



PRESIDENT'S MALARIA INITIATIVE



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

RWANDA
END OF SPRAY REPORT

SPRAY CAMPAIGN: FEBRUARY 9 - MARCH 7, 2015

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BCC	Behavior Change Communication
CHW	Community Health Worker
COP	Chief of Party
CTC	Client Technology Center
DCV	Data Collection Verification
DEV	Data Entry Verification
EE	Error Eliminator
EPEDR	<i>Entreprise pour la Protection de l'Environnement et Development Rural</i>
HLC	Human Landing Catch
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring & Evaluation
MOH	Ministry of Health
MOP	Malaria Operational Plan
MOPDD	Malaria and Other Parasitic Diseases Division
MPDD	Medical Procurement and Distribution Division
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
PSC	Pyrethrum Spray Catch
RBC	Rwanda Biomedical Center
REMA	Rwanda Environmental Management Authority
RHCC	Rwanda Health Communication Center
SACCO	Savings and Credit Cooperatives
SEA	Supplemental Environmental Assessment
SOP	Spray Operator
TL	Team Leader
ToT	Training of Trainers
USAID	United States Agency for International Development
WG	Wettable Granules
WHO	World Health Organization
WP	Wettable Powder

EXECUTIVE SUMMARY

Abt Associates supports the implementation of indoor residual spraying (IRS) in Rwanda on a three-year Africa Indoor Residual Spraying (AIRS) project funded by 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 February – March 2015 targeting 126,714 structures in 20 of 27 sectors in two districts, Gisagara (13 sectors), and Nyagatare (7 sectors), using Bendiocarb (a carbamate).

The following are project achievements and key highlights of the February 2015 spray campaign (see Table 1), which lasted 24 operational days:

- A total of 127,150 structures were sprayed out of 127,892 structures found by spray operators in the targeted districts, accounting for a coverage rate of 99.4%. In total, 517,194 residents were protected, including 74,279 (14.4%) children under five years old and 8,489 (1.6%) pregnant women.
- A total of 127,308 structures were mobilized and 13,358 brochures were distributed during the mobilization exercise.
- A total of 3,237 individuals were trained using PMI funds to support IRS activities in the two districts. Of these, 829 were spray operators (SOPs) (336 males and 493 females), 193 were team leaders (116 males and 77 females), and 1,691 were village IEC mobilizers (1,525 males and 166 females). Over 55% of all SOPs trained to implement IRS were female. Overall, 29.6% (n=959) of all IRS trained personnel for the February – March 2015 campaign were female.
- A total of 108,343 sachets of insecticide were used to spray 127,150 structures in the two IRS districts, with a utilization ratio of approximately 1:1.2 (sachet to structures sprayed).
- A total of 80 dormitories in 27 schools and 1 prison were sprayed in the target districts protecting 6,044 residents. A total of 264 sachets of insecticide were used.
- All (1,791.4 kg) IRS insecticide contaminated wastes, including 108,607 empty sachets and 25,003 used masks, were incinerated at two different incineration plants- Nyagatare Hospital incineration plant for wastes from Nyagatare, Kibilizi Hospital incineration plant for wastes from Gisagara. Other wastes, including 1,842 used gloves, and assorted plastics items (27 damaged barrels, 12 jerry cans and 13 basins) were disposed of at the Enterprise pour la Protection de l'Environnement et Developement Rural (EPEDR) Recycling plant. A total 950 of uncontaminated carton boxes were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as papers, and used dried cell batteries were disposed of at the Nduba dumping site.
- Wall bioassays conducted within one week of spraying in February 2015 to assess the quality of spraying in the target districts recorded 100% mortalities of susceptible *An. gambiae s.l.* One month post-IRS, average percentage mortalities of 100% and 99.4% were recorded for Gisagara and Nyagatare districts respectively.

TABLE 1: AIRS RWANDA IRS CAMPAIGN SUMMARY: FEBRUARY 2015

Number of districts covered by PMI-supported IRS	2 districts (Gisagara, and Nyagatare)
Insecticide	Carbamates
Number of structures covered by PMI-supported IRS	127,150
Number of structures targeted by PMI-supported IRS	127,892
Spray coverage	99.4%
Population protected by PMI-supported IRS	517,194 (8,489 pregnant women, 74,279 children less than 5 years old)
Dates of PMI-supported IRS campaign	February 9 - March 7, 2015
Length of campaign	24 days
Number of people trained with USG funds to deliver IRS ¹	1,152

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

I. COUNTRY BACKGROUND

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 of age and 450,000 pregnant women per year.² 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 one-third of the districts, malaria transmission is comparatively stable year-round.³ Climate and altitude are major factors that influence malaria prevalence in the country. Other contributors are: high human concentration, population movement (especially from areas of low transmission to high transmission), irrigation schemes (especially in the eastern and southern parts of the country), and cross-border movement of people (especially in the eastern and southeast parts of the country). Based on the insecticide resistance management (IRM) plan and the Malaria Strategic Plan 2013 -2018, the Malaria and Other Parasitic Diseases Division (MOPDD) intends to target interventions based on the changing malaria epidemiology given the significant decline in the burden of malaria in Rwanda and the accompanying high coverage of malaria control interventions nationwide.⁴

Among the malaria control strategies applied in Rwanda, IRS has been featured since 2007. Beginning in 2008, declining malaria incidence in some areas prompted adjustments, from district-wide blanket IRS coverage, to more targeted focal spraying to cover high risk areas. With time, the focal targets were reconsidered because of generalized increases in malaria caseloads, but the expansion to cover entire districts depended on the availability of resources. Much of the IRS in Rwanda has been funded by the President's Malaria Initiative (PMI).

In August 2011, Abt Associates was contracted by PMI to implement IRS in Rwanda under the Africa Indoor Residual Spraying (AIRS) Project. PMI and the Rwanda Ministry of Health (MOH), through MOPDD, identified three high-burden malaria districts in which to implement IRS. The three IRS districts were Bugesera, Gisagara and Nyagatare, with a total of 242,461 structures. A total of 236,610 structures in 42 sectors were sprayed in August - September of 2012 using a pyrethroid (Deltamethrin WG 250). Considering that malaria transmission takes place year round and peaks during the periods of October - December and March - May, a second spray round was conducted in February 2013 using a pyrethroid (Deltamethrin WG 250) to supplement the August - September 2012 spray round. This was done in order to ensure protection for the population during the two major transmission seasons. Twenty sectors were selected for the February 2013 IRS campaign in the three IRS districts. The sector selection was based on their high malaria prevalence, as was evidenced from malaria cases reported in 2012 from the health facilities serving the sectors.

In September 2013, a total of 37 sectors were selected in the three IRS districts in which 224,708 structures were sprayed. A carbamate (Bendiocarb) was used in Nyagatare and a pyrethroid

² 2012 Population and Housing Census, Nov 2012

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

⁴ Malaria Strategic Plan 2012-2017

(Deltamethrin WG 250) in Bugesera and Gisagara districts. In February 2014, a total of 20 out of 42 sectors targeting 124,012 structures in the three IRS districts were sprayed using Bendiocarb. In September 2014, a total of 28 out of 42 sectors in the three IRS districts were sprayed covering a total of 173,086 structures using Bendiocarb.

In September 2014, Abt Associates was awarded a three-year Task Order (The PMI AIRS Project) to support the implementation of IRS in 15 African countries. In Rwanda, PMI and the Rwanda Ministry of Health (MOH), through MOPDD will continue to implement IRS in three high-burden malaria districts (Bugesera, Gisagara and Nyagatare).

