs, washers, storekeepers, sector supervisors, and sector coordinators.

Six women were pregnant during the medical examination in Karama, Rwempasha and Matimba sectors of Nyagatare district; and, Gahara, Nyarubuye and Nasho sectors of Kirehe district. AIRS Rwanda assigned them to cell IEC mobilizer positions, which would not expose them to insecticide.

Additional selection criteria for SOPs and TLs were as follows:

- A resident of the sector;
- A CHW;
- Previous IRS experience
- Able to read and write; and
- Below 40 years of age.

The SOPs and TLs attended an intensive five-day theory and practical training (see Annex E), which covered:

- Introduction to malaria control;
- Spray techniques and use of CFV's;
- Handling and managing insecticides including steps of insecticide mixing;
- Handling and maintaining spray pumps;
- Personal and environmental safety;
- Data collection and filling out data collection forms; and
- Basics of IEC for IRS.

AIRS Rwanda trained 1,634 SOPs and TLs - see Table 6. One hundred forty eight facilitators (ToT participants) conducted the training. See Annex D for a detailed SOP program.

**TABLE 6: SPRAY OPERATORS AND TEAM LEADERS TRAINED TO IMPLEMENT IRS**

District	Training Sites	Spray Operators Newly Trained			Spray Operators Previously Trained			Facilitators		
		Male	Female	% Female	Male	Female	% Female	Male	Female	% Female
Nyagatare	14	75	118	61.1%	300	423	58.5%	48	33	40.7%
Kirehe	12	34	63	64.9%	297	324	52.2%	35	32	47.8%
<b>Total</b>	<b>26</b>	<b>109</b>	<b>181</b>	<b>62.3%</b>	<b>597</b>	<b>747</b>	<b>55.6%</b>	<b>83</b>	<b>65</b>	<b>43.9%</b>
		<b>290 (17.7%)</b>			<b>1,344 (82.3%)</b>			<b>148 (43.9%)</b>		

### 2.6.3 TEAM LEADER TRAINING

In preparation for the September 2016 spray campaign, AIRS Rwanda conducted a one-day training for TLs on September 17, 2016 in all operational sites. The main objective of the training was to build the capacity and skills of TLs in their supervisory role.

Sector coordinators and supervisors who received training during the ToT sessions facilitated the TL training. The TL training covered the following key topics:

- Spray team leader responsibilities;
- Giving and receiving constructive feedback;
- Using the DOS checklist in supervising the spray quality; and
- Data Collection and Reporting.

AIRS Rwanda trained 312 TLs in the two IRS target districts. Annex H contains a summary of team leaders trained.

## 2.6.4 DATA COLLECTION TRAINING

Between August and September 2016, the AIRS Rwanda team, led by the M&E and Database Managers, facilitated data collection training sessions during the ToT for sector coordinators, supervisors, and sector IEC assistants. They also facilitated the data collection training for SOPs, TLs, IEC mobilizers and data entry clerks. The training focused on the following key topics:

- Data collection forms (SOP and TL forms, IEC-village and cell-mobilizer forms) and the AIRS Supervisory Toolkit;
- Key IRS definitions (e.g. eligible structure) and indicators;
- Supervisory roles and responsibilities;
- Reviewing collected data and spotting irregularities;
- Timely, consistent, and accurate reporting;
- Setting appropriate and realistic reporting timelines;
- Establishing backup reporting/ communication protocols;
- AIRS database and security protocols;
- Data Quality Assurance and Control;
- House marking for IRS operations; and
- Mobile data collection and reporting.

## 2.6.5 LOGISTICS TRAINING

AIRS Rwanda trained all staff involved in logistics and storekeeping during IRS implementation. Sector coordinators, sector supervisors, and IEC assistants received training on basic skills in logistics and store management during the ToT sessions. AIRS Rwanda conducted a comprehensive, two-day training for 38 logistics assistants and storekeepers (15 males and 23 females) on the following topics:

- Individual roles and responsibilities in IRS logistics;
- Warehouse and commodity management;
- Store management and record keeping;
- IRS transportation management;
- Management of food vendors;
- IRS water management for cleaning PPE and progressive rinsing;
- Soak pit management;
- Environmental compliance; and
- Understanding and preparing for post IRS activities.

## 2.6.6 WASHER TRAINING

Before commencing IRS operations, AIRS Rwanda conducted a one-day refresher training/orientation for 113 washers (44 males and 69 females) at the 32 operational sites in the two IRS districts. Sector coordinators, sector supervisors and sector storekeepers managed the refresher training at their respective sites. The washers received instruction on the use of PPE, washing insecticide contaminated PPE, soak pit maintenance, effluent waste disposal, and the effects of insecticide on humans and the environment. They also received advice on how to respond to insecticide side effects.

## 2.6.7 FIRE, TRANSPORTATION AND SECURITY TRAINING

Sixty-five security guards (64 males and 1 female) received orientation on fire security and a general security protocol for IRS stores. Ninety-six IRS drivers received orientation on safety procedures while transporting insecticides and the use of first aid kits. They also received training on measures to take:

- While transporting spray operators to and from the field; and
- In case an accident occurred leading to an insecticide spill.

# 3. INFORMATION, EDUCATION AND COMMUNICATION

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AIRS Rwanda collaborated with MOPDD and district and sector authorities to train implementers in using diverse and effective approaches and channels of communication to sensitize and mobilize communities.

## 3.1 TRAINING

### 3.1.1 TRAINING OF TRAINERS

AIRS Rwanda collaborated with the MOPDD to conduct a one-day ToT on mobilization in Kigali on September 2, 2016. The first objective of the training was to strengthen participants' knowledge and capacity to train and disseminate IEC and behavior change communication (BCC) messages to IEC community mobilizers. The second objective was to plan, coordinate, and supervise IEC IRS activities. The training included both theory and practical sessions, including mock IRS mobilization and completion of data collection tools. The training also covered how to develop and update a community mobilization plan. In addition, the ToT emphasized the key messages to be communicated to IRS beneficiaries on the strong smell of the new insecticide to mitigate potential resistance.

The MOPDD facilitated the following sessions: introduction to malaria, malaria prevention and control interventions, malaria burden in Rwanda, and mosquito characteristics. The trainees included the District IEC Assistants, Sector IEC Assistants, Sector Supervisors, and Sector Coordinators. They received training on how to conduct training of IEC mobilizers at the cell and village level, and how to coordinate and supervise all IEC/IRS activities. A total of 158 people (87 males and 71 females) participated in this training. They included two District IEC Assistants, 33 Sector IEC Assistants, 32 Sector Coordinators, and 91 Sector Supervisors.

### 3.1.2 TRAINING OF IEC COMMUNITY MOBILIZERS

AIRS Rwanda trained IEC mobilizers on September 7-8, 2016 in Kirehe and Nyagatare districts in designated training sites in the sectors. The trainees were village and cell leaders whom AIRS Rwanda recruited based on the following criteria: a cell or village leader and/or in charge of security at the village level, good conduct, respectable, able to read and write, and known by the community. Sector IEC Assistants, Sector Coordinators, and Sector Supervisors facilitated the sector-level training. District IEC Assistants and AIRS Rwanda staff provided overall coordination. AIRS Rwanda trained the IEC mobilizers on the basics of malaria control and IRS and how to:

- Identify eligible structures for IRS in the two targeted districts;
- Promote understanding and acceptance of IRS by educating the community about the purpose of the IRS campaign;
- Inform beneficiaries about the benefits of IRS;

- Address common myths and misconceptions about IRS;
- Introduce the use of new insecticide (Actellic 300 CS) and how to address any potential resistance from beneficiaries related to its strong smell;
- Discuss with structure owners their role before, during, and after spray operations to ensure a safe and successful IRS campaign; and
- Create more long-term or sustainable awareness of the program by involving and engaging key community stakeholders.

AIRS Rwanda trained 2,644 mobilizers (253 females and 2,391 males) at the cell and village level. Each sector and cell team also developed an individual community mobilization implementation plan. Table 7 shows the number of mobilizers AIRS Rwanda trained by district.

**TABLE 7: IEC MOBILIZERS TRAINED TO IMPLEMENT IRS**

District	Number of IEC Mobilizers Trained				TOTAL	% Females Trained
	Cell		Village			
	Male	Female	Male	Female		
Kirehe	33	28	1,142	76	1,279	8.1 %
Nyagatare	69	40	1,147	109	1,365	10.9 %
<b>TOTAL</b>	<b>102</b>	<b>68</b>	<b>2,289</b>	<b>185</b>	<b>2,644</b>	<b>9.6 %</b>

## 3.2 DOOR-TO-DOOR MOBILIZATION

AIRS Rwanda conducted door-to-door mobilization of structures for two days in each village from September 16 to October 11, 2016. During this exercise, village mobilizers reached eligible structures with IRS messages and distributed IRS structure cards to those who lost or never received IRS cards. They also collected data using the IEC mobilizer form and communicated the dates of spraying to the structure owners. They marked the outside doors with the IRS structure number found on the IRS card issued to that structure (Figure 3). AIRS Rwanda mobilized 204,715 structures with a 97.2% IRS acceptance rate. Table 8 contains the results of the mobilization activity. Sector IEC Assistants, with support from the Sector and Cell Social Affairs Officers, oversaw the implementation of this activity. They also reviewed the data collected and IRS cards issued to the structures to ensure accuracy and completeness.

**FIGURE 3: MOBILIZATION**



**TABLE 8: RESULTS OF IRS MOBILIZATION**

District	Structures Sensitized	Adults Reached with IRS Messages		Structures Accepting IRS	% Structures Accepting IRS
		Male	Female		
Nyagatare	111,209	104,414	125,356	106,711	96.0%
Kirehe	93,506	81,365	101,520	92,207	98.6 %
<b>TOTAL</b>	<b>204,715</b>	<b>185,779</b>	<b>226,876</b>	<b>198,918</b>	<b>97.2 %</b>

### 3.3 IEC COORDINATION

Local leaders at all levels readily provided support during the entire period of spraying. Sector executives and social affairs officers were instrumental in linking spray operations teams to target communities. A district IEC staff member in each of the IRS districts coordinated and supervised district IEC activities. They worked closely with the District Vice-Mayors in charge of social affairs and district health officers to supervise the district IEC activities. Sector IEC staff worked closely with sector and cell social affairs and sector coordinators to supervise the sector IEC activities. The Sector IEC supervisors issued the village mobilizers the materials (structure cards and IEC data collection tools) a

day before the mobilization date of the village. The supervision team ensured that the cell and village mobilizers mobilized all eligible structures, that mobilizers informed structure owners about the date of spraying at least a day in advance, and that the data collected by mobilizers was accurate. IEC teams worked according to the updated IRS schedule each day.

On the actual spraying date, the IEC mobilizers worked with SOPs to give directions to the mobilized structures, facilitated the structure preparations by structure owners, and helped to convince the structure owners who were hesitant about IRS. The IEC mobilizers also noted structures that were not sprayed on the planned day and coordinated with SOPs to spray them the following day.

## 3.4 OTHER IEC ACTIVITIES

### 3.4.1 IRS LAUNCH

AIRS Rwanda organized a walk for IRS during the official launch of IRS operations in both Kirehe and Nyagatare districts during September 2016. Among the participants were: district, sector, cell and village authorities; private sector representatives from business entities; schools; health facility representatives; armed forces (army and police); the media; and the community. The launch event was broadcast live on national radio and in the evening on two major television stations - Rwanda Television and TVI.

**FIGURE 4: WALK FOR IRS IN KIREHE DISTRICT LAUNCH**



### 3.4.2 COMMUNITY MOBILIZATION BY LOCAL LEADERS

Local leaders actively participated in mobilization activities. This was due to early advocacy and engagement from both AIRS Rwanda and the MOPDD. The sector executive secretaries, social affairs officers, and CHWs' chief at the health centers, supervised IRS activities and occasionally led IRS teams to mobilize communities, especially where there was resistance. The cell social affairs officers supervised the mobilization activities in their respective cells. In past spray campaigns, AIRS Rwanda experienced refusals at district centers. This was not the case during the September 2016 spray campaign because both district and sector authorities, including all health facilities, participated actively in community mobilization in these areas.

### 3.4.3 MONTHLY COMMUNITY WORK (UMUGANDA)

In Rwanda, there is a mandatory community service day from 8:00am to 11:00am on the last Saturday of each month called “Umuganda” or community service. By law, all able-bodied citizens between 18 and 65 years are expected to participate in voluntary community work. During the spray campaign period, Umuganda occurred on September 24, 2016.

AIRS collaborated with local leaders to include IRS as part of the Umuganda agenda and to sensitize the community on the ongoing IRS activities. The IRS district and sector support teams participated in Umuganda at various sites. They shared IRS messages with the community through local authorities, specifically the cell and village leaders who were also the IEC mobilizers. The main message was to encourage community members to embrace IRS and open their houses for the SOPs to spray them. The District Vice-Mayors (Social Affairs) and Sector Executive secretaries helped deliver the IRS message in the IRS districts, in addition to mobilizing leaders in their areas of jurisdiction to participate in IRS supervision. In some sectors where community members were unlikely to open their structures for spraying, leaders made arrangements with the community to conduct IRS as their Umuganda day activity.