During February- March 2015 campaign, a total of 20 out of 27 sectors in two IRS districts (Gisagara and Nyagatare) were selected with a total 126,714 structures. In addition, the project 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. This included building the capacity of government officials and partners to undertake high-quality IRS.
- Daily and weekly monitoring of the IRS program via supervision of data collection and data entry using the AIRS 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).
- Safe and correct insecticide application, thus minimizing human and environmental exposure to IRS insecticides, in compliance with the Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) and Supplemental Environmental Assessment (SEA).
- Coordination of information, education and communication (IEC), sensitization, and mobilization activities with other stakeholders to raise the populations' 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.
- Promote cost efficiency through due diligence and efficiency of operations.
- Provide technical assistance during spray rounds conducted by MOPDD.

2. PRE-SEASON ACTIVITIES

2.1 SELECTION OF IRS DISTRICTS AND SECTORS

Two districts, Gisagara and Nyagatare were selected for IRS during the February 2015 campaign (see Figure 1 below). The IRS districts were selected based on the malaria burden as was reported in epidemiological data from health facilities. A total of 126,714 structures were targeted for spraying in 20 sectors.

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

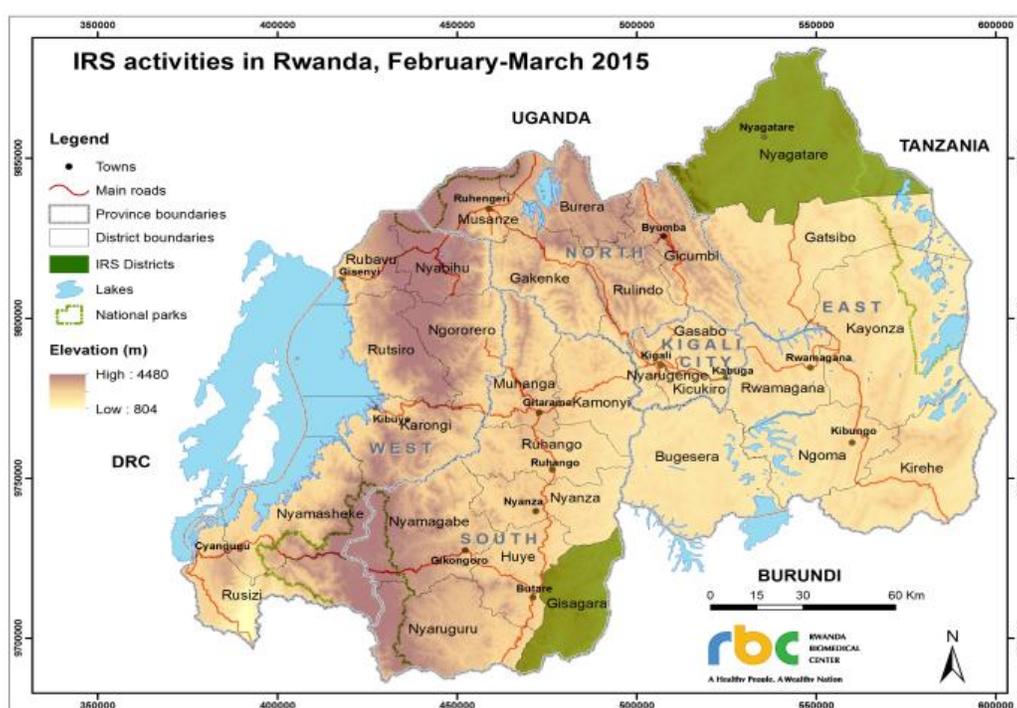


Table 2 shows a summary of the number of target structures and the target population in the 20 sectors.

TABLE 2: TARGET STRUCTURES FOR IRS ROUND 13

District	Number of Sectors	Number of Target Structures	Target Population		Total
			Females	Males	
Gisagara	13 of 13	75,619	165,345	145,530	310,875
Nyagatare	7 of 14	51,095	104,407	96,384	200,791
Total	20 of 27	126,714	269,752	241,914	511,666

2.2 DISTRICT PLANNING MEETINGS

Following the choice of the target sectors in the two IRS districts, collaboration and coordination between stakeholders was intensified. Micro-planning meetings with district and sector authorities in the two districts and 20 sectors were conducted in December 2014. This was done in collaboration with MOPDD who facilitated invitations of counterparts from the local government and health centers. Among the key issues of discussion was recruitment of IRS seasonal staff, provision of storage space for IRS materials and supervision at the sector level. Being the government entity with whom AIRS Rwanda works directly, the MOPDD/MOH has to endorse the required support expected from the local government counterparts. In total, 50 participants (33 males and 17 females) attended micro-planning meetings in Gisagara and Nyagatare districts. In each of the districts, a one-day planning meeting was organized to discuss and develop an IRS operational plan with local leaders. In addition, the roles and responsibilities of each of the partners were discussed and agreed upon. 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.

2.3 INSECTICIDE SELECTION

A carbamate, Bendiocarb (Ficam 80 WP), was used during the February - March IRS campaign in the two districts. The selection was based on data obtained from insecticide susceptibility assays that were carried out in 2013. 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 carbamate class, the local vector species in the IRS target districts sites showed between 84% and 100% mortalities.

In addition, the Rwanda insecticide resistance management (IRM)⁶ plan states that in a bid to manage the development of insecticide resistance, specifically pyrethroid resistance, IRS will be conducted with a phased transition to a carbamate for two years (2013 and 2014) followed by a phased transition to organophosphate (pirimiphos methyl, Actellic CS) for two years in 2015 and 2016. Rotation will be the main strategy implemented in the mid-term of four years with a hope that IRS will graduate from sector-wide spraying to focalized cell-level spraying by 2017. A switch to carbamates was thus implemented starting 2013 September in only one district. Use of carbamate in all three IRS districts was fully implemented starting February 2014. In line with the IRM plan of using a carbamate for two years, bendiocarb was used in the February 2015 spray campaign (see Annex 1, MoH Letter on Insecticide Choice for 2013/2014, dated March 22, 2013).

2.4 LOGISTICS NEEDS AND PROCUREMENT

The central AIRS 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.

⁶ Rwanda Strategic Plan for Insecticide Resistance Management in Malaria Vectors (2013–2017)

Besides reference to the inventory records from the previous IRS campaign, a logistics needs assessment was conducted in November-December 2014. During the logistics needs assessment the following were considered:

- Available stock of materials, consumables, and equipment;
- Transport arrangements, including vehicle hiring for spray operations and supervision;
- Estimation of insecticide, PPE, and spray equipment required to meet the needs of spraying; and
- Mobilization and distribution of equipment, materials, and supplies (see Annex 2).

2.4.1 INTERNATIONAL PROCUREMENT

Internationally procured commodities included 119,862 sachets from Bayer South Africa and 3,033 sachets from AIRS Mali's stock balance (for a stock total of 122,895), all of which were carbamate insecticide (Ficam VC 80 WP). Table 3 shows the items and quantities that were procured internationally.

TABLE 3: INTERNATIONAL PURCHASES

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used	Quantity Damaged	Quantity in Stock after the Campaign
Spray pump repair kits	27	11	38	7	0	31
Respiratory masks	11,676	46,320	57,996	25,307	0	32,689
First aid kits	76	157	233	94	0	139
Insecticide sachets (Ficam VC 80WP)	0	122,895	122,895	108,607	0	14,288
Pressure gauges	17	50	67	15	0	52
Nozzle gaskets	162	840	1,002	613	0	389
Boots	1,115	408	1,523	79	79	1,444
Extension Lance	0	215	215	31	0	184
Filter Nylon	582	150	732	156	0	576
Hose	0	100	100	0	0	100
Shoulder Strap, X-P	0	150	150	5	0	145

2.4.2 LOCAL PROCUREMENT

Local procurement involved an open competitive tendering process in which a solicitation for quotes for services and materials was performed. The selection was done by the Abt Associates Rwanda procurement committee based on the lowest cost and technically acceptable bid according to the criteria given 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 2 for the detailed list.

2.4.3 MATERIAL DISTRIBUTION TO THE DISTRICTS AND OPERATION SITES

Following the September 2014 IRS campaign, IRS materials, such as coveralls, boots, helmets, gloves, masks and pumps, were retained in the district storage facilities. Other items, such as respiratory masks and gloves, were distributed from the central warehouse to the district stores in January 2015 and insecticide was distributed in the first week of February 2015. Further distribution of the materials to the operation sites was done based on the number of target structures to be sprayed and the number of support staff (see Table 4).

TABLE 4: IRS COMMODITY DISTRIBUTION TO DISTRICT STORES

District	Coveralls	Boots	Helmets	Respiratory Masks	Carbamate Sachets	Pumps
Nyagatare	750	350	456	10,080	41,998	219
Gisagara	550	338	300	15,000	66,609	120
Total	1,300	688	756	25,080	108,607	339

2.5 HUMAN RESOURCE REQUIREMENTS

The project recruited and deployed a total of 149 support staff that provided support during the IRS operations across the three districts. Seasonal staff were comprised of: 2 district IEC assistants, 12 data clerks, 3 district storekeepers, 20 sector store keepers, 2 logistics assistants, 2 pump technicians, 3 finance assistants, 20 sector coordinators, 63 sector supervisors, 20 sector IEC assistants, and 2 office cleaners.

Implementation of IRS operations in the sectors was conducted by spray operators (790), team leaders (193), washers (71), cell IEC mobilizers (105), and village IEC mobilizers (1,691). A total of 54 nurses (side effect managers) and security guards (43) provided IRS support at the sector level. Staff was recruited 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. AIRS Rwanda hired 29.2% (n=903) females of the 3,096 people hired as seasonal staff. It is noteworthy that more than half of hired spray operators and team leaders (54.9 %) were female; 58% of spray operators were female, while 40% of team leaders were women. Table 5 enumerates the IRS seasonal support staff by gender and district. In September 2014, 28.0% (n=1,166) of all seasonal staff were females and 58.7% of spray operators and team leaders were female. The percentage of females among spray operators is high relative to other cadre of seasonal staff. This is because spray operators are selected from the community health workers (CHWs) pool at the village level. The constitution of the CHWs is such that in each village there are three CHWs and two of them are females.

TABLE 5: SEASONAL IRS STAFF HIRED BY DISTRICT

Staff Position	Gisagara		Nyagatare		Total		% Females Hired
	Male	Female	Male	Female	Male	Female	
District IEC Assistants	1	0	0	1	1	1	50.0%
Data Clerks	6	1	2	3	8	4	33.3%
District Storekeepers	1	1	0	1	1	2	66.7%
Sector Storekeepers	9	4	3	4	12	8	40.0%
Logistics Assistants	0	1	1	0	1	1	50.0%
Finance Assistants	1	1	0	1	1	2	66.7%
Sector Coordinators	5	8	5	2	10	10	50.0%
Sector Supervisors	17	20	7	19	24	39	61.9%
Sectors IEC Assistants	9	4	4	3	13	7	35.0%
Spray Operators	205	266	122	197	327	463	58.6%
Team Leaders	75	41	41	36	116	77	39.9%
Cell IEC Supervisors	33	26	23	23	56	49	46.7%
Village IEC Mobilizers	916	132	609	34	1,525	166	9.8%
Security Guards	28	1	14	0	42	1	2.3%
Adverse effect Managers	17	15	12	10	29	25	46.3%
Washers	13	30	10	18	23	48	67.6%
Pump Technicians	1	0	1	0	2	0	0.0%
Cleaners	1	0	1	0	2	0	0.0%
Total	1,338	551	855	352	2,193	903	29.2%

2.6 IRS TRAININGS

Prior to the commencement of IRS activities, a team of Abt Associates staff members in collaboration with MOPDD reviewed and updated the IRS training manuals and materials, including data forms, supervision checklists and the IRS structure cards. In addition, training sites and external trainers were identified in advance of the trainings. The trainings 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; and
- Supervision of IRS activities.

2.6.1 TRAINING OF TRAINERS

A refresher training of trainers (ToT) was organized and conducted in collaboration with MOPDD on January 12-14, 2015. MOPDD did the official opening of the ToT and also facilitated some of the sessions including introduction to malaria control and management of adverse effects. Since all participants had gone through the ToT during the September 2014 and other past IRS rounds, the ToT was mainly aimed at refreshing the participants' skills and knowledge of IRS. During the training, they received instructions on methods to conduct IRS training and supervision of the IRS implementers. The training consisted of both theory and practical sessions through group discussions, demonstrations, lectures and question and answer methods. The participants included 20 IRS sector coordinators and 72 IRS sector supervisors. After the ToT, the participants were assigned to different training sites in the IRS target districts to conduct IRS training for SOPs and Team Leaders (TLs). The number of trainers deployed to each of the training sites was based on the number of participants to be trained at each of the training sites. The number of trainers is shown in Table 6.

TABLE 6: NUMBER OF TOT PARTICIPANTS, BY GENDER

IRS Role	Number of Participants		Total
	Male	Female	
Sector Coordinators	10	10	20
Sector Supervisors	28	44	72
Total	38	54	92

FIGURE 2: IRS PRACTICAL TRAINING SESSION



2.6.2 SPRAY OPERATOR AND TEAM LEADER TRAINING

The SOP and TL training was organized and conducted in close collaboration with district and sector authorities for five days during the period of February 2 - 6, 2015. In the two target districts, training sites were provided by sector authorities or rented by Abt Associates. The major objective of the training was to equip the SOPs and TLs with the skills to conduct quality IRS.

Prior to 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 females with potential exposure to insecticide, including SOPs, TLs, storekeepers, sector supervisors, and sector coordinators, were also screened for pregnancy.

In addition, the SOPs and TLs had to fully meet the selection criteria to be eligible for training and IRS operations. The selection criteria required an SOP or TL to be:

- A resident of the sector;
- A community health worker (CHW);
- Able to read and write; and
- Below 40 years of age.

The SOPs and TLs were taken through intensive five-day theory and practical sessions (see Annex 3) which covered content in:

- Introduction to malaria control;
- Spray techniques;
- Handling and managing insecticides;
- Handling and maintaining spray pumps;
- Personal and environmental safety;
- Leading a spraying team;
- Data collection and filling out data collection forms; and
- Basics of IEC for IRS.

A total of 1,022 SOPs and TLs were trained; details are provided in Table 7. A total of 92 facilitators (ToT participants) conducted the training.

TABLE 7: NUMBER OF SPRAY OPERATORS 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
Gisagara	13	69	116	62.7%	216	211	49.4%	25	31	55.4%
Nyagatare	7	60	93	59.6%	107	150	58.4%	13	23	63.9%
Total	20	129	209	61.8%	323	361	52.8%	38	54	58.7%
		338 (33.1%)			684 (66.9%)			92		

2.6.3 DATA COLLECTION TRAINING

Between January and February 2015, 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 spray operators, team leaders, IEC mobilizers and data entry clerks. The training focused on the following key topics:

- Familiarity with data collection forms (spray operator and team leader forms, IEC village and cell mobilizer forms) and the AIRS Supervisory Toolkit;
- Understanding 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 a backup reporting/ communication protocols;
- AIRS database and security protocols; and
- Data Quality Assurance and Control.