### 3.4.4 MASS MEDIA COMMUNICATION

Radio spots were aired twice daily from September 15 to 28, 2016 in Kirehe and Nyagatare districts. The key messages were the importance of IRS in the fight against malaria, the IRS campaign dates, the role of the community in IRS activities (before, during, and after spraying), adverse-effects management, and information about the funding agency. In addition, Kirehe district conducted a radio talk show about the IRS campaign. This highlighted the progress of spray operations in Kirehe district, feedback from the community on IRS acceptance, and challenges throughout the campaign. During the talk show, community members called in to express their appreciation of and ask questions about IRS.

Mass media communication also included 34 banners at two IRS district offices and at 32 sector administrative offices. The message on the banners was “Birakureba” (Kinyarwanda for “This concerns you”).



# 4. IMPLEMENTATION OF IRS ACTIVITIES

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The September 2016 IRS campaign was the sixteenth round of IRS implementation since the start of IRS campaigns in 2007 in Rwanda. AIRS Rwanda conducted the campaign over a 20-day period from September 19 to October 11, 2016 in Kirehe and Nyagatare districts. On day one of the spray operations, AIRS Rwanda in collaboration with the authorities launched IRS in a selected sector in each of the two districts.

## 4.1 IRS SUPERVISION

A team from AIRS Rwanda, the MOH/MOPDD, PMI, and local authorities at both the district and sector levels supervised IRS. During the IRS campaign, the team ensured supervision of spray operations at all levels. To achieve this, the team used the structure described below.

- SOPs were in teams of four, with one TL supervising each team.
- A sector supervisor supervised four teams. Supervisors reported directly to the sector coordinator, who in turn reported to the district coordinator.
- In each district, a full-time AIRS Rwanda staff member helped the AIRS district coordinator to coordinate routine daily supervision by working closely with the district staff and all other supervisors (from AIRS Rwanda and other stakeholders). At least five AIRS staff, in addition to the district coordinators, provided supportive supervision to the district staff in the field from Monday to Thursday every week.
- The MOPDD appointed three staff in the two IRS target districts to work closely with the AIRS Rwanda district coordinator and other supervisors in the field during spray operations.
- AIRS Rwanda implemented a supervision plan to ensure consistency and coordination of supervision and proper follow-up of corrective measures to improve spray operations performance.
- Local government officers (sector social affairs officers in charge of CHWs at both district hospitals and health centers, M&E officers at district hospitals, and district health environmental officers) dedicated two days each week to IRS supervision. The District Vice-Mayors and Sector Executive secretaries occasionally visited the teams in the field to supervise operations.
- Supervision checklists were used to assess the daily performance of SOPs and TLs, adherence to environmental compliance requirements, data collection, and data entry. In addition, during supervision in the field, all supervisors in all target districts and sectors used m-Health e-checklists on mobile phones, which comprised all environmental checklists. This promoted real time tracking and monitoring of issues observed by supervisors during spray operations.
- All of the operational sites used the Performance Tracking Sheet on a daily basis. At the end of each day, sector coordinators submitted summary data from the performance tracking sheet to district coordinators. They in turn compiled the data, updated the district Performance Tracking Sheet, and submitted a daily report to the central level (AIRS Rwanda management and the MOPDD IRS focal point). This daily report comprised the district performance data for that day, the data for all past days, challenges experienced during the day, and how the team resolved them.

- AIRS Rwanda instituted a supervision records book in each sector for coordination and consistency. Every supervisor who visited the sector noted their observations and recommendations in the book. The next supervisor would then follow up on the observations and recommendations made by the previous supervisor. Through this practice, performance improved because issues were addressed for specific sectors and not just generally.
- AIRS Rwanda held regular meetings at all levels (national, district, and sector) to review the progress of IRS and check on implementation of recommendations reached during operations.
- AIRS Rwanda received further supervision support from:
  - AIRS Kenya Operations Manager (Zeddy Bore), who was on short term technical learning/assistance with AIRS Rwanda.
  - AIRS headquarters staff through the AIRS Project Director (Brad Lucas) and Technical Program Manager (Mariandrea Chamorro).
  - Representatives from PMI through the AIRS COR at USAID/PMI Washington DC (Allison Belemvire).
- During their visits, the above staff travelled to both Kirehe and Nyagatare districts. They undertook soak pit and site store audits of IRS equipment and materials, including insecticide and PPE, in compliance with USAID/PMI Best Management Practices for AIRS. In addition, they supervised IRS in the field to observe adherence to spray quality techniques during the campaign. They also observed supervision techniques by the site supervisors and TLs and the use of supervision tools. During their supervision, they provided advice on areas to be improved in spray operations, such as stock management and spray quality techniques. More details are available in their trip reports.
- During spray operations, AIRS Rwanda introduced a new “Directly Observed Spraying” (DOS) checklist to ensure that quality of spraying was adhered to by all SOPs in the field, and to standardize spray quality supervision by TLs and other supervisors. TLs used the DOS checklist to supervise insecticide mixing and triple rinsing of insecticide bottles, full PPE use by all SOPs, use of CFVs during spraying, household preparation, and application of proper spray techniques. TLs used the DOS form to supervise each SOP on their team at least once per day. TLs corrected any mistakes (red flags) made by the SOPs and noted the errors on the DOS checklist.

Table 9 is a summary of red flags reported via DOS and the main actions taken by AIRS Rwanda to address those red flags.

**TABLE 9: DOS CHECKLISTS COMPLETED BY TEAM LEADERS AND OTHER SUPERVISORS**

Type of Form	Number of DOS Completed	Common Errors Found	Action Taken
DOS	30,208	<p><b>Nyagatare:</b></p> <ul style="list-style-type: none"> <li>The most common red flag was improper overlap of spray swaths.</li> <li>The second most common red flag was the leakage from spray pumps.</li> <li>The third most common red flag was improper spray distance (45 cm).</li> </ul> <p><b>Kirehe:</b></p> <ul style="list-style-type: none"> <li>The most common red flag was improper spray distance (45 cm). The second most common red flag was improper spray speed.</li> <li>The third most common red flag was improper overlap of spray swaths.</li> </ul>	<ul style="list-style-type: none"> <li>There was close communication between AIRS Rwanda and field teams to address issues reported by DOS checklists.</li> <li>Customized messages about red flags reported the previous day were sent directly to SOPs, TLs and supervisors in the field on daily basis.</li> <li>Daily morning briefs were used to remind TLs to observe spray quality for each SOP.</li> </ul>

Table 10 summarizes the institutions/stakeholders that participated in supervision.

**TABLE 10: INSTITUTIONS/ STAKEHOLDERS THAT PARTICIPATED IN IRS SUPERVISION**

Level	Institution	Responsibilities
National Level	MOH/MOPDD/Rwanda Biomedical Center (RBC), REMA USAID/PMI AIRS Rwanda	Overall supervision for IRS activities
District and Sector Level (Local Authorities)	District Vice-Mayor/Social Affairs District Health Director District Environmental Health Officer Hospital Director M&E Officer at District Hospital In charge of CHW's at District Hospital Sector Executive secretaries Sector Social Affairs In charge of CHW's at Health Centers	Close supervision in districts and environmental protection
Other Support	AIRS Kenya Operations Manager AIRS Headquarters staff PMI/ Washington DC	Overall supervision for IRS activities

AIRS Rwanda stressed the need for strict supervision to ensure adherence to IRS BMPs. Some of the practices which were emphasized were:

- Letting natural light into the structure during spraying by alternating opening and closing doors and windows so that a) sprayers could see what they were doing, and b) the TL could complete the DOS;
- Ensuring proper record keeping on stock cards and other store records for insecticide and empty bottles at each sector store; and
- Conducting twice-weekly physical stock audits at every district and sector store, including verifying the use of all inventory record keeping forms and, verifying that the actual stock in the store room at the time of the audit matched the balances listed on the insecticide and empty bottle ledgers.

AIRS Rwanda supervisors convened at the Kigali office every Friday during the IRS operations period for a feedback meeting and to review the progress of IRS activities. Staff from the MOPDD occasionally joined AIRS Rwanda staff during progress review meetings. During these interactions, MOPDD representatives and the AIRS Rwanda team discussed the issues at hand and provided guidance to the district coordinators and the teams in the field.

## 4.2 M-HEALTH

During the spray campaign, AIRS Rwanda used the m-Health system to gain faster access to daily data on spray operations and improve supervisory efforts by different levels of IRS supervisors.

AIRS Rwanda continued to use the three-part mobile system that Dimagi LLC helped develop during the September 2015 IRS campaign. During past IRS campaigns, the project reported all data in the field using paper forms, and supervisors used paper checklists to conduct supervision. Reporting and follow-up of issues encountered in the field took up to three days. The use of m-Health for reporting and supervision sped up the process, enabling same-day reporting of issues and immediate follow-up. It was easier to track progress and rectify issues as they arose in the field. The AIRS Rwanda M&E Manager, who worked remotely with a consultant from Dimagi, could update the CommCare application configuration on phones as needed.

Before the start of the September 2016 spray operations, AIRS Rwanda deployed 19 mobile phones in Kirehe, 27 phones in Nyagatare and seven mobile phones to be used by AIRS Rwanda staff during supervision. The team used a gateway phone at the central level to receive data from all sectors and synchronize all data to the Dimagi server.

AIRS Rwanda used the mobile phones for the three major functions described below.

- *Reporting:* During spray operations, all sector coordinators sent daily reports on four operational indicators to the gateway phone. The gateway phone then sent the data to the Dimagi server for processing and storage. The indicators included the total number of SOPs who worked, the total number of structures they found, the total number of structures they sprayed, and the total number of insecticide bottles they used.
- *Supervision:* Sector coordinators and supervisors used checklists on the mobile phones on a daily basis to supervise spray operations, including environmental compliance. At the end of each day, supervisors submitted completed supervisory forms to the CommCare system. The CommCare system then sent the submitted reports to both the country-level staff and AIRS home office staff. The reports helped address gaps noted during supervision or red flag issues for immediate action as required.

- *Job aids messaging:* All seasonal workers received different daily job aid messages on spray operations and gender issues. These messages regularly reminded the seasonal staff of important IRS messages, which in turn led to increased awareness of SOPs and better quality of spraying (see Annex E for Job aid messages that went to seasonal staff).
- *The mobile phone application added value to operations:* AIRS Rwanda solved issues that had been problematic during the September 2015 and February 2016 spray campaigns. For instance, during the September 2016 spray operations, the project received daily supervisory reports with and without red flags as opposed to the previous spray campaigns when supervisory reports contained red flags only. Moreover, the AIRS M&E Manager was trained to upload customized messages that were sent in a timely manner to all seasonal workers to address any reported operations issues.

## 4.3 LOGISTICS

### 4.3.1 IRS STORAGE AND INSECTICIDE STOCK MANAGEMENT

AIRS Rwanda distributed IRS commodities from the central warehouse at the Kicukiro Small Scale Industrial area in Kigali to the target district storage facilities. The district level storage facilities served as distribution centers for IRS materials, insecticide, equipment, and supplies for IRS operations. A logistics assistant and a storekeeper managed each of the district storage facilities as well as the central warehouse, and ensured distribution and close supervision of supplies and materials. There were 32 storage facilities at the operation sites in the two districts, 25 of which the district/sector provided at the sector offices free of charge as an in-kind contribution to the IRS campaign. AIRS Rwanda rented seven storage facilities in Nyagatare District at locations near the sector offices. AIRS Rwanda rented only three storage facilities in February because fewer sectors (9 out of 14) were sprayed compared to September when all sectors in Nyagatare district were sprayed. In addition, a number of the sector rooms used for free in the past were being used as storage for food in response to the food crisis experienced in some parts of the district. Each Sector Storekeeper was in charge of storage management at the sector level with oversight from the District Logistics Assistant and Storekeeper.

AIRS Rwanda carefully tracked insecticide, other materials, and equipment stocks from the central warehouse to the district storage facility, and subsequently to the operation sites' storage facilities. The team tracked empty insecticide bottles daily at the sector and district stores. Storekeepers accounted for them by recording how many insecticide bottles each spray operator, team, or sector had received and used. They documented stock records on stock cards, insecticide distribution tracking sheets, and commodity ledger books.

Transportation of empty bottles from district stores to the Enterprise pour la Protection de l'Environnement et Développement Rural (EPEDR) recycling plant in Kigali was conducted on a weekly basis. In addition, empty insecticide boxes were dismantled and delivered to Cards from Africa for recycling on weekly basis during spray operations. This was done on a weekly basis because there was not enough space at the district and sector storage facilities to accommodate both unused insecticide and accumulated empty bottles up to the end of the spray campaign.