2.6.4 LOGISTICS TRAINING

All the staff who would be involved in logistics and storekeeping during the implementation of IRS was trained. Sector coordinators, sector supervisors and IEC assistants were given basic skills in logistics and store management during the ToT sessions. A comprehensive, one day training was conducted for 25 logistics assistants and storekeepers (14 males and 11 females). Participants were trained on the following topics:

- Individual roles and responsibilities in logistics;
- Warehouse and commodity management;
- Store management 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.

2.6.5 WASHER TRAINING

A total of 71 washers were given a one-day refresher training/orientation at the 20 operational sites in the two IRS districts before the commencement of IRS operations. Sector coordinators, sector supervisors and sector storekeepers were responsible for the refresher training at their respective operational sites. The washers were instructed 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 were also advised on how to respond to insecticide adverse effects that they might experience. Table 8 shows the numbers of washers trained by gender per district.

TABLE 8: WASHERS TRAINED BY GENDER PER DISTRICT

District	Male	Female	% Females
Nyagatare	10	18	64.3%
Gisagara	13	30	69.8%
Total	23	48	67.6%

2.6.6 FIRE AND TRANSPORTATION SECURITY TRAINING

Forty-three security guards were given an orientation on fire security and a general security protocol for IRS stores. Sixty-one IRS drivers were given an orientation on safety procedures while transporting insecticides and the use of first aid kits. They were also trained 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

To ensure effective community mobilization, AIRS Rwanda worked in close collaboration with MOPDD and district and sector authorities to train implementers and use diverse approaches and channels of communication to sensitize and mobilize communities.

3.1 TRAINING

3.1.1 TRAINING OF TRAINERS

A one-day ToT on mobilization was conducted in Kigali on January 15, 2015 by AIRS Rwanda in collaboration with MOPDD. During the ToT, MOPDD provided 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 were trained 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 68 candidates (35 males and 33 females) participated in this training; 2 District IEC Assistants, 20 Sector IEC Assistants, 20 Sector Coordinators, and 26 Sector Supervisors.

The main 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 and to also effectively plan, coordinate and supervise IEC IRS activities. The training included both theory and practical sessions among which were mock sessions to practice IRS mobilization and filling of data collection tools. The trainees were also taught how to develop and update a community mobilization plan.

3.1.2 TRAINING OF IEC COMMUNITY MOBILIZERS

The training of IEC mobilizers was conducted on 29th January 2015 in Gisagara and Nyagatare districts in designated training sites in the sectors. The trainees were village and cell leaders who were recruited based on the following criteria: one had to be a cell or village leader and/or in charge of security at the village level, was of good conduct, respectable, able to read and write, and known by the community. The trainings, which were held at the sector level, were facilitated by the Sector IEC Assistants together with Sector Coordinators and Sector Supervisors. Overall coordination was done by District IEC Assistants and AIRS Rwanda staff. The IEC mobilizers were trained 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;

- Discuss with structure owners their role before, during and after spray operations to ensure a safe and successful IRS campaign; and
- Create a more long-term or sustainable awareness of the program by involving and engaging key community stakeholders.

A total of 1,796 mobilizers (215 females and 1,581 males) at the cell and village level were trained. Each sector and cell team also developed an individual community mobilization implementation plan. Table 9 below shows the number of mobilizers trained by district.

TABLE 9: NUMBER OF IEC MOBILIZERS TRAINED TO IMPLEMENT IRS

District	Number of IEC Mobilizers Trained				TOTAL	% Females Trained
	Cell		Village			
	Male	Female	Male	Female		
Gisagara	33	26	916	132	1,107	14.3 %
Nyagatare	23	23	609	34	689	8.3 %
TOTAL	56	49	1,525	166	1,796	12.0 %

3.2 DOOR-TO-DOOR MOBILIZATION

Door-to-door mobilization of structures was conducted for two to three days in each village during the period of February 6 - March 7, 2015. 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. A few brochures were also distributed. They also collected data using the IEC Mobilizer Form and communicated the dates of spraying to the structure owners. They marked the outside doors of the structures that were mobilized with the IRS structure number found on the IRS card which was issued to that particular structure. A total of 127,308 structures were mobilized with a 98.9% IRS acceptance rate recorded. Some 13,358 brochures were distributed. Table 10 shows the results of the mobilization activity during the IRS spray round. 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 of the data, (Figure 3).

FIGURE 3: MOBILIZATION



TABLE 10: RESULTS OF IRS MOBILIZATION

District	Structures Sensitized	Adults Reached with IRS Messages		Structures Accepting IRS	% Structures Accepting IRS	Brochures Distributed
		Male	Female			
Gisagara	75,455	66,881	90,391	74,539	98.8%	10,258
Nyagatare	51,853	49,766	59,986	51,343	99.0%	3,100
TOTAL	127,308	116,647	150,377	125,882	98.9%	13,358

3.3 IEC COORDINATION

During the entire period of spraying, local leaders at all levels readily provided support. Sector executives and social affairs officers were very instrumental in linking spray operations teams to target communities. Each of the IRS districts had a district IEC staff member who 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, brochures 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; all structure owners were informed of the date of spraying, at least a day in advance, and that the data collected was accurate. IEC teams worked according to the updated IRS schedule each day.

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

3.4 OTHER IEC ACTIVITIES

3.4.1 COMMUNITY MOBILIZATION MEETINGS BY LOCAL LEADERS

Local leaders actively participated in mobilization activities. This was due to early advocacy and engagement from both Abt and MOPDD. The sector executive secretaries and social affairs officers in charge of CHW's supervised the IRS activities and occasionally led IRS teams to mobilize the community, especially in cases where the communities tended to resist. The cell social affairs officers were in charge of supervising the mobilization activities in their respective cells.

3.4.2 MONTHLY COMMUNITY WORK (UMUGANDA)

In order to promote community cohesion, Rwanda has set aside the last Saturday (8 am to 11 am) of each month as a community service day, locally referred to as 'Umuganda'. On this day, all other activities are usually halted except for the Umuganda activities. During Umuganda the community conducts communal activities and also takes time to discuss ways of promoting development activities in the society. During the spray campaign period Umuganda was conducted on February 28, 2015.

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

3.4.3 MASS MEDIA COMMUNICATION

Radio spots were aired twice daily from February 4 - 18, 2015 in Gisagara and Nyagatare districts. The key messages relayed during the radio spots 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 on the funding agency.

Mass media communication was further enriched using 22 banners which were placed at IRS district offices (2) and at sector administrative offices (20). The message printed on the banners was “*Birakureba*” (Kinyarwanda for “This concerns you”). Table II presents details the mass media communication activities done during the IRS operations.

TABLE II: MASS MEDIA COMMUNICATION ACTIVITIES

Dates	Type of IEC Activity/Material	Frequency/Number Produced
February 4 - 18, 2015	Radio spots aired 2 times per day for each radio station	30 times on Radio Huye station, Gisagara 30 times on Radio Nyagatare station
January 29 - March 10, 2015	IRS Banner	1 banner at each IRS district office and 1 at each sector administrative office

4. IMPLEMENTATION OF IRS ACTIVITIES

The 13th round of IRS implementation was carried out over a 24-day period from February 9 - March 7 in Gisagara and Nyagatare districts.

I.I. IRS SUPERVISION

IRS supervision was conducted by a team from Abt Associates, MOH/MOPDD, PMI, and local authorities at both the district and sector levels. During the IRS campaign, supervision of the spray operations was ensured at all levels. To achieve this, a structure was set up such that:

- Spray operators were grouped into teams of four. Each team was supervised by a team leader.
- A sector supervisor was responsible for supervising three teams. Supervisors reported directly to the sector coordinator, who in turn reported to the district coordinator.
- A full-time AIRS staff member was appointed to be in charge of each district to coordinate routine daily supervision by working closely with the district staff and all other supervisors (from AIRS and other stakeholders). At least three AIRS staff was in the field Monday through Thursday every week in each district to provide supportive supervision to the district staff.
- MOPDD appointed one staff in each of the IRS target districts who worked very closely with Abt district coordinator and other supervisors in the field during spray operations.
- A supervision plan was put in place to ensure consistency and coordination of supervision and proper follow-up of corrective measures in order to improve the spray operations performance.
- Local government officers (sector social affairs officers, in charge of CHW's at both district hospitals and health centers, M&E officers at district hospitals and district 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 was also augmented by the use of supervision checklists (see Annex 4), which were used as tools to assess the daily performance of spray operators and team leaders, adherence to environmental compliance requirements, data collection and data entry.
- All of the operational sites were using the Performance Tracking Sheet on a daily basis. At the end of each spray day sector coordinators submitted summary data from the performance tracking sheet to District coordinators who in turn compiled the data and submitted to the central level (Abt management and MOPDD IRS focal point) daily. Part of this daily report were challenges experienced in the day and how they were resolved.
- Regular meetings were held at all levels (national, district and sector) to review the progress of IRS and check on implementation of recommendations reached during the operations.

Table 12 summarizes the institutions/stakeholders which participated in supervision.

TABLE 12: INSTITUTIONS/ STAKEHOLDERS THAT PARTICIPATED IN IRS SUPERVISION

Level	Institution	Responsibilities
National Level	MOH/MOPDD/Rwanda Biomedical Center (RBC), USAID/PMI Abt Associates	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

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

4.1 LOGISTICS

4.1.1 IRS STORAGE AND INSECTICIDE STOCK MANAGEMENT

District level storage facilities served as distribution centers for IRS materials, equipment, and supplies which were used during the IRS operations. The district storage facilities were managed by a logistics assistant and a storekeeper who ensured distribution and close supervision of supplies and materials at the operation sites storage facilities. There were 20 storage facilities at the operation sites in the two districts, 16 of which were provided at the sector offices at no cost, as the district/sector authority's contribution to the IRS campaign. The other 4 facilities (2 in Gisagara district and 2 in Nyagatare District) were rented at locations near the sector offices. Each Sector Storekeeper was in charge of storage management at the sector level with oversight from the District Logistics Assistant and Storekeeper.

Insecticide, other materials, and equipment stocks were carefully tracked and managed from the central warehouse to the district storage facility and subsequently to the operation sites storage facilities. Empty insecticide sachets were tracked daily at the sector and district stores. They were accounted for by recording how many insecticide sachets each spray operator or team or sector had received and used. All stock records were documented on stock cards.

4.1.2 IRS VEHICLES

A total of 64 vehicles were contracted for the support of the IRS operations in the two districts. The vehicles were managed in such a way that the 61 vehicles for SOPs' transportation were used during the first 20 days of the spray campaign, and during the last four days the vehicles were reduced to 39. This is because in the last four days of operations most teams worked in villages near the operation sites and could walk to the villages; otherwise, vehicles did two trips from the operation sites to the villages to drop off the SOPs since the distances are relatively short. This strategy gave us total cost saving of US\$7920. Table 13 shows the number of vehicles assigned to each district.

TABLE 13: DISTRIBUTION OF VEHICLES IN THE DISTRICTS

District	First 20 days			Last 4 days		
	Vehicles for SOPs	Vehicles for Supervision	Total	Vehicles for SOPs	Vehicles for Supervision	Total
Gisagara	37	2	39	24	2	26
Nyagatare	24	1	25	15	1	16
Total	61	3	64	39	3	42

4.2 IRS PAYMENTS

Before the start of the spray operations, a one-day refresher training was conducted bringing together the three Finance Assistants. The participants were briefed on responsibilities to ensure efficient management of funds and facilitation of logistical support. They were taken through their responsibilities which 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 that were approved and submitted by the District Coordinator based on the schedule of payments made 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 sending them to the Abt Associates' Rwanda finance office for payments.
- Collection and reconciling of IRS vehicle logs sheets.

IRS support staffs hired by AIRS at the district level were paid through their bank accounts by electronic transfer. Other seasonal staffs at the sector level including SOPs, Team Leaders, Mobilizers, Washers and security guards were paid by transfer of funds to SACCO micro finance institutions in each sector. An agreement was established between each SACCO and AIRS in order to have this service made. After each payment, a copy of payroll signed by recipients was returned to the AIRS main office in Kigali as proof of payment.

5. POST-SEASON ACTIVITIES

5.1 POST SEASON REVIEW MEETINGS

IRS evaluation/review meetings were conducted at the district level in order to:

- Review the overall IRS programmatic implementation process for the February 2015 spray round, experiences and achievements of the IRS round;
- Review IRS challenges in the three IRS target districts and come up with recommendations for the next spray cycle; and
- Reach a consensus on the recommendations and way forward for future spray cycles.

The review meetings were convened by district authorities in collaboration with the Abt Associates district teams. The aim of these meetings was to review the implementation of the IRS operations at the district level and to share experiences, challenges, and lessons learned in order to generate ideas on improving future spray operations. These meetings were attended by the following categories of people:

- District and Sector Authorities, including Army and Police Commanders in the district;
- Hospitals and health centers;
- MOH/MOPDD representatives; and
- Abt Associates staff.

The number of participants who attended the review meetings is shown in Table 14.

TABLE 14: EVALUATION MEETINGS PARTICIPANTS

District	Review Meeting Dates	Participants		Total
		Male	Female	
Gisagara	March 11, 2015	34	17	51
Nyagatare	March 18, 2015	17	10	27
Total		51	27	78

The summary of recommendations from the review meetings were:

- The district/ sector authorities should enhance oversight of the recruitment process of SOPs so that only CHWs with previous IRS experience are considered and that such recruitment should strictly adhere to all criteria laid down by the MOH.
- The agreed plan for the improved recruitment of SOPs whereby the President in-charge of CHWs at the sector takes overall responsibility for recruiting, the health facility in-charge (Sector Social Affairs) verifies the list, and the Sector Executive Officer signs off on the final list.

- The sector and district IRS support staff coordinates closely with the Sector authorities so that IRS activities are not disrupted without sufficient notice. Cell and village leaders should dedicate more time and effort to IRS mobilization and implementation and each should provide feedback on structures in their villages that may have been missed by SOPs.

5.2 INVENTORY

Following completion of IRS operations, all of the commodities at the sector stores were transported to the district stores. The sector storekeepers updated their stock records and handed them over to the district storekeepers/logistics assistants. At the district stores, stock records were updated to show the remaining stock including the commodities that were retrieved from the sector stores and the district inventories were updated accordingly. Table 15 shows a summary of the remaining stock. See Annex 4 for detailed inventory.