### 4.3.2 IRS VEHICLES

AIRS Rwanda contracted 96 vehicles for IRS operations in the two districts. AIRS Rwanda managed the IRS vehicles so that the teams used 96 vehicles for SOPs' transportation during the first 18 days of the spray campaign and reduced the number to 72 during the last two days. This is because most teams worked in villages near the operation sites in the last two days and could walk to the villages or the vehicles made two trips to villages to drop off the SOPs since the distances are relatively short. This strategy gave us total cost saving of US\$4,160. Table 11 shows the number of vehicles assigned to each district.

**TABLE 11: DISTRIBUTION OF VEHICLES IN THE DISTRICTS**

District	First 18 days			Last 2 days		
	Vehicles for SOPs	Vehicles for Supervision	Total	Vehicles for SOPs	Vehicles for Supervision	Total
Kirehe	42	3	45	31	3	34
Nyagatare	54	3	57	41	3	44
<b>Total</b>	<b>96</b>	<b>6</b>	<b>102</b>	<b>72</b>	<b>6</b>	<b>78</b>

## 4.4 IRS PAYMENTS

Before the start of spray operations, AIRS Rwanda conducted a one-day refresher training for the three Finance Assistants. The participants were briefed on their responsibilities to ensure efficient management of funds and facilitation of logistical support. Their responsibilities included:

- Distribution and collection of signed contracts from all the seasonal staff (SOPs, TLs, washers, security guards, and mobilizers);
- Collection of all timesheets for seasonal staff before preparing payrolls;
- Preparation of payrolls approved by the District Coordinator and submitted based on the schedule of payments created by the Finance Manager at the start of the IRS campaign;
- Follow up with the Savings and Credit Cooperatives (SACCO) banks (Microfinance Banks) to ensure that all the seasonal staff received their payments and signed the payroll;
- Collection of invoices from food vendors and conveyance to the AIRS Rwanda finance office for payment; and
- Collection and reconciliation of IRS vehicle logs sheets.

AIRS Rwanda paid IRS support staff at the district level through their bank accounts by electronic transfer. AIRS Rwanda paid other seasonal staff at the sector level, including SOPs, TLs, mobilizers, washers, and security guards, by transfer of funds to SACCO micro finance institutions in each sector. AIRS Rwanda established an agreement with each SACCO for this service. After each payment, a copy of the payroll signed by recipients was returned to the AIRS main office in Kigali as proof of payment.

# 5. POST-SEASON ACTIVITIES

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## 5.1 POST SEASON REVIEW MEETINGS

AIRS Rwanda conducted IRS evaluation/review meetings at the district level to:

- Review the overall IRS implementation process, experiences and achievements for the September 2016 spray round;
- Review IRS challenges in the two target districts and identify recommendations for the next spray cycle;
- Reach consensus on the recommendations and way forward for future spray campaigns.

District authorities in collaboration with the AIRS Rwanda district teams convened the review meetings. The following categories of people attended:

- District and sector authorities, including army and police commanders in the district;
- Hospitals and health center representatives;
- MOH/MOPDD representatives; and
- AIRS Rwanda staff.

A total of 112 participants (70 males and 42 females) attended in both Kirehe and Nyagatare districts.

Discussions in the review meetings were centered on supervision and individual sector IRS performance.

Recommendations from the review meetings included:

- The district/sector authorities should enhance oversight of the recruitment process of SOPs to limit recruitment to CHWs with previous IRS experience, and to ensure recruitment strictly adheres to all criteria set by MOH;
- The sector and district IRS support staff should coordinate closely with the sector authorities to avoid disruption of IRS activities without sufficient notice; and
- District and sector authorities including army and police should take special measures to address IRS refusals in peri-urban areas, such as trade centers especially in Nyagatare sector of Nyagatare district and Kirehe and Kigina sectors of Kirehe district.

## 5.2 INVENTORY

Following completion of IRS operations, AIRS Rwanda transported all commodities from the sector stores to the district stores. The sector storekeepers updated their stock records and handed them to the district storekeepers/logistics assistants. At the district stores, storekeepers updated stock records to show the remaining stock, including the commodities that were retrieved from the sector stores. Storekeepers updated the district inventories accordingly. See Annex F for IRS commodities stock.



# 6. MONITORING AND EVALUATION

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M&E for the IRS campaign closely followed the processes in the annual AIRS Rwanda Work Plan and the AIRS M&E Concept Paper developed by the AIRS Home Office team.

## 6.1 KEY OBJECTIVES

AIRS Rwanda M&E activities aim to:

- Emphasize accuracy of data entry and validation processes through comprehensive training and supervision at all levels;
- Streamline and standardize data flow, minimize errors, and facilitate timely reporting;
- Ensure IRS data security and storage for future reference through the establishment and enforcement of proper protocols; and
- Document lessons learned and good practices observed in the implementation of project activities to encourage application of best practices in future project years.

## 6.2 DATA MANAGEMENT

AIRS Rwanda incorporated all AIRS M&E protocol updates, including enhancements to the data collection tools, before the start of mobilization and spraying to ensure the collection, management, and reporting of high-quality data. The database served as a tool for implementation and management by tracking key performance and output indicators. The database helped M&E and technical staff members produce real-time reports for quick feedback. The database also helped reconcile and prevent additional errors in data collection and entry through programmed audit checks and other data quality assurance measures.

SOPs collected spray data, which TLs and supervisors verified and transmitted to the data centers for entry. Data clerks performed a final verification of spray form data and arithmetic before entering the data into the database. At the end of each day, the database and M&E managers reviewed the data for anomalies and addressed issues with data center staff. Data clerks entered all data within 48 hours of spraying for quality control purposes and timely generation of weekly client spray progress reports. They also filed and archived daily spray operator and IEC/mobilizer forms at each data center. Data clerks performed a daily electronic back-up to the AIRS Rwanda server and to an external hard drive for safety and storage.

## 6.2.1 DATABASE PREPARATION

The AIRS Rwanda M&E team performed the following activities in preparation for the spray campaign:

- Reviewed the database based on challenges and lessons learned from the last spray campaign to ensure that data quality assurance and control of IRS data were upheld at all levels;
- Ensured IRS data security and storage for future reference through establishment and enforcement of proper protocols;
- Streamlined and standardized data information flow to minimize errors and facilitate timely reporting;
- Emphasized accuracy of both the data collection/verification and the data entry process through comprehensive training and supervision at all levels;
- Recruited and trained data clerks in data entry and data management; and
- Facilitated training of data entry clerks, data cleaners, and M&E assistants on the database.

Spray coverage was calculated based on the total number of structures sprayed (numerator) divided by structures found by SOPs (denominator). A final count of “structures found” from the last spray campaign served as the target for tracking spray progress and performance at the sector- and district-levels.

## 6.3 DATA QUALITY ASSURANCE AND CONTROL

AIRS Rwanda staff performed data quality assurance measures daily during the IRS campaign. A variety of AIRS staff performed the function, including TLs, supervisors, sector coordinators, sector and district IEC Assistants, district coordinators, M&E Assistants, and Abt staff. More detail is provided below about the activities performed to ensure high-quality data, including physical data verification (spray and mobilization) and random spot checks. AIRS Rwanda used the AIRS M&E Supervisory Toolkit, which consists of the two tools described below.

- Error Eliminator (EE) forms for mobilizer and spray data are designed to verify the completeness and correctness of data collected in the field. Every day during the spray campaign, TLs, sector supervisors and coordinators, district IEC Assistants and Coordinators, M&E Assistants, and Abt staff completed EE forms for spray data. Also, each day, cell IEC Supervisors, Sector IEC Assistants, District IEC Assistants, District Coordinators, M&E Assistants, and Abt staff completed the EE forms for mobilizer data.

A total of 25,007 spray data Error Eliminator forms were completed by team leaders and supervisors in the field. The most common error in these forms was disparities between insecticide reported on forms by spray operators and actual insecticide received. To verify and correct the records, the AIRS Rwanda team worked closely with the logistics team to use insecticide distribution cards and other logistics tools to cross-check insecticide issued and returned.

The team urged SOPs to indicate on the SOP forms the number of insecticide bottles they received immediately after they received them.

Additionally, a total of 2,009 mobilizer data Error Eliminator forms were completed by cell IEC mobilizers, sector and district IEC assistants. The most common error in the mobilizer data EE forms were mobilizer forms without mobilizer codes and errors in summations. AIRS Rwanda reminded Cell and Sector IEC's to make sure that they filled out all mobilizer forms completely and well before submission to data centers. The sector IEC assistants would also verify that all village IEC forms before submission to data centers

- Data Collection Verification (DCV) forms are designed to check the accuracy of data collected by SOPs in the field. Supervisors used the DCV forms to ensure that the data written on the Daily Spray Operator Forms matched the information reported by households. Supervisory staff (Sector Coordinators, District IEC Assistants, District Coordinators, M&E Assistants, and Abt staff) used this form to interview households a few days after spraying. The AIRS team incorporated the DCV form in the m-Health checklists accessed via smartphone. Data collected on the m-Health DCV form was sent directly to the server. The reports generated by CommCare were submitted to the M&E manager and Assistants, who then used the report to confirm if the data collected agreed with SOP structure data.

Supervisory staff visited ~2,059 structures (~1.03 %) with the DCV form and compared the data collected and reported by SOPs on the data collection forms with information provided by household owners. The most common errors observed using DCVs were;

- i. Cases where the number of people residing in structures and rooms mismatched with SOP forms.
- ii. Some SOPs did not record 'found and not sprayed' structures on the SOP form.

Corrections were immediately made in the database and SOPs were advised to report accurate data.

The TLs were advised to diligently track all found structures (sprayed and unsprayed) by their teams during spraying and cross-check with SOP forms that all were recorded.

### 6.3.1 DATABASE QUALITY CONTROL

As in previous spray campaigns, the Access database used programmed audit checks and data locks that prevented data clerks from entering data incorrectly. For this particular campaign, Abt's Client Technology Center (CTC) continued to use SQL Servers to centralize and connect data clerk computers and avoid duplicate entries at each data center. CTC reviewed the IRS cleaning/reporting tool to help data clerks clean and reconcile data. Sufficient data clerks were hired to allow enough time for one clerk to use the IRS cleaning/reporting tool every day to clean data. As a result, data cleaning was completed one day after data entry of all spray data. The cleaning/reporting tool also enabled clerks to generate local reports for each district.

Finally, data clerks performed double-data entry, whereby they initially entered spray totals or a summary of each daily SOP form to produce real-time reporting of spray progress. Thereafter, they entered spray details data (i.e., line-by-line or structure-by-structure), which generated this end-of-spray report and all other client-submitted reports. During a thorough cleaning process using the IRS cleaning/reporting tool, AIRS Rwanda investigated and reconciled discrepancies between spray totals and details data before finalizing and reporting campaign results. AIRS Rwanda also corrected the paper spray forms and the database, where necessary.

## 6.3.2 RANDOM SPOT CHECKS

The M&E and Database Managers performed daily data verification activities for the Access database to guarantee data quality. They scanned the database and ran spray progress reports to identify anomalies and data entry errors. In the event they found discrepancies that they could not reconcile at the data center level, the M&E manager contacted the field supervisor to resolve the issue. At the end of every day, the M&E assistant used IRS cleaner/reporter to identify data entry errors and provided corrections and feedback to the data clerks.

## 6.4 IRS RESULTS

During the spray campaign, 198,970 structures of the 200,278 structures found were sprayed, resulting in 99.3 % spray coverage. A total of 812,714 people were protected, including 13,718 pregnant women and 118,913 children under five years (see Table 12).

**TABLE 12: SUMMARY OF RWANDA IRS RESULTS FOR SEPTEMBER 2016 CAMPAIGN**

District	Total Structures Found	Total Structures Sprayed	Spray Coverage (%)	Total Population Protected			
				Male	Female	Pregnant Women	Children <5 Years
Kirehe	85,873	85,422	99.5%	165,919	179,496	5,841	48,604
Nyagatare	114,405	113,548	99.3%	226,915	240,384	7,877	70,309
<b>Total</b>	<b>200,278</b>	<b>198,970</b>	<b>99.3%</b>	<b>392,834</b>	<b>419,880</b>	<b>13,718</b>	<b>118,913</b>

The spray operations progressed at a faster pace than planned especially in week two because the expected rain did not start until the last week. There was greater acceptance of IRS by the community because of the different insecticide used (Actellic 300 CS) compared to the previous spray campaign (Bendiocarb 80WP).

### 6.4.1 SCHOOLS AND PRISONS IN IRS TARGET DISTRICTS<sup>7</sup>

AIRS Rwanda sprayed 157 dormitories in 26 schools, three police stations, and one army camp in the two IRS target districts, protecting 8,118 people. AIRS Rwanda used 293 insecticide bottles for this (see Table 13).