TABLE 15: STOCK OF IRS COMMODITIES

Item	Quantity Before the Campaign	Unit	Quantity Used	Remaining Stock after the Campaign
Coveralls	4,977	Piece	1,572	3,405
Boots	1,523	Pair	79	1,444
Helmets	2,799	Piece	1,290	1,509
Head Gear	3,053	Piece	398	2,655
Inner part for Helmets	2,976	Piece	736	2,240
Face Shields	2,136	Piece	101	2,035
First Aid kits	233	Piece	94	139
Latex Nitrile Gloves	4,978	Pair	2,660	2,318
Respiratory Masks	57,996	Piece	25,307	32,689
Spray Pumps	1,558	Piece	24	1,534
Spray Pump Repair Kits	38	Kit	7	31
Nozzle Tips 8002E	338	Piece	0	338
Pump Hoses	100	Piece	0	100
Pressure Gauges	67	Piece	15	52
Extension Assembly	215	Piece	31	184
Carbamate Sachets	122,895	Sachet	108,607	14,288*

*Expiry date: July 2016

6. MONITORING AND EVALUATION

Monitoring and evaluation for the February 2015 IRS campaign closely followed the processes outlined in the annual AIRS Rwanda Work Plans and the AIRS M&E Concept Paper developed by the AIRS Home Office team.

6.1 KEY OBJECTIVES

The key objectives of AIRS Rwanda M&E activities are:

- To emphasize accuracy of both the data collection and data entry processes through comprehensive training and supervision at all levels;
- To streamline and standardize data flow, minimize error, and facilitate timely reporting;
- To ensure IRS data security and storage for future reference through the establishment and enforcement of proper protocols; and
- To document lessons learned and good practices observed in the implementation of the project activities and apply to future project years.

6.2 DATA MANAGEMENT

All AIRS M&E protocol updates, including enhancements to the data collection tools, were incorporated before the start of mobilization and spray 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 also helped M&E and technical staffs produce “real-time” reports for quick feedback and to reconcile and prevent additional errors in data collection and entry through programmed audit checks and other data quality assurance measures.

Spray data were collected by spray operators, verified by team leaders and supervisors, and transmitted to the data centers for entry. Data clerks performed a final verification of spray form data and arithmetic before entering into the database. At the end of each day, the Database and M&E Managers reviewed the data entered for anomalies and addressed issues with data center staff. For quality control purposes and timely generation of weekly client spray progress reports, all data were entered within 48 hours of spraying. Daily Spray Operator and IEC/Mobilizer Forms were filed and archived at each of the data centers. A daily electronic back-up was performed to the AIRS Rwanda server and to an external hard drive for data 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 make sure that data quality assurance and control of IRS data are 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 trainings and supervision at all levels.
- Recruited and trained data clerks in data entry and data management.
- Facilitated training of data entry clerks, data cleaners, and M&E Assistants on the database.

Spray coverage was calculated with *details* data and is based on the total number of structures sprayed (numerator) against structures found by spray operators (denominator). A final count of “structures found” from the last spray campaign served as targets for tracking spray progress and performance at the sector- and district-levels.

6.3 DATA QUALITY ASSURANCE AND CONTROL

During the February 2015 spray round, AIRS Rwanda used the AIRS M&E Supervisory Toolkit, which consists of the following two tools to standardize and improve IRS supervision:

- Error Eliminator (EE) forms for mobilizer and spray data verify the completeness and correctness of data collected while in the field. During the spray campaign, the EE for spray data were completed daily by team leaders, sector supervisors and coordinators, district IEC Assistants and Coordinators, M&E Assistants and Abt staff. The EE for mobilizer data was completed on daily basis by cell IEC Supervisors, Sector IEC Assistants, District IEC Assistants, District Coordinators, M&E Assistants and Abt staff.
- Data Collection Verification (DCV) forms check the accuracy of data collected in the field. Supervisors used the DCV to ensure that the data written on the Daily Spray Operator Forms matched with the information reported by households. Sector Coordinators, District IEC Assistants, District Coordinators, M&E Assistants and Abt staff visited villages and interviewed households using the DCV form a few days after spraying. Supervisory staff visited ~1,510 structures (~1.2%) with the DCV and compared the data collected from the field with the DCV with data collected by spray operators on the data collection forms. Any discrepancies were addressed and rectified with the appropriate AIRS staff.

Table 16 shows the number of M&E forms completed during February 2015 spray operations, errors found and measures taken.

TABLE 16: NUMBER OF M&E FORMS COMPLETED, ERRORS FOUND AND MEASURES TAKEN

Type of Form	Number of Forms Completed	Common Errors Found	Action Taken
Error Eliminator for Spray Data	23,142	SOP and Team Leader forms where insecticide reported on forms didn't match with actual insecticide received.	The AIRS Rwanda team worked very closely with the logistics team to use insecticide distribution cards and other logistics tools to crosscheck insecticide issued and returned. SOPs were urged to indicate on the SOP forms the number of insecticide sachets received immediately after they were issued.
Error Eliminator for Mobilizer Data	2,939	Mobilizer forms without mobilizer codes. Errors in summations	Cell and Sector IEC's were reminded to make sure that all mobilizer forms are completely filled-out well before submission to data centers. Advised sector IECs to verify all village IEC forms before submission to data centers.
DCV	1,510	Cases where the number of people residing in structures and rooms found mismatched on SOP forms. Some SOPs did not record 'found and not sprayed' structures on the SOP form	Corrections were immediately done in the database and SOP's 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.

Data quality assurance measures were performed daily during the IRS campaign by a variety of AIRS staff (i.e., team leaders, supervisors, sector coordinators, sector and district IEC Assistants, district coordinators, M&E Assistants and Abt staff). We provide more detail below about the specific activities we performed to ensure high-quality data, regarding physical data verification (spray and mobilization), database quality control, and random spot checks.

6.3.1 PHYSICAL DATA VERIFICATION

Physical data verification was performed at three different levels:

- Spray Operator/Mobilizer and Village IEC Level: 100% of spray and mobilizer data collected on SOP and Village IEC forms were reviewed, arithmetically verified, and signed off by the team leaders and sector supervisors.
- District Level: Sector and District Coordinators collected the Daily Spray Operator and Village IEC forms from team leaders and checked the accuracy of the spray and mobilizer data (100% of forms). Spray and mobilizer forms were then handed over to the M&E Assistant for data entry. Data forms were transmitted from the sectors to the district office every evening.

- Data Entry Level: Data clerks reviewed each form (100%) for typos and transcription errors and verified the arithmetic before entering the data into the database.

6.3.2 DATABASE QUALITY CONTROL

As in previous spray campaigns, the Access database used programmed audit checks and data locks that prevent data clerks from mis-entering data. For this particular campaign, Abt Associates' Client Technology Center (CTC) continued to use SQL Servers to centralize and connect data clerk computers and avoid duplicate entries at each data center. The SQL servers also have the capacity and speed to process large amounts of data (more than 80,000 structures per data center). CTC also reviewed the IRS cleaning/reporting tool to help data clerks to clean and reconcile data. We hired sufficient data clerks this campaign 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 immediately one day after data entry of all spray data. The cleaning/reporting tool also enabled them to generate local reports for each district.

Finally, data clerks performed double-data entry, whereby they initially entered spray totals data or a summary of each daily spray operator form in order to produce "real-time" reporting of spray progress. Thereafter, they entered spray details data (i.e. line-by-line or structure-by-structure), from which this End of Spray Report and all other client-submitted reports are generated. During a thorough cleaning process using the IRS cleaning/reporting tool, discrepancies between spray totals and details data were investigated and reconciled before finalizing and reporting campaign results. Corrections were made to the paper spray forms and the database, where necessary.

6.3.3 RANDOM SPOT CHECKS

The M&E and Database Managers performed daily data verification activities of the Access database to guarantee the quality of the data. They scanned the database and ran spray progress reports to identify anomalies and data entry errors. In the event they found discrepancies between data collected and data entered that could not be reconciled at the data center level, the M&E Manager contacted the field supervisor for clarification 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.

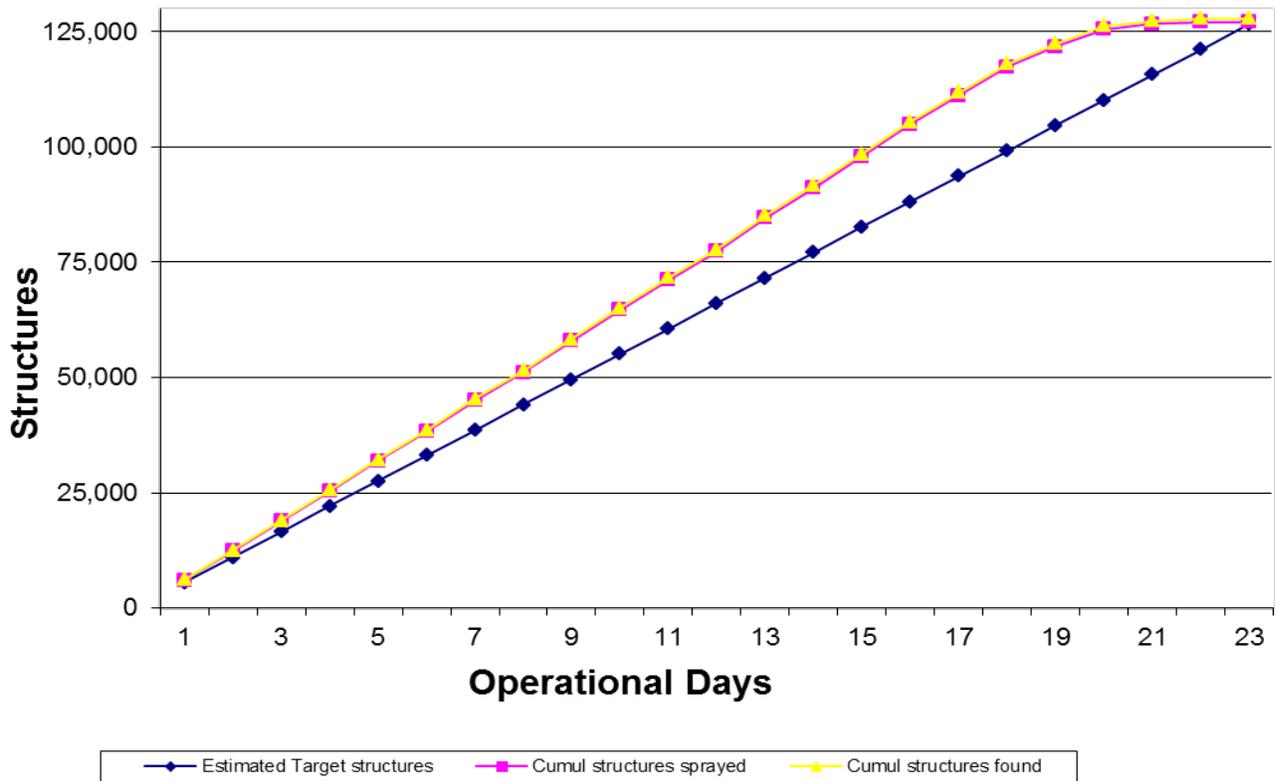
6.4 IRS RESULTS

During the spray campaign, 127,150 structures of the 127,892 structures found were sprayed, resulting in 99.4% spray coverage. A total of 517,194 people were protected, including 8,489 pregnant women and 74,279 children under five years old (see Table 17).

TABLE 17: SUMMARY OF RWANDA IRS RESULTS FOR FEBRUARY 2015 CAMPAIGN

District	Total Structures Found	Total Structures Sprayed	Spray Coverage (%)	Total Population Protected			
				Male	Female	Pregnant Women	Children <5 Years
Gisagara	77,035	76,725	99.6	148,112	168,284	4,874	45,830
Nyagatare	50,857	50,425	99.2	96,163	104,635	3,615	28,449
Total	127,892	127,150	99.4	244,275	272,919	8,489	74,279

FIGURE 4: IRS DAILY TRACKER



6.4.1 SCHOOLS AND PRISONS IN IRS TARGET DISTRICTS⁷

During the February 2015 spray campaign, a total of 80 dormitories were sprayed in 27 schools and 1 prison in the two IRS target districts, protecting 6,044 people. Two hundred and sixty four (264) insecticide sachets were used (see Table 18).

⁷ Spraying of special structures such as dormitories in schools and prisons is only reported in the EOSR, not in the weekly spray progress reports sent to PMI. ⁸ The figures in brackets show the number dissected.

TABLE 18: IRS RESULTS FOR SCHOOLS, PRISONS AND REFUGEE CAMPS IN IRS DISTRICTS

District	Targets for schools	# Targets for Dormitories	# Schools sprayed	# Prisons sprayed	# Dormitories sprayed	Population Protected				Found Rooms	Sprayed Rooms	Mosquito Nets Available	Insecticide Used
						Male	Female	Pregnant Women	Children < 5 years				
Gisagara	29	273	23	1	72	2,297	3,068	0	0	286	281	1,675	233
Nyagatare	6	62	4	0	8	531	328	0	0	20	20	510	31
Total	35	335	27	1	80	2,828	3,396	0	0	306	301	2,185	264

6.4.2 INSECTICIDE USAGE

The total number of sachets used during the February 2015 campaign was 108,607 (108,343 plus 264 sachets for other structures and schools in the two target districts). On average, one sachet sprayed 1.2 structures (see Table 19). The average number of sachets used by a spray operator per day was 6.9, and each operator, on average, sprayed 8.1 structures per day in the three target districts.

TABLE 19: INSECTICIDE USAGE

District	Total Structures Sprayed	Total Sachets Used	Average Number of Sachets per Sprayed Structure	Average Number of Sachets per SOP per Day	Number of Structures sprayed per day per SOP
Gisagara	76,725	66,376	1.2	7.2	8.3
Nyagatare	50,425	41,967	1.2	6.5	7.9
Total	127,150	108,343	1.2	6.9	8.1

7. ENVIRONMENTAL COMPLIANCE

7.1 PRE-SEASON ENVIRONMENTAL ASSESSMENT

During the period of January 5-9, 2015, the Rwanda AIRS team conducted pre-spray environmental assessments in the two IRS districts at the operation sites at the sector level. This was done using smartphones which were pre-programmed with environmental assessment checklists. Data was entered in the e-forms on the smartphones while at the field operational sites and submitted to a central database on an automated server at Abt Associates' Bethesda office. A work list was generated which was then instantly shared with the AIRS Chief of Party (COP), Operations Manager and the Environmental Compliance Manager to guide them on the actions to be taken in preparing the operation sites for IRS. The assessments involved identifying potentially compliant storage facilities, determining the suitability of soak pits that were used in the previous IRS round, and siting locations for new soak pits. In total, four storage facilities were rented while 16 were provided by the sector authorities at the sector and cell office premises. Some of the stores required minor refurbishments which generally included fixing double locks and reinforcing doors and windows. The soak pits were cleared of bushes that had grown in and around them, murrum was added in the wash area and compacted, a polythene sheet fixed onto the murrum, and poles were fixed to further stabilize the fence. The various materials especially the charcoal and sawdust were also replaced in the pit. Table 20 shows the details of the refurbishments that were done at the operation sites.