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<sup>7</sup> Spraying of special structures such as dormitories in schools and prisons is reported only in the EOSR, not in the weekly spray progress reports sent to PMI. <http://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/best-practices-indoor-residual-spraying-feb-2015.pdf?sfvrsn=4>

**TABLE 13: IRS RESULTS FOR SCHOOLS AND PRISONS IN IRS DISTRICTS**

District	Targets for schools	# Targets for Dormitories	# Schools sprayed	# Police Stations/Army Sprayed	# Dormitories sprayed	Population Protected				Found Rooms	Sprayed Rooms	Mosquito Nets Available	Insecticide Used
						Male	Female	Pregnant Women	Children < 5 years				
Kirehe	9	56	9	1	71	1,626	1,285	0	0	186	163	1,864	127
Nyagatare	21	47	17	3	86	2,579	2,628	0	1	286	223	2,659	166
<b>Total</b>	<b>30</b>	<b>103</b>	<b>26</b>	<b>4</b>	<b>157</b>	<b>4,205</b>	<b>3,913</b>	<b>0</b>	<b>1</b>	<b>472</b>	<b>386</b>	<b>4,523</b>	<b>293</b>

## 6.4.2 INSECTICIDE USAGE

AIRS Rwanda used a total of 155,870 bottles (plus 293 bottles for other structures and schools) during the September 2016 campaign. On average, one bottle sprayed 1.3 structures (see Table 14). Each SOP used on average 6.8 bottles per day, and sprayed on average 8.7 structures per day.

**TABLE 14: INSECTICIDE USAGE**

District	Total Structures Sprayed	Total Bottles Used	Average Number of Sprayed Structures per Bottles	Average Number of Bottles per SOP per Day	Number of Structures Sprayed per day per SOP
Kirehe	85,422	66,642	1.3	6.8	8.7
Nyagatare	113,548	88,935	1.3	6.9	8.8
<b>Total</b>	<b>198,970</b>	<b>155,577</b>	<b>1.3</b>	<b>6.8</b>	<b>8.7</b>

Out of the initial insecticide stock of 173,964 OP bottles, a balance of 18,094 OP bottles remained. This insecticide is stored in the central warehouse and will be used as the first stock in the September 2017 spray round. The expiry date of the insecticide is May, 2018.

# 7. ENVIRONMENTAL COMPLIANCE

## 7.1 ENVIRONMENTAL COMPLIANCE DOCUMENTATION

The 2011 SEA (amended in 2013), was valid throughout 2016. AIRS Rwanda submitted a letter report in June 2016, which highlighted the environmental compliance plan for the September 2016 IRS campaign and the choice of pesticides. It also reported on the preparations and readiness for the IRS campaign.

## 7.2 PRE-SEASON ENVIRONMENTAL ASSESSMENT

The AIRS Rwanda team conducted pre-spray environmental assessments from July 18 to 22, 2016 in the two IRS districts at the sector level operation sites. AIRS Rwanda entered data on smartphones, which was transmitted to a central database on an automated server at Abt's Bethesda office to generate a work list. The work list was instantly shared with the AIRS Rwanda Chief of Party (COP), Operations Manager, and the Environmental Compliance Officer (ECO) to guide them on the actions to take to prepare the operation sites for IRS. The assessments involved reviewing compliant storage facilities, determining the suitability of soak pits from the previous IRS round, and siting locations for new soak pits. In total, AIRS Rwanda rented seven storage facilities while sector authorities at the sector and cell office premises provided 25 facilities. Some of the stores required minor refurbishments, which generally included fixing double locks and reinforcing doors and windows. AIRS Rwanda determined to use regular soak pits in all the operation sites and no mobile soak pits. AIRS Rwanda sourced constructors from the sectors who cleared the soak pits of bushes. The constructors also added and compacted murrum in the wash area and fixed a polythene sheet onto the murrum. Finally, the constructors fixed poles to stabilize the fences. Table 15 shows the details of the refurbishments at the operation sites.

**TABLE 15: CONSTRUCTION AND REFURBISHMENTS AT IRS OPERATION SITES**

District	Number of Operation Sites	Site Refurbished (soak pit, storeroom, fence, etc.)
Nyagatare	18	14 soak pits refurbished 4 new soak pits constructed (2 in Rukomo, 1 in Cyabayaga and 1 in Kiyombe sectors) 10 offices and storage facility provided by sector and cell authorities 7 office and storage facilities were rented
Kirehe	16	13 soak pits refurbished 3 new soak pits constructed (1 in Nyarubuye, 1 in Kirehe and 1 in Mpanga I sectors) 15 offices and storage facility provided by sector and cell authorities

## 7.3 SAFETY AND ENVIRONMENTAL COMPLIANCE DURING THE SPRAY CAMPAIGN

Before IRS training, all SOPs, washers, and supervisors underwent medical tests in August 2016 to ensure their fitness to participate in the IRS operations. The tests comprised a routine physical examination, pregnancy tests for all females (including storekeepers, sector supervisors, sector coordinators), and hematocrit and liver function tests (AST, ALT). A total of 1,800 SOP's, TL's, washers, store keepers and supervised went through medical examination at district hospitals in both Kirehe and Nyagatare districts. During the medical examinations, medical personnel found 13 (7 males and 6 females) SOPs and washers unfit for IRS operations. Six of them were pregnant women to whom AIRS Rwanda assigned mobilization duties in their cells. AIRS Rwanda replaced the other seven before IRS training and operations.

During IRS operations, AIRS Rwanda required all staff to adhere to requirements for environmental and human safety related to IRS. AIRS Rwanda instituted mitigation measures by providing appropriate PPE to all spray personnel and others who had potential exposure to insecticide. PPE included coveralls, gloves, boots, helmets, face shields, neck protection, and dust masks for use during spraying.

Enclosed trucks were used to transport insecticides from the central warehouse to district warehouses. The trucks were certified according to the PMI/AIRS BMP8 criteria for vehicles that transport pesticide. Trucks covered with tarpaulins distributed insecticides from the district warehouse to the operations sites. Each vehicle had a kit for spill management and first aid, material safety data sheets, and accident/emergency procedure sheets. SOPs moved from operational sites to the field using certified trucks retrofitted with railings on the periphery and bench seats. AIRS Rwanda inspected vehicles before using them against the PMI BMPs to ensure compliance with safety and environmental requirements and compliance for IRS operations.

AIRS Rwanda monitored soak pits throughout operations. AIRS Rwanda used plastic sheeting at the wash areas to ensure that insecticide contaminated effluent did not pollute the environment. AIRS Rwanda replaced the sheeting where and when it was necessary, and fenced and gated the soak pit and wash areas to ensure no unauthorized access. AIRS Rwanda used the progressive (triple) rinsing system at each soak pit for washing spray pumps. Trained washers washed the PPE over the soak pits each spray day. The spray operations teams also bathed themselves in the provided washrooms at the end of every work day before leaving the operational sites for the day. AIRS Rwanda conducted mid-spray environmental compliance inspections during the spray operations in the two IRS districts to ensure adherence to mitigation measures put in place during spray operations. AIRS Rwanda staff, in conjunction with the district health environmental officers, used smartphones to conduct the inspections.

The inspection teams assessed the use of PPE during spraying and washing activities, stores records and arrangement, transportation of SOPs, and use of warning signs and first aid kits. They inspected fire extinguishers in storerooms. They also ensured correct handling and packing of waste during the operations in preparation for disposal at the end of operations. The teams monitored preparation of households for spraying and the instructions given to residents on what to do during and after spraying operations. The inspections also involved observing the SOPs in the field.

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<http://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/best-practices-indoor-residual-spraying-feb-2015.pdf?sfvrsn=4>

## 7.4 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS AND OTHER INCIDENTS

A team was in charge of adverse effects in each district. The team comprised a coordinator, a doctor who was based at the district hospital, and a nurse at each health center affiliated with each IRS operation site. These teams worked closely with the ECO; their role was to address adverse effects that community members and/or the spray operations support staff might experience during spray operations. Before the start of the IRS operations, the teams received refresher training at each district on management of IRS adverse effects. Only two cases of vehicle accidents were reported in Nyagatare and in Kirehe districts (Nasho sector) and Nyagatare district (Karama sector) respectively.

## 7.5 POST-SEASON ENVIRONMENTAL ASSESSMENT

AIRS Rwanda conducted the post-season environmental assessment in the two districts using smartphones. The assessment confirmed collection of all IRS items from the operation sites and transport of insecticides and IRS wastes to district storage facilities. AIRS Rwanda cleaned soak pits and their surroundings, covered them with plastic sheets, and securely locked doors. AIRS agreed with the district and sector authorities that the sectors would provide security for the soak pits and wash areas to ensure against vandalism during the non-spraying season. AIRS Rwanda cleaned and decontaminated stores before handing them over to the owners.

## 7.6 IRS WASTE DISPOSAL

AIRS Rwanda disposed of IRS waste at different sites according to the type generated during the IRS operations. The IRS waste disposal sites included recycling plants for plastics and carton boxes, and dump site and incineration plants at the district hospitals. The incinerators used for IRS wastes had both primary and secondary combustion chambers with separate burners and blowers for forced air and turbulence. The primary and secondary operating temperatures were recorded manually on a daily basis (minimum 850° C for wastes with chlorine content < 1%). The residence time for the gas in the secondary chamber was 2-3 seconds. There was post-combustion gas treatment in the form of a bag filter. The chimney/stack height was 6 meters. IRS waste was incinerated separately without mixing with other hospital waste. Incineration was supervised and witnessed by IRS's ECO and/or the Environmental Health Officer of the district hospital.

AIRS Rwanda disposed of wastes as described below.

*Nyagatare:* AIRS Rwanda sent 264kg of contaminated waste (20,944 used masks) from Nyagatare district to the Nyagatare District Hospital incineration plant, A total of 89,101 empty insecticide bottles, 384 used gloves, and assorted plastics items (damaged barrels, jerry cans and basins) were sent to the EPEDR Recycling plant. AIRS Rwanda donated 7,426 uncontaminated carton boxes to Cards from Africa Company at Samuduha. AIRS Rwanda disposed of other uncontaminated waste, including used dry cell batteries, at the Nduba dumping site.

*Kirehe:* AIRS Rwanda sent 216kg of contaminated waste (16,572 used masks) from Kirehe district to Kirehe Hospital incineration plant. A total of 66,769 empty insecticide bottles, 429 used gloves, and assorted plastics items (damaged barrels, jerry cans and basins) were sent to the EPEDR Recycling plant. AIRS Rwanda donated 5,563 uncontaminated cardboard boxes to Cards from Africa Company at Samuduha. AIRS Rwanda disposed of other uncontaminated waste such dry cell batteries at the Nduba dumping site. See Annex G for certificates of incineration.



# 8. CAPACITY BUILDING OF THE MINISTRY OF HEALTH

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## 8.1 CAPACITY BUILDING DURING IRS TRAINING

AIRS Rwanda conducted the IRS implementation in close collaboration with MOH and district staff to promote sustainability. MOPDD staff worked with AIRS staff to facilitate IEC and SOP ToTs. The training created a pool of trainers for the future depending on their availability.

The trained IEC and SOP ToTs in turn facilitated training for IEC implementers and SOPs at the district and sector levels. The beneficiaries of the two training sessions (IEC implementers and SOPs) were cell and village heads and CHWs (SOPs) involved in IEC and spraying activities respectively. AIRS Rwanda supervised IRS operations in collaboration with the MOPDD and district/sector staff (Vice Mayor-Social Affairs, District Health Director, District Environmental Health Officer, and Sector Social Affairs Officers). The staff received orientation on IRS supervisory activities.

In addition, AIRS Rwanda conducted training in the districts bringing together environmental health officers and clinicians. These in turn play an important role in ensuring adherence to environmental compliance procedures and management of side effects.

After completion of the IRS in October 2016, AIRS started providing technical support to IRS in three other MOH funded districts. The IEC and SOP ToTs trained IEC implementers and spray operators in the three MOH IRS districts. Consequently they worked as the support staff at the district and sector levels. In addition, AIRS Rwanda provided three core trainers to lead and train all ToT's conducted by MOPDD in the three target districts.

## 8.2 TECHNICAL SUPPORT FOR MOH IRS OPERATIONS

AIRS Rwanda, with PMI approval, lent materials and equipment (506 spray pumps and 165 complete helmets, 187 rinsing barrels, 42 water tanks, 3 repair kits, and 23 computers for data entry) to MOH to support implementation of spray operations in MOPDD-supported districts (Bugesera, Gisagara and Gatsibo).

Implementation of the MOH IRS is scheduled to start on October 31, 2016. AIRS Rwanda will provide technical support to the target districts. AIRS Rwanda will appoint three staff to provide full time support to the districts (one for each district) in the preparations and implementation of the spray operations. In addition, AIRS Rwanda will provide technical support for environmental compliance, stores management, and data entry and management during MOH IRS operations. The MOPDD returned all materials after completion of the spray campaign.



# 9. ENTOMOLOGY

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Entomological monitoring is essential in any insecticide-based vector control intervention such as IRS. It helps assess the quality of the vector control intervention implemented and its efficacy. The entomological monitoring data helps justify decisions such as the selection of insecticide and target areas. Working in collaboration with MOPDD, AIRS Rwanda implemented entomology monitoring activities aimed at:

- Assessing malaria vector density and species composition in intervention areas;
- Determining vector behavior;
- Establishing vector feeding time and location; and
- Assessing the quality of insecticide application and monitoring insecticide decay rates.

## 9.1 WALL BIOASSAYS

AIRS Rwanda conducted monthly cone bioassays in 24 sprayed structures on three different wall surfaces - mud, plastered not painted (PNP), and plastered and painted (PP) in each of the IRS districts during the September 2016 spray campaign. AIRS Rwanda also conducted control tests on surfaces known to have no insecticide. AIRS Rwanda conducted the cone bioassays using susceptible *An. gambiae* s.s. (Kisumu colony).

Cone bioassays conducted within one week of spraying showed 100% mortality of susceptible *An. gambiae* s.s. Pirimiphos-methyl is known to have an air borne effect that lasts from a few weeks to several months, Thus, data collected in October 2016 which showed 100% mortality was used to further confirm spraying quality was satisfactory and to provide a baseline. Wall bioassay conducted in November (T<sub>2</sub>) and December (T<sub>3</sub>) 2016, also showed 100% mortality of susceptible *An. gambiae* s.s..



# 10. GENDER

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## 10.1 GENDER MAINSTREAMING

AIRS Rwanda implemented all planned activities in the gender inclusion initiative in the operational plan. These are described below.

- *Training:* AIRS Rwanda incorporated gender sessions in all IRS training materials for discussion during the IRS training (ToT, mobilizer, and SOP training). AIRS Rwanda also appointed gender focal points at district and sectors levels among the IRS support staff.
- *Increased recruitment of women:* AIRS Rwanda used micro-planning meetings with all district and sector authorities to discuss the importance of increasing the number of women SOPs during IRS operations by recruiting only CHWs with previous IRS experience. AIRS Rwanda also continued to advocate with MOH to increase the number of female mobilizers during IRS operations. AIRS Rwanda revised all vehicle tender adverts and encouraged vehicle vendors to hire at least 30% female drivers during IRS operations. AIRS Rwanda employed two women drivers (one in Nyagatare district and another for IRS supervision vehicles). AIRS Rwanda will continue to advocate recruit more women for all IRS activities.
- *Gender-friendly work environment:* AIRS Rwanda ensured the work environment was more gender friendly by constructing separate stand-alone double bathrooms for both men and women in each operational site.
- *Distribution of Afripads to female seasonal workers:* AIRS Rwanda distributed 1,440 sanitary pads (640 in Kirehe and 800 in Nyagatare districts) to female seasonal workers during September 2016. This product (Deluxe Menstrual Kit) contains reusable sanitary pads that enable women to manage their periods effectively for 12+ months. AIRS Rwanda procured sanitary pads to eliminate menstruation as a possible barrier to women's participation in the spray campaign. Before distribution, AIRS conducted training for all district and sector gender focal points (33 females), who then conducted a session on female hygiene for all women seasonal workers at each operational site. This session emphasized the importance of using pads to encourage women's participation and to promote hygiene in IRS operations. Alternative duties for pregnant IRS workers: Six pregnant SOPs switched their assignment to responsibility for mobilization in their cells of residence.
- *Gender Awareness Guidelines and messages:* AIRS Rwanda posted gender awareness guidelines at each operational site to encourage professionalism and mutual respect. In addition, AIRS Rwanda prepared and disseminated gender messages regularly to all seasonal workers throughout the spray campaign to enhance gender awareness and encourage women and men to express any gender-related issues encountered during IRS operations.

- *Gender norms survey:* AIRS Rwanda conducted the gender norms and attitudes survey before the start and at the end of the spray campaign. The objective of was to assess gender norms and attitudes with regard to decision making and agency (ability to act on decisions) of men and women within the home among all IRS seasonal workers of the sampled sectors. The team analyzed the data and found encouraging results. The average pre-score for all respondents was 6.93. The post score rose significantly by .84 points to 7.76 ( $p < 0.001$ ), suggesting a shift in attitudes following seasonal employment with AIRS.

A separate report will summarize the results across all four AIRS countries that participated in the survey.

# II. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

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## II.1 CHALLENGES

AIRS Rwanda experienced the following challenges during the IRS campaign:

- With the introduction of a new insecticide (Actellic 300 CS) and use of CFV's for the first time in Rwanda, SOP's across all target districts experienced clogging of nozzles and CFV's during spray operations.
- TL's observed mistakes during supervision of spray techniques but were not reporting them on DOS checklists as red flags, perhaps because they corrected them during supervision.
- Supervisors noted that unsprayed structures were not recorded or marked during the first week of spraying, although this issue was not as prevalent as in past campaigns. This was immediately addressed and improvement was noted by the second week of spraying.
- Absence of some households during spraying because of farming, market days, work days, funerals, and some refusals meant that some structures could not be covered, even after mop-up. Out of 1,308 structures that were not sprayed, 119 (9.1%) were because of refusals.
- Two soak pits were flooded due to heavy rain during the third and last week of spray operations; too much rainfall caused waste water to infiltrate slowly into soak pits.
- IRS coverage was low in urban areas mainly in Nyagatare sector in Nyagatare district, and Kigina sectors in Kirehe districts, because of refusals and absence of householders at the time of spraying.
- A higher percentage of IRS cards lost by the community members were identified in urban areas sprayed in the third week compared to rural areas sprayed in the first two weeks.
- The Actellic 300CS insecticide bottles (full and empty) occupied more space compared to previously used carbamates. AIRS Rwanda therefore rented more storage space and hired more transportation vehicles to ferry empty bottles to Kigali from the districts. In addition, empty carbamate sachets were incinerated at the districts hospitals during previous campaigns, meaning the logistical coordination and transport costs were minimal.

## II.2 LESSONS LEARNED AND RECOMMENDATIONS

- AIRS Rwanda will continue to enforce messages to SOP's to agitate their pumps frequently before and during spraying to avoid clogging of spray pumps and CFV's. Proper cleaning of CFV's at the end of each work day and provision of screwdrivers to each team leader would help alleviate the challenge of nozzle and CFV clogging.
- To improve TL DOS reporting, AIRS Rwanda will enhance supervision of TLs and encourage them to consistently report issues/red flags noted during supervision even if they already corrected the SOPs.

- Engagement of CHW supervisors at operational sites for IEC coordination in the sectors enhanced coordination of IRS activities at the community level. AIRS will continue to engage local leaders in mobilizing and enhancing IRS acceptability.
- AIRS Rwanda will adhere to the recruitment procedure for SOPs by engaging the officer in charge of CHWs at the health center, followed by verification and approval by the Head of Health Center, Sector Social affairs, and the Sector Executive Officer.
- Enhanced supervision by the AIRS staff, the MOPDD, and district and sector staff and regular feedback meetings were instrumental in smooth IRS implementation and achieving high spray coverage.
- Data cleaning conducted regularly during IRS data entry was instrumental in identifying any errors and taking immediate remedial action. This also provided an opportunity to compare insecticide used as recorded in the database with daily logistics records.
- Cell offices can provide storage facilities and IRS operation sites where space is unavailable at sector offices.
- AIRS Rwanda will continue to recruit only CHWs with previous IRS experience. Micro-planning meetings with district and sector authorities will discuss the importance of increasing the number of women SOPs by recruiting only CHWs with previous IRS experience. AIRS Rwanda will also continue to advocate with MOH to increase the number of women mobilizers during IRS operations.
- AIRS Rwanda will continue to distribute sanitary napkins to female seasonal workers in forthcoming spray operations to eliminate this potential barrier to women's participation.

# ANNEX A: MOH LETTER ON INSECTICIDE SELECTION 2016/2017

REPUBLIC OF RWANDA



MINISTRY OF HEALTH  
P.O. Box: 84 KIGALI  
[www.moh.gov.rw](http://www.moh.gov.rw)

Ms Marcia Musisi- Nkambwe  
USAID Country Mission Director  
KIGALI-RWANDA

Dear Mission Director

**Re: Choice of Insecticide for Indoor Residual Spraying 2016 to 2017 in Rwanda**

I am honoured to take this opportunity to thank USAID/PMI for all the support it has been providing in the fight against malaria in Rwanda.

Considering the National Strategic Plan for Insecticide Resistance Management in Malaria Vectors 2013-2017, it was planned a rotation of insecticides at a two-year basis as a resistance management strategy for mitigation of occurrence of insecticide resistance. It is in that perspective that there will be a change of the current class of insecticide "Carbamates"(Bendiocarb) that was used in IRS since September 2013 and start using Organophosphate (Pirimiphos Methyl "Actellic") in the spray round of September 2016

We would appreciate again your support under the lead of Malaria and Other Parasitic Diseases Division for the implementation of this strategy with special attention to the environmental compliance and IEC/BCC in accordance to the product.

Yours Sincerely

  
  
Dr. Patrick NDIMUBANA  
Minister of State in Charge of  
Public Health and Primary Health Care

Cc

- The Permanent Secretary/MoH
- Director General of RBC
- The Deputy DG/RBC
- The Head of IHDPC/RBC
- ✓The Head of Malaria and OPDD/RBC

Kigali, on 20 JUL 2016  
N° 20/3395/RBC-IHPDC/2016



Copy Vector Control  
unit and file



## ANNEX B: INSECTICIDE RESISTANCE TESTING RESULTS

No	District	Sites	Period	Deltamethrin 0.05%	Permethrin 0.75%	Lambdacyha lothrin 0.05%	Pyrimiphos methyl 0.25%	Bendiocarb 0.1%	Fenitrothion 1%	DDT 4%
1	Kirehe	Bukora	Jan-15	67	54	36	100	94	100	62
2	Bugesera	Mareba	Jan-15	67	63	43	100	100	100	80
3	Bugesera	Gashora	Jan-15	58	41	46	100	100	100	70
4	Nyanza	Busoro	May-15	63	47	62	100	100	100	93
5	Nyagatare	Cyondo	Aug-15	93	91	96	100	100	100	99
6	Gatsibo	Ngarama	Sep-15	65	53	68	100	98	100	90
7	Nyagatare	Mimuli	Sep-15	58	43	44	100	90	100	71
8	Nyagatare	Nyagatare	Sep-15	100	87	91	100	100	100	99
9	Gisagara	Gakoma	Sep-15	94	93	89	100	100	100	97
10	Bugesera	Mwogo	Oct-15	73	46	78	100	98	100	88
11	Gisagara	Kirarambogo	Nov-15	78	83	85	100	96	100	81
12	Rwamagana	Nyagasambu	Nov-15	78	74	78	100	75	100	85
13	Kirehe	Bukora	Dec-15	99	81	89	100	100	100	100
14	Bugesera	Mareba	Dec-15	100	97	95	100	100	100	100



# ANNEX C: LOCAL PROCUREMENT

Description	Quantity/ Number
<b>IRS Transportation</b>	
Rented vehicles used in micro-planning and logistics assessments	2
Rented vehicles used in IRS implementation	96
IRS supervision vehicles (Country Office)	2
Rented vehicles that facilitated the post IRS activities	2
<b>Printing and Photocopying</b>	
Cell IEC mobilizer form	1,517
Daily health team leader checklist	5,753
Daily summary form for sector coordinators	497
Emergency response	144
Error eliminator form for mobilizer data	2,666
Error eliminator form for spray data	6,634
Incident report form	66
Insecticide distribution card	680
IRS cards	173,090
Material safety data sheet	144
Spill response procedure	144
Spray operator performance sheet (district)	5
Spray operator performance sheet (sector)	43
Sprayer operator form	36,164
Stock cards	720
Team leader form	7,069
Village IEC implementer form	21,930
Emergency contact	144
Goods delivery note	16
Good issued note	134
Good received note	12
Request book	12
Spray operation pocket guide (Kinyarwanda)	400
Assorted photocopies	36,050

Description	Quantity/ Number
<b>Assorted materials</b>	
Chalk	279
Cloth lines	15
Dry cell batteries	2,522
Duracell batteries (AA)	1,761
Dustbin (sanitary)	5
Empty boxes (cartons)	107
Empty sac	771
Fire extinguishers	20
Liquid soap	3
Lubricant oil	59
Megaphone	10
Padlock	5
PMI logo	12
Powder (face)	479
Powder soap	2,001
Screw driver	250
Sisal rope	36
Toilet soap	1,455
Torch plastic - normal	1700
Washing/laundry soap	1,275
Wire mesh	3
Wooden door for soak pit	3
Basin	98
Jerrycan	243
Plastic sheeting	6
Spade plastic	10
Polythene/tarpaulin	121
Sand box	10
Sprayer bag	500
Latex gloves- examination	10

Description	Quantity/ Number
<b>Stationery</b>	
Clear sheet protector	392
Flip chart pad	20
HP cartridge	4
Meter ruler 100cm	18
Note pad	3,889
Office file	232
Paper clips	98
Paper ream	31
Pen	4,105
Staples	89



# ANNEX D: SOP TRAINING PROGRAM

Timing	Day 1	Day 2	Day 3	Day 4	Day 5
	<b>Your Equipment</b>	<b>Your Skills</b>	<b>Practice Sessions</b>	<b>Practice Sessions</b>	<b>Practice Sessions</b>
08:00-08:30	<b>Opening:</b> Welcome & Introductions	Review of Day 1	Review of Day 2	Review of Day 3	S13: Review of Key Concepts
08:30-09:15	S1: Introduction to Malaria Prevention and Indoor Residual Spraying	S5: Introduction to Spray Techniques	S9: Spray Technique Practice	S11: Spray Technique Practice	S14: Spray Operator Ethics (30 min) S15: Comprehensive Skills Practice
09:15-10:15	S2: Spray Operator Safety Procedures (Use of PPE, Safety of Population and Environment; and Insecticide Exposure and Treatment)	S5 (cont)	S9 (cont)	S11: Spray Technique Practice	S16: Performance Monitoring (Spray Operator Targets)
10:15-10:30	<b>Break</b>	<b>Break</b>	<b>Break</b>	<b>Break</b>	<b>Break</b>
10:30-11:30	S3: Using Your Equipment (Introduction to the Spray Pump, Parts of Compression Pump, Handling and Pump Maintenance)	S5 (cont)	S9 (cont)	S11: Spray Technique Practice	IRS Payment: Timesheet SACCO/Account Number
11:30-12:30		S6: Working with the Community			
12:30-13:30	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>
13:30-14:30	Introduction of new Insecticide (Actellic 300 CS) and Insecticide Mixing Procedures	S7: Recordkeeping for IRS (Identifying eligible structures; Marking houses; Daily Spray Record and Practice: Completing the Daily Spray Operator Forms)	S9 (cont)	S11: Spray Technique Practice	Final Assessment
14:30-15:30	S4: Beginning the Spray Day (Starting the day, Morning Meeting, Checking out Equipment and Daily Evaluation)				
15:30-15:45	<b>Break</b>	<b>Break</b>	<b>Break</b>	<b>Break</b>	
15:45-16:45	Dressing rehearsal	S8: Close of the Spray Day	S10: Triple-Rinse	S11: Spray Technique Practice	Closing
16:45- 17:00	End-of-day feedback	End-of-day feedback	End-of-day feedback	End-of-day feedback	



# ANNEX E: JOB AID MESSAGES SENT TO SEASONAL STAFF

Time	Recipient	Message	Total Number to be submitted in a spray season
<i>What time of day should this message be sent? For sprayers, they are not allowed to have phones during the work day.</i>	<i>Who will receive this message</i>		
13:30h	Team Leaders	Team Leaders MUST carefully check the filled spray operators' data collection forms at the close of the day before submitting to the supervisors.	2
14:00h	Cell and Sector IEC's and Sector Coordinators	Ensure mobilizers notify the communities to prepare a day ahead of the arrival of the spray team.	2
09:00h	Spray Operators, Team Leaders, Supervisors, and Sector Coordinators	Eating, drinking or smoking during the spraying period will result in dismissal. It is not allowed.	2
07:00h	Spray Operators and Team Leaders	Good morning! Remember the spray target is 9 structures per spray operator per day. All rooms should be sprayed as well. Thanks for the good job.	2
16:30h	M&E Assistants	Attention! {case.name} have not submitted their SMS report for today.	20
13:30h	Sector Coordinators	a. # team members. Structures found. #structures sprayed. #insecticide units used.	1
06:30h	Spray Operators, Team Leaders, Supervisors, and Sector Coordinators	Full PPE use remains mandatory for the duration of the spray operation.	2
16:00h	Spray Operators and Team Leaders	Remember only heavy, non-edible, bulky items should be packed in the center of the room and covered with the polythene sheet before spraying.	2
07:30h	Team Leader	Remember your spray nozzle should be 45cm from the surface. Spray pressure is between 35 and 55psi.	2

Time	Recipient	Message	Total Number to be submitted in a spray season
06:50h	Spray Operators, Team Leaders, Supervisors, and Sector Coordinators	To ensure the safety of all seasonal staff and community, report the health status and any adverse effect to your supervisor.	1
15:00h	Spray Operators, Team Leaders, Washers, Security Guards, Supervisors, and Sector Coordinators	PMI AIRS Project will not tolerate sexually-oriented conduct, whether it is intended or not, that is unwelcome.	2
15:00h	Spray Operators, Team Leaders, Washers, Security Guards, Supervisors, and Sector Coordinators	Sexual harassment is defined as: sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature.	1
14:30h	Spray Operators, Team Leaders, Washers, Security Guards, Supervisors, and Sector Coordinators	Other work-related harassment is the unwelcome, deliberate or repeated unsolicited verbal, physical, or visual contact or solicitation of favors that are offensive, abusive, intimidating, hostile, denigrating, or demeaning.	1
14:30h	Spray Operators, Team Leaders, Washers, Security guards, Supervisors, and Sector Coordinators	The PMI AIRS Project takes any allegations of sexual harassment seriously. All complaints should be made to your <u>Gender Focal Point at 0786477460</u> . Please also contact the Rwanda National Police, Gender Based Violence Unit at <b>3512</b> for further support.	1
		<b>14</b>	<b>41</b>

# ANNEX F: STOCK UPDATE

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used/Damaged/Out of use	Quantity in Stock after the Campaign
Sprayer pumps	1,711	0	1,711	44	1,667
Dust mask	8,970	44,520	53,490	37,516	15,974
Hard hat (shell)	2,411	0	2,411	679	1,732
Face shield	1,675	1,700	3,375	1,643	1,732
Face shield bracket	2,686	1,500	4,186	2,454	1,732
Apron	165	0	165	28	137
First aid kits	4	138	142	123	19
Gloves (nitrile)	2,440	0	2,440	786	1,654
Gloves for washers	180	0	180	27	153
Coverall	4,728	0	4,728	659	4,069
Boot (rubber)	1,969	204	2,173	215	1,958
Nozzle valve body cap	249	0	0	0	249
Control flow valve (CFV)	1,685	0	1,685	33	1,652
Extension lance	236	0	236	90	146
Gasket nozzle	1,019	0	1,019	459	560
Lance	4	0	4	4	0
Stop cock	46	0	46	0	46
Repair kit	28	0	28	8	20
Pressure gauge	48	100	148	98	50
Gaskets, simplex cover	130	0	130	130	0
Wash valve pin	315	0	315	191	124
Body shutoff	26	0	26	0	26
Insecticide (Actellic 300 CS)	0	173,964	173,964	155,870	18,094



# ANNEX G: WASTE DISPOSAL CERTIFICATES





# ANNEX H: PEOPLE TRAINED TO IMPLEMENT IRS

Categories of Persons Trained	Training on IRS Delivery										Other Trainings														Total				
	Training of Trainers		Spraying Operations		Data Capture		Logistics Training		Technical Maintenance		Structure Enumeration/IEC TOT		Structure Enumeration/IEC Training		Poison Control		Environmental Compliance		Coveralls Washing		Fire Security		Finance			Transport Security			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F		
Sector Coordinators	19	13																											32
Sector Supervisors	68	58																											126
Spray Operators			548	774																									1,322
Team Leaders			158	154																									312
Data Entry Clerks					11	10																							21
Logisticians							1	2																					3
District Store Keepers							2	1																					3
Sector Store Keepers							12	20																					32
Finance Assistants																							1	2					3
Pump Technicians									2	0																			2
District IEC Assistants											1	1																	2
Sector IEC Assistants & Supervisors											86	70																	156

Categories of Persons Trained	Training on IRS Delivery										Other Trainings														Total		
	Training of Trainers		Spraying Operations		Data Capture		Logistics Training		Technical Maintenance		Structure Enumeration/IEC TOT		Structure Enumeration/IEC Training		Poison Control		Environmental Compliance		Coveralls Washing		Fire Security		Finance			Transport Security	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F
Cell IEC Mobilizers													102	68													170
Village IEC Mobilizers													2,289	185													2,474
Adverse Effects Teams (Clinicians)															34	7											41
Environmental Compliance Officers																	2	0									2
Washers																			44	69							113
Security Guards																					64	1					65
Drivers																									96	0	96
<b>TOTAL M/F</b>	<b>87</b>	<b>71</b>	<b>706</b>	<b>928</b>	<b>11</b>	<b>10</b>	<b>15</b>	<b>23</b>	<b>2</b>	<b>0</b>	<b>87</b>	<b>71</b>	<b>2,391</b>	<b>253</b>	<b>34</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>44</b>	<b>69</b>	<b>64</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>96</b>	<b>0</b>	<b>4,975</b>
<b>TOTAL/Training</b>	<b>158</b>		<b>1,634</b>		<b>21</b>		<b>38</b>		<b>2</b>		<b>158</b>		<b>2,644</b>		<b>41</b>		<b>2</b>		<b>113</b>		<b>65</b>		<b>3</b>		<b>96</b>		<b>4,975</b>

# ANNEX I: ENVIRONMENTAL MITIGATION AND MONITORING REPORT – THE PMI AIRS PROJECT

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- **The Environmental Mitigation and Monitoring Report (EMMR)** form is submitted annually with the End of Spray Report (EOSR).
- This form reports on the results of applying the mitigation measures described in the Mitigation Plan and identifies outstanding issues with respect to required conditions. In some cases, digital photos are the best way to document mitigation and are included in the report.

The EMMR must be completed by the Implementing Partner. The EMMRs are reviewed and approved by the COR and the BEO (and/or MEO, as appropriate). Any sub- awards, sub-grants, and sub-activities must incorporate provisions stipulating a) the completion of an annual environmental monitoring report and b) that activities to be undertaken will be within the scope of the environmental determinations and recommendations of this IEE. This includes assurances that any mitigating measures required for those activities be followed.

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
Ia. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	ECO and district coordinators inspected vehicles to be used during IRS operations to see if they met IRS standard requirements. A total of 96 vehicles were inspected and hired for the support of the IRS operations in the two districts. Nyagatare used 54 while Kirehe used 42 vehicles .	Vehicles that did not meet PMI IRS requirements (such as insurance, strong benches for SOP to sit on, etc.) were not contracted and old fire extinguishers were replaced with new ones.	
Ib. Driver training	96 drivers were trained on safety issues (including wearing coveralls while on IRS field operations).	In this years spray campaign , we had two vehicle accidents. The first was due to a slippery road with a steep slope where the driver failed to control the vehicle. The second was when the vehicle was going up a hilly road, the gear/brakes system jammed, and the vehicle receded downhill. Both vehicle incident reports were sent to home office.	To encourage the drivers to keep a close watch on the vehicle operating system.  -To encourage drivers to drive carefully on slippery roads
Ic. Cell phone, personal protective equipment (PPE), and spill kits on board during pesticide transportation.	Spray operator transportation vehicle inspections revealed that all vehicles had spill kits on board during the transportation of SOPs.		
Id. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	Training and screening of SOPs in order to see those who were unhealthy or pregnant. All female SOPs and washers were tested for pregnancy and 13 (6 pregnant cases and 7 unfit out of the total screened) were eliminated after positive results.	Six pregnant women were assigned to cell IEC mobilizer positions.	
Ie. Health fitness testing for all operators	All SOPs, washers, and supervisors were medically tested for health and fitness. A total of 1,634 SOPs were screened for health and fitness and the 13 found to be unfit were excluded from participating in IRS operations	In this years spray campaign,we used the updated lists of medically tested SOPs submitted by hospital directors.	
If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	Training on the use of PPE was conducted for all SOPs, there was no case of adverse effect resulting from insecticide contact.		

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
I.g. Training on mixing pesticides and the proper use and maintenance of spray pumps.	All SOPs were trained on mixing pesticides before spraying. Triple rinsing of empty bottles in the field was emphasized during the SOP training.	All SOPs had formal training on mixing insecticide before spraying. Triple rinsing of empty bottles in the field was emphasized during the SOP training.	
I.h. Provision of adequate facilities and supplies for end-of-day cleanup.	Washing soap and other supplies were available at all operational sites to facilitate end of day clean up. There were 1,082 smartphone-based end of day cleanup inspections during the campaign and in no cases were the unavailability of soap or water for cleanup reported.	No outstanding issues	
I.i. Enforce clean-up procedures.	The seven-barrel progressive rinsing procedure was performed by all SOPs. Of the 1,082 end of day cleanup inspections conducted, there were only 22 cases of unsupervised clean-up. The non-compliant issues identified during the inspections included: washing of the outside of pumps; rinsing of PPE; SOPs washing hands and face; overalls being cleaned; and flooding of soak pits draining water into soak.	All non-compliance issues were immediately corrected.	
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	IEC campaigns were effectively carried out before the campaign. A total of 2,474 Village IEC's (2,289 males and 185 females) conducted IEC campaigns to inform homeowners of responsibilities and precautions. Village IEC was supervised by 170 Cell IECs (102 males and 68 females).	No outstanding issues	
2b. Prohibition of spraying houses that is not properly prepared.	In general, households were prepared before spraying activities were conducted. During the campaign, 11,099 homeowner preparation inspections were conducted and there 29 cases with houses not being properly prepared. No SOPs sprayed a house that was not prepared.	These non compliance issues were addressed in morning briefs to SOPs.	
2c. Two-hour exclusion from house after spraying	Supervisors informed homeowners of a two-hour exclusion from house after spraying.	SOPs and supervisor supported each other in emphasizing the message to homeowners of two hour exclusion from the house	

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside.	There were 29 reported cases (out of 11,099 total inspections) of homeowners being exposed to insecticide. Before spraying started, all homeowners were instructed avoid exposure to insecticide.		
3a. Indoor spraying only.	Sector coordinators and supervisors emphasized indoor spraying only. There were no cases of SOPs spraying outdoor surfaces . All SOPs observed this requirement.		
3b. Training on proper spray technique	Training of SOPs was conducted with application of spraying techniques. There were few cases of SOPs not in compliance with the spray speed and 5 cm swath overlap guidelines.	The few raised issues on spraying techniques were addressed immediately by IRS supervisors in the field.	
3c. Maintenance of pumps	A pump technician was placed at each district warehouse to repair and maintain pumps before and during IRS operations. In addition, the technician made site visits to fix the pumps with leakages. There were few reported cases of a leaking pump and they were immediately repaired.	Leaking pumps were repaired by pump technician after being identified by SOPs. No outstanding issues were reported	A greater effort has been made during ToT and SOP trainings to ensure that any leakages are reported on time so that repairs are done before going out to the field.
4a. Choose sites for disposal of liquid wastes according to PMI BMPs.	Contaminated liquid waste to be disposed in soak pits. All soak pits for the disposal of liquid waste were chosen, inspected and determined to be ready for operation prior to the beginning of the spray campaign. The pre-seasonal environmental compliance inspection was conducted from July 18 to 22, 2016 to verify the soak pits which required rehabilitation and also best sites to construct new soak pits.		
4b. Construct soak pits with charcoal to adsorb pesticide from rinsewater.	Re-construction of new soak pits was completed before spraying operations. Rehabilitation and reconstruction of some soak pits was based on PMI BMP guidelines.		

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
4c. Maintain soak pits as necessary during season.	There were two reported case of the soak pit at Rwimiyaga site and Karangazi site at Nyagatare district where they were not adequately draining water, but the gravel in the soak pits was found to be adequate. The soakpit flooding was due to excessive rainfall which caused waste water to infiltrate slowly into the soak pit.	There was re-excavation of the soak pit to remove mud which was slowing the flow of waste waters.	Soak pits will be covered with plastic sheeting during the day when not in use to prevent waterlogged ground. In addition, boot washes will be used at the entrance to the soak pit to minimize mud introduced to the soak pit.
4d. Inspection and certification of solid waste disposal sites before spray campaign.	ECO conducted certification of solid waste disposal sites before the spray campaign. Site visits to all IRS waste disposal areas was completed before the start of operations.	All our waste disposal sites were in good condition before IRS disposal started. There were no issues of concern.	
4e. Monitoring waste storage and management during campaign.	All waste at district sectors was properly stored in district stores prior to final disposal.	There were no outstanding issues.	
4f. Monitoring disposal procedures post-campaign.	All IRS waste was accompanied to disposal sites by storekeepers and logistic assistants.	The ECO was in post during inspection activities and storekeepers and logistic assistants successfully delivered IRS waste to respective areas.	Check on cardboard usage at Cards from Africa to be sure they are not being diverted elsewhere.
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	Storekeepers are to maintain and check all records of the stock regularly during IRS operations. During the 493 storekeeper performance inspections, there were 14 instances of non-compliance with stock-keeping guidelines. These cases were all addressed immediately.	Branding and updating stock records was emphasized	Non-compliance cases were all addressed immediately
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	Daily checking of spray performance sheet to verify insecticide usage rate team by team.	In a few sectors insecticide usage rate was low.	Sector teams and TLs were instructed to supervise the insecticide usage rate by SOPs.

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
5c. Visual examination of houses sprayed to confirm pesticide application.	Quality control wall bioassay tests were conducted for the first week spray round in September 2016 in twenty four (24) sprayed structures in the two districts. In each of the two districts, two sectors were selected. In each sector, six structures were sampled. The structures sampled were of three different wall surfaces, namely; plastered and painted (PP), plastered and not painted (PNP) and mud. For each of the three different wall surfaces, two structures were used for the tests. The results showed 100% knock-down after both 30 and 60 minutes post exposure. Mortality rates of 100% in the three different wall surfaces of the structures were recorded. The results show that the application of the insecticides was satisfactory. Further monthly wall bioassay tests will be conducted to assess the insecticide decay rates.		
5d. Perform physical inventory counts during the spray season.	Inventory check was completed by coordinators, store keepers, and supervisors during the spraying periods in all districts sectors.	In IRS operations sites where inventory checks were undertaken by supervisors, records of the stock was complete.	

# ANNEX J: MONITORING AND EVALUATION PLAN MATRIX – SEPTEMBER 2016 CAMPAIGN RESULTS

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
<b>Component 1: Establish cost-effective supply chain mechanisms and execute logistical plans</b>								
<b>I.1 Procurement</b>								
1.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100% Round 2: 100%	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 1; 100% Round 2: 1; 100%	TBD; 100%	
1.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100% Round 2; 100%	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 1; 100% Round 2: 0; 0% <sup>9</sup>	TBD; 100%	
1.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 0; 0% <sup>10</sup> Round 2: 1; 100%	TBD; 100%	

<sup>9</sup> AIRS Rwanda received international insecticide procurement on August 22, 2016 and IRS Operations started on September 19, 2016.

<sup>10</sup> AIRS Rwanda received international procurement on the January 22, 2016, and started IRS Operations on the February 15, 2016.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
1.1.4 Number and percentage of local procurements for PPE delivered 14 days before the start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: N/A Round 2: NA	Round 1: N/A Round 2: N/A	Round 1: N/A Round 2: N/A	Round 1: N/A Round 2: N/A	TBD; 100%	
1.1.5 Successfully completed spray operations without an insecticide stock-out	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: Acheived Round 2: Achieved	Round 1: Acheived Round 2: achieved	Round 1: Acheived Round 2: Achieved	Round 1: Acheived Round 2: Achieved	Completed	
<b>1.2 In-Country Exemption and Custom Clearance Process</b>								
1.2.1 Complete exemption and clearance process within the minimum 2 weeks	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: Completed Round 2: Completed	Round 1: Completed Round 2: Completed	Completed	Round 1: Completed Round 2: Completed	Completed	
<b>1.3 In-Country Logistics, Warehousing, and Training</b>								
1.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<i>Data source:</i> Training records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign  By Gender	Round 1: 26: 15 males 11 females  Round 2: 39 Male: 22 Female: 17	Round 1: 25; 100%  14 males 11 females  Round 2: 45; 100% 17 males 28 females	Round 1: 33 17 Male 16 Female  Round 2: 38 19 Male 19 Female	Round 1: 34; 100% 14 Males 20 Females Round 2: 38 100% 15 Males 23Females	TBD; 100%	
1.3.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 20: 100% Round 2: 36; 100%	Round 1: 20: 100%  Round 2: 35; 100%	Round 1: 26;100 % Round 2: 33;100 %	Round 1: 25;100% Round 2: 32;100%	TBD; 100%	
1.3.3 Submit up-to-date inventory records 30 days after the end of each spray campaign	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: completed Round 2: completed	Round 1: Completed Round 2: Not yet completed	Round 1: completed Round 2: completed	Round 1: Completed Round 2: Completed	TBD; 100%	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
<b>Component 2: Implement safe and high-quality IRS programs and provide operational management support</b>								
<b>2.1 Planning and Design of IRS Programs</b>								
2.1.1 Annual PMI AIRS country work plan developed and submitted on time	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	
2.1.2 Percentage reduction in project operational expenses per structure from the previous year, excluding insecticide costs	<i>Data source:</i> Project financial records  <i>Reporting frequency:</i> Annually	By Spray Campaign	5%	13.1%	5%	TBD	5%	
<b>2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations</b>								
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the PMI COR team	<i>Data source:</i> Project records – submitted SEAs/ letter reports  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation <sup>11</sup>	<i>Data source:</i> Project records – Training reports  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By Gender	Round 1: 3,215  Males: 2,301 Females: 919  Round 2: 5,593  Male: 3941 Female: 1652	Round 1: 3,220:  Males: 2,269 Females: 951  Round 2: 5,726 Males: 4,120 Females: 1,606	Round 1: 4,047  Round2: 5269	Round 1: 3,793 Males: 2,721 Females: 1,072 Round 2: 4,915 Males: 3,508 Females: 1,407	TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.2.3 Number of health workers receiving insecticide poisoning case management training	<i>Data source:</i> Project records – Training reports  <i>Reporting frequency:</i> Each spray season	By Spray Campaign By Gender	Round 1: 54 Males: 30 Females: 24  Round 2: 88 Male: 44 Female:44	Round 1: 38 Male: 19 Female: 19  Round 2:93 Males:67 Females:26	Round 1: 30  Round 2: 38	Round 1: 33 Males: 23 Females: 10 Round 2: 41 Males: 34 Females: 7	TBD	
2.2.4 Number of adverse reactions to pesticide exposure documented	<i>Data source:</i> Incident report forms  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign  By Residential/ occupational exposure	Round 1: 0  Round 2: 0	Round 1: 2  Round 2: 1	Round 1: 0 Round 2: 0	Round 1: 2  Occupational exposure: 2 Round 2: 0	0	
2.2.5 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	<i>Data source:</i> Project records – Reports submitted by district environmental officers  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By Regular Soak Pit  By Mobile Soak Pit  By Storehouse	Round 1: 40  Regular Soakpit: 20 Mobile Soakpit: 0 Storehouse: 20 Round 2: 72 Regular Soakpit: 36 Mobile Soakpit: 0  Storehouse: 36	Round 1: 40  Regular Soakpit: 20 Mobile Soakpit: 0  Storehouse: 20 Round 2: 70 Regular Soakpit: 35 Mobile Soakpit: 0  Storehouse: 35	Round 1: 52 Round 2: 66  Regular Soakpit:26 Mobile Soakpit: 0  Storehouse:26 Round 2: 6  Regular Soakpit:33 Mobile Soakpit: 0  Storehouse:33	Round 1: 50 Regular Soakpit: 25 Mobile Soakpit: 0 Storehouse: 25 Round 2: 66 Regular Soakpits: 34 Mobile Soakpit: 0  Stores: 32	TBD; 100%	
<b>2.3 Conduct Communications Activities and Community Mobilization</b>								
2.3.1 Number of radio spots and talk shows aired	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Per spray	By Spray Campaign	Round 1: 60 Round 2: 90	Round 1: 60 Round 2: 84	Round 1:56 Round 2:56	Round 1: 56 Round 2: 56	TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	campaign							
2.3.2 Number of IRS print materials disseminated	<i>Data source:</i> Project records <i>Reporting frequency:</i> Semi-annually	By Spray Campaign  By Type of printed material and message(s)	Round 1: 0  Round 2: 0  Brochures	Round 1: 13,358 Round 2: 0 Brochures	N/A	Round 1: N/A Round 2: N/A	TBD	
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	<i>Data source:</i> Mobilization Data Collection Forms <i>Reporting frequency:</i> Daily per mobilization conducted	By Spray Campaign  By Gender	Round 1: 269,084 Males: 119,947 Females: 149,137  Round 2: 480,643 Males: 209,965 Females: 270,678	Round 1: 267,024 Males: 116,647 Females: 150,377  Round 2: 554,302 Males: 199,858 Females: 354,444	Round 1: 332,581 Males: 145,285 Females: 187,296  Round 2: 411,767 Males: 179,877 Females: 231,890	Round 1: 340,068 Males: 154,788 Females: 185,280 Round 2: 598,434 Males: 412,655 Females: 185,779	TBD	
<b>2.4 Spray Targeted Structures According to Technical Specifications</b>								
2.4.1 Number of structures targeted for spraying	<i>Data source:</i> Previous spray campaign data, enumeration data (targets); Daily Spray Operator Forms (results) <i>Reporting frequency:</i> Daily per spray campaign	By Spray Campaign	Round 1: 126,714 Round 2: 213,271	Round 1: 127,892 Round 2: 220,114	Round 1: 144,417  Round 2: 188,189	Round 1: 150,818 Round 2: 200,278	TBD	
2.4.2 Number of structures sprayed with IRS	<i>Data source:</i> Daily Spray Operator Forms <i>Reporting frequency:</i> Daily per	By Spray Campaign	Round 1: 107,707 Round 2: 181,280	Round 1: 127,150 Round 2: 215,981	Round 1: 122,754  Round 2:	Round 1: 147,947 Round 2: 198,970	TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	spray campaign				159,961			
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By Spray Campaign	Round 1: 85% Round 2: 85%	Round 1: 99.4% Round 2: 98.1	Round 1: 85%  Round 2: 85%	Round 1: 98.1% Round 2: 99.3%	85%	
2.4.4 Number of people residing in structures sprayed (Number of people protected by IRS)	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By Spray Campaign  By Gender  By pregnant women  By children <5 years old	Round 1: 503,259  Round 2: 883,674	Round 1: 517,194 Males: 244,275 Females: 272,919  Pregnant Women: 8,489; Children <5: 74,279  Round 2: 889,326 Males: 427,914 Females: 461,412  Pregnant Women: 14,375 Children <5: 132,568	Round 1: 602,198 Round 2: 774,778	Round 1: 618,696  Males: 299,219 Females: 319,477 Pregnant Women: 10,256 Children <5: 90,089  Round 2: 812,714 Males: 392,834 Females: 419,880 Pregnant Women: 13,718 Children <5: 118,913	TBD	TBD
<b>Component 3: Ongoing Monitoring and Evaluation and Quality Control Measures</b>								
3.1 Submit AIRS Rwanda M&E Plan to PMI for approval	<i>Data source:</i> Project records	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results						
			Year 1		Year 2		Year 3		
			Target	Results	Target	Results	Target	Results	
	<i>Reporting frequency: Semi-annual</i>								
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	<i>Data source: Spray operations reports</i> <i>Reporting frequency: Per spray campaign</i>	By Spray Campaign	Round 1: NA Round 2: NA	Round 1: NA Round 2: NA	Round 1: NA Round 2: Completed	Round 1: N/A Round 2: In Process	Completed		

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
<b>Component 4: Contribute to Global and Country-Level IRS Policy Setting and Develop and Disseminate Experiences and Best Practices</b>								
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	<i>Data source:</i> Project records – Activity reports  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign  By Guideline/checklist/tool	Round 1: NA Round 2: 1 <sup>12</sup>	Round 1: NA Round 2: 1	Round 1: N/A Round 2: 14	Round 1: N/A Round 2: 14	TBD	
4.2 Number of articles/best practices documents published	<i>Data source:</i> Project records – Activity reports  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign  By IRS Technical Area	Round 1: NA Round 2: NA	Round 1: NA Round 2: NA	Round 1: 1 Round 2: 1	Round 1: 1 Operational Round 2: 1	TBD	
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	<i>Data source:</i> Project records – Activity reports  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign  By IRS Technical Area	Round 1: 1 Round 2: 1	Round 1: 1 Round 2: 1	Round 1: 2 Round 2: 2	Round 1: 2 Round 2: 2	TBD	
4.4 Number of enterprises engaged through public-private partnerships	<i>Data source:</i> Project records – Activity reports  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign	Round 1: 4 Round 2: 5	Round 1: 4 Round 2: 4	Round 1: 2 Round 2: 2	Round 1: 2 Round 2: 2	TBD	
<b>Component 5: Contribute to the collection and analysis of Routine entomological and epidemiological data</b>								
<b>5.1 Support entomological monitoring activities and insecticide resistance strategies</b>								
5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location )	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By Spray Campaign	Round 1: 12 Round 2: 12	Round 1: 12 Round 2: 12	Round 1: 12 Round 2: 12	Round 1: 12 Round 2: 12	TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	<i>Data source:</i> Entomological reports <i>Reporting frequency:</i> Annually	By Spray Campaign	Round 1: 12; 100% Round 2: 12; 100%	Round 1: 12; 100% Round 2: 12; 100%	Round 1:12;100%; Round 2: 12;100%	Round 1:12;100%; Round 2: 12;100%	TBD	
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	<i>Data source:</i> Entomological reports <i>Reporting frequency:</i> Annually	By Spray Campaign	Round 1: 12; 100% Round 2: 12; 100%	Round 1: 12; 100% Round 2: 12; 100%	Round 1:12;100%; Round 2: 12;100%	Round 1:12;100%; Round 2: 12;100%	TBD	
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	<i>Data source:</i> Entomological reports <i>Reporting frequency:</i> Annually	By Spray Campaign	Round 1: 12; 100%  All four classes of insecticide will be tested at each of the 12 sites  Round 2: 12; 100%  All four classes of insecticide will be tested at each of the 12 sites	Round 1: 12; 100%  All four classes of insecticide are being tested at each of the 12 sites  Round 2: 12; 100%  All four classes of insecticide are being tested at each of the 12 sites	Round 1:12;100%  All the four classes of insecticide will be tested at each of the 12 sites  Round 2: 12;100%  All the four classes of insecticide will be tested at each of the 12 sites Round	Round 1:12;100%  All four classes of insecticide are being tested at each of the 12 sites  Round 2: 12;100%  All four classes of insecticide are being tested at each of the 12 sites	TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS*	<i>Data source: Entomological reports</i> <i>Reporting frequency: Per spray campaign</i>	By Spray Campaign	Round 1: 1 bioassay (24 houses)  Round 2: 1 bioassay (24 houses)	Round 1: 1 bioassay (24 houses)  Round 2: 1 bioassay (36 houses)	Round 1: 1 bioassay (24 houses)  Round 2: 1 bioassay (24 houses)	Round 1: 1 bioassay (24 houses)  Round 2: 1 bioassay (24 <sup>13</sup> houses)	TBD	
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay*	<i>Data source: Entomological reports</i> <i>Reporting frequency: Per spray campaign</i>	By Spray Campaign	Round 1: 2 (24 houses) Round 2: 2 (36 houses)	Round 1: 5 (24 houses) Round 2: 6 (36 houses)	Round 1: 4 (24)  Round 2: 4(24)	Round 1: 4(24) Round 2: 4 (24)	TBD	
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites*	<i>Data source: Entomological reports</i> <i>Reporting frequency: Per spray campaign</i>	By Spray Campaign  By Type of Insecticide	4 replicates per 6 insecticides	TBD				
<b>5.2 Support Epidemiological Malaria Data Collection and Analysis</b>								
5.2.1 Collect routine epidemiological data	<i>Data source: Project Reports</i> <i>Reporting Frequency: Annually</i>	By Spray Campaign	Round 1: N/A Round 2: N/A	Round 1: N/A Round 2: N/A	Round 1: N/A	Round 1: N/A Round 2: N/A	TBD	
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI AIRS Project	<i>Data source: Epidemiological reports</i> <i>Reporting frequency: Annually</i>	By Spray Campaign	Round 1: N/A Round 1: N/A	Round 1: N/A Round 2: N/A	Round 1: N/A	N/A	TBD	

February 15, 2016.

<sup>13</sup> Those are: Sector Coordinators and supervisors, SOP's and team leaders, logisticians, pump technicians, environmental complia

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
<b>Component 6 (Cross-cutting): Capacity Building, Knowledge Transfer, Gender Inclusion</b>								
<b>6.1 Increasing the Role of Women and Addressing Gender Barriers</b>								
6.1.1 Number of people trained to deliver IRS in target districts <sup>14</sup>	Data source: Project records – Training reports  Reporting frequency: Semi-annually	By Spray Campaign  By Spray Campaign  By Gender  Percentage of Women Trained	Round 1: 1,179 Males: 525 Females: 654; 55.4%  Round 2: 1973 Male: 872 Female: 1101; 55.8%	Round 1: 1,152 <sup>15</sup> Males: 509 Females: 643; 55.8%  Round 2: 2,005 <sup>16</sup> Males: 882 Females: 1,123	Round 1: 1,389 Males:619 Females: 770; 55.5%  Round 2: 1,735 Males: 772 Females: 963; 55.5%	Round 1: 1,384 Males: 637 Females: 747; 54%  Round 2: 1,833 Males: 827 Females: 1,006; 54.8%	TBD	
6.1.2 Total number of people trained to support IRS in target districts	Data source: Project records – Training reports  Reporting frequency: Semi-annually	By Spray Campaign  By Spray Campaign  By Gender  Percentage of women trained	Round 1: 3,274; Males: 2,394 Females: 880; 26.9%  Round 2: 5,622; Male:3,957 Female: 1,665;29.6%	Round 1: 3,237 Male: 2,278 Female: 959; 29.6%  Round 2: 5,761 Males: 4,139 Females: 1,622; 28.1 %	Round 1: 3,760 Females: 26.8%  Round 2: 5,256 Females: 29.6%	Round 1: 3,814 Males: 2,730 Females: 1,084 Females: 28.4 %  Round 2: 4,975 Males: 3,540 Females: 1,435; 28.8%	TBD	
6.1.3 Number of women recruited (i.e. number of women	Data source: Project records – Recruitment reports reports	By Country	Round 1: 903; 29.2%	Round 1: 903: 29.2%	Round 1: 1,033: 27.1%	Round 1: 1,085: 28.4%	TBD	

nce officers, sector IEC's, cell and village mobilizers, clinicians, washers, securi

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Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
on the selection list) for IRS employment	<i>Reporting frequency: Semi-annually</i>	By Percentage of women recruited	Round 2: 1,625; 28.9%	Round 2: 1,485; 27.5%	Round 2: 1,343; 35%	Round 2: 1,309; 28.4%		
6.1.4 Number of people trained as IRS Training of Trainers	<i>Data source: Project records – Training reports</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign  By Gender  Percentage of women trained	Round 1: 172; Males: 78 Females: 94 54.7%  Round 2: 289; Male: 132 Female: 157; 54.3%	Round 1: 160 Males: 73 Females: 87 54.4%  Round 2: 307 Males: 161 Females: 146	Round 1: 109;  Round 2: 168	Round 1: 105 Males: 63 Females: 42; 40%  Round 2: 158 Males: 87 Females: 71; 44.9%	TBD	
6.1.5 Total number of people hired to support IRS in target districts	<i>Data source: Project records – Contracts signed</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign  Gender  Percentage of women hired	Round 1: 2,987 Males: 2,121 Females: 866; 28.9%  Round 2: 5,573; Male: 3,948 Female: 1,625; 29%	Round 1: 3,096 Male: 2,193 Female: 903; 29.2%  Round 2: 5,395 Male: 3,909 Female: 1,486	Round 1: 3,700 Females: 29%  Round 2: 6,946 Females: 29.1%	Round 1: 3,528 Males: 2,539 Females: 989 Females: 28%  Round 2: 4,605 Males: 3,296 Females: 1,309; 28.4%	TBD	
6.1.6 Number of women hired in supervisory roles in target districts (this number includes site supervisors, team leaders, M&E assistants and others who supervise seasonal staff <sup>17</sup> )	<i>Data source: Project records – Contracts signed</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign  Percentage of women hired	Round 1: 188; 45.9%  Round 2: 338; 45.9%	Round 1: 188; 45.9%  Round 2: 329; 44.6%	Round 1: 55% of 507  Round 2: 55% of 687	Round 1: 212; 43.4 %  Round 2: 291; 45.7%	TBD	

Performance Indicator	Data Source(s) and	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.1.7 Number of staff (permanent and seasonal) who have completed gender awareness training	<i>Data source: Project records – Training reports</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign  Gender  Percentage of women trained	Round 1: NA Round 2: 5,543; 100%	Round 1: NA Round 2: 5,329 <sup>18</sup> ; 100%	Round 1: 3,508; 92.3%  Round 2: 4,941; 94%	Round 1: 3,557; 28.6%  Round 2: 4,745 <sup>19</sup> ; 29.8%	TBD	

<sup>18</sup> AIRS Rwanda received international insecticide procurement on August 22, 2016 and IRS Operations started on September 19, 2016.

<sup>19</sup> AIRS Rwanda received international procurement on the January 22, 2016, and started IRS Operations on the February 15, 2016.

<sup>20</sup> Those are: Sector Coordinators and supervisors, SOP's and team leaders, logisticians, pump technicians, environmental compliance officers, sector IEC's, cell and village mobilizers, clinicians, washers, security guards and drivers.

<sup>21</sup> Round 2: wall bio assays were conducted in 2 sectors per district, and tested in 6 houses per sector: 6 Houses \*2 sectors\*2 districts=**24 houses**

<sup>22</sup> This includes only: SOP's, TL's, Sector coordinators and supervisors and clinicians

<sup>23</sup> This includes: Coordinators and Supervisors, SOP's and TL's, Logisticians, Sector IEC's ,Cell and Village mobilizers and Washers

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
<b>6.2 Capacity Building</b>								
6.2.1 Number of government officials trained in IRS oversight	<i>Data source: Project records – Training reports</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign  By Gender  Percentage of Women Trained	Round 1:63 Males: 33 Females: 30; 47.6%  Round 2: 100; Males: 52 Female: 48;48%	Round 1: 40 Males: 21 Females:19 47.5%  Round 2: 50; Males:38 Females: 12 24.0%	Round 1:38 Round 2:46	Round 1: 34 Males: 24 Females: 10; 29.4%  Round 2: 43 Males:36 Females: 7 16.3%	TBD	
6.2.2 Implement all activities outlined in the yearly Capacity Building Action Plan	<i>Data source: Project records – Capacity assessment reports</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign	Round 1: Completed  Round 2: Completed	Round 1: Completed Round 2: Completed	Completed	Completed	Completed	
6.2.3 Rwanda government implements at least one aspect of the IRS program independently.	<i>Data source: Project records – MOUs</i>  <i>Reporting frequency: Semi-annually</i>	By Spray Campaign	Round 1: Completed Round 2: Completed	Round 1: Completed Round 2: Completed	Round 1:Completed Round 2: Completed	Round 1: Completed Round 2: Completed	TBD	