TABLE 20: CONSTRUCTION AND REFURBISHMENTS AT IRS OPERATION SITES

District/Province	Number of Operation Sites	Site Refurbished (soak pit, storeroom, fence, etc.)
Nyagatare/ Eastern province	7	6 soak pits refurbished 1 new soak pit constructed 5 offices and storage facility provided by sector and cell authorities 2 offices and storage facilities were rented
Gisagara/ Southern Province	13	11 soak pits refurbished 2 new soak pits constructed 11 offices and storage facilities provided at the sector and cell offices 2 rented offices and storage facilities

The 2012 SEA that was amended in 2013 is valid throughout 2016. The letter report which was submitted in July 2014 highlighted the environmental compliance plan for the September 2014 and February 2015 IRS campaigns.

7.2 SAFETY AND ENVIRONMENTAL COMPLIANCE DURING THE SPRAY CAMPAIGN

Prior to IRS training in preparations for the spray operation, all spray operators, washers and supervisors underwent medical tests to ensure their fitness to participate in the IRS operations. The tests were comprised of a routine physical examination, pregnancy tests for all females (also included were storekeepers, sector supervisors, sector coordinators) and hematocrit and liver function tests (AST, ALT). Anyone who was found unfit did not participate in the operations. During the medical examinations conducted in January 2015, five SOPs and washers were found unfit for IRS operations and were replaced immediately before IRS training and operations. The excluded candidates either exhibited high levels of transaminases (3) or were found to be pregnant (2). Table 21 shows the number of SOPs, washers and supervisors that underwent medical checkup in each IRS district.

TABLE 21: MEDICAL CHECKUP FOR IRS STAFF

District	SOPs, Washers and storekeepers examined		SOPs, Washers a storekeepers found unfit	
	Male	Female	Male	Female
Nyagatare	178	262	1	4
Gisagara	290	359	0	0
Total	468	621	1	4

During IRS operations, all staff who took part in IRS were required to adhere to the requirements for environmental and human safety related to IRS. Mitigation measures were instituted through the provision of appropriate PPE to all spray personnel and others who had potential exposure to insecticide. PPE included coveralls, gloves, boots, helmets, face shields, and dust masks for use throughout the spray period.

Transportation of insecticides from the central warehouse to the district warehouses was done using enclosed certified trucks. Distribution from the district warehouse to the operations sites was done using trucks covered with tarpaulins. Each vehicle was equipped with kits for spill management and first aid, Material Safety Data Sheets and accident/emergency procedures sheets. Spray operators were transported from the operational sites to the field using certified trucks that were retrofitted with railings on the periphery and seating benches. Prior to their engagement, all the vehicles were inspected against the PMI BMPs to ensure compliance with safety and environmental requirements, and issued a certificate attesting to their compliance.

Soak pits were monitored throughout operations. Plastic sheeting was used at the wash areas to ensure that insecticide contaminated effluent did not pollute the environment and was replaced where and when it was deemed necessary. The soak pit and wash areas were fenced and gated to ensure that non-authorized entities did not access the premises. The progressive (triple) rinsing system was used at each soak pit for washing spray pumps. Trained washers washed the PPE over the soak pits at the end of 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. Mid-spray environmental compliance inspections were carried out during the spray operations in the two IRS districts to ensure that mitigation measures put in place during spray operations were adhered to. The inspection was done by Abt AIRS staff in conjunction with the district environmental officers using smartphones as well as paper checklists.

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. Additionally, fire extinguishers in storerooms were inspected. The inspection teams also ensured that wastes were correctly handled and packed during the operations in preparation for disposal at the end of the operations. Preparations of households for spraying and the instructions given to residents on what to do during and after spraying operations were monitored. Part of the inspections also involved observing the spray operators in the field.

7.3 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS AND OTHER INCIDENTS

Each of the two IRS districts had a team in charge of adverse effects. The team was comprised of a coordinator, a doctor who was based at the district hospital and two nurses based at each health center affiliated with each IRS operation site. These teams were responsible for addressing any adverse effects experienced by community members and/or the spray operations support staff during the spray operations. Before the start of the IRS operations, this team received refresher training at each district on management of IRS adverse effects. During the February 2015 spray campaign, two cases of adverse effects were reported in Nyagatare and Gisagara districts (Rukomo and Kigembe sectors respectively). The associated symptoms of the reported cases were mild, limited to localized irritations of eyes and the skin. These cases were attended to appropriately and the people affected recovered within a few hours of attention. Table 22 below provides a summary of the adverse effects that were reported in the two districts and were attended to at either a health center or district hospital.

TABLE 22: NUMBER OF ADVERSE EFFECTS CASES

District	Number of Cases	Symptoms
Nyagatare	1	Headache, abdominal pain and vomiting (A spray operator was spraying a structure and started feeling headache, abdominal pain and started vomiting).
Gisagara	1	Eye irritation and headache (A spray operator got insecticide splash on her face when she was opening a spray pump. The face shield of her head gear was flung open).

7.4 POST-SEASON ENVIRONMENTAL ASSESSMENT

The post-season environmental assessment was conducted in the two districts using smartphones. During the assessment it was confirmed that all IRS items were collected from the operation sites and that insecticides and IRS wastes were taken to district storage facilities. Soak pits and their surroundings were well cleaned, covered with a plastic sheet, and the doors securely locked. AIRS agreed with the district and sector authorities that the sectors would provide security for the soak pits and wash areas to ensure that they are not vandalized during the non-spraying season. Stores were cleaned/decontaminated before being handed over to the owners.

7.5 IRS WASTE DISPOSAL

IRS wastes were disposed at different sites according to the type generated during the IRS operations. A total of 655 kg of contaminated wastes from Nyagatare district, comprising 41,998 empty insecticide sachets and 10,160 used masks were sent to the Nyagatare District Hospital incineration plant, whose combustion temperature is 1100° Celsius for incineration. An incineration certificate was issued by Nyagatare hospital incineration plant. Other wastes, including 699 used gloves, and assorted plastics items (11 damaged barrels, 12 jerry cans and 2 basins) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 350 uncontaminated carton boxes were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as papers, and used dry cell batteries were disposed of at the Nduba dumping site.

A total of 1136.4 kg of contaminated wastes from Gisagara district comprising 66,609 empty insecticide sachets and 14,843 used masks from Gisagara District were sent to Kibilizi Hospital incineration plant. Incineration certificate was issued by the Kibilizi Hospital incineration plant (Annex 5). Other wastes, including 1,143 used gloves, and assorted plastics items (16 damaged barrels and 11 basins,) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 600 uncontaminated carton boxes were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as papers, and sprayer bags were disposed of at the Nduba dumping site.

8. CAPACITY BUILDING OF THE MINISTRY OF HEALTH

IRS implementation was conducted by the AIRS Rwanda team in close collaboration with the MOH and district staff to promote sustainability. The MOPDD staff worked with the AIRS staff in the facilitation of the IEC and SOP ToTs. These trainings created a pool of trainers who will be very useful in the future depending on their availability. The trained IEC and SOP ToTs in turn facilitated the trainings for the IEC implementers and spray operators at the district and sector levels. The beneficiaries of these two trainings (IEC implementers and SOPs) were the cell and village heads, and community health workers (SOPs) who were involved in IEC and spraying activities respectively. Supervision of IRS operations was conducted in collaboration with MOPDD, district/sector staff (Vice Mayor-Social Affairs, District Health Director, District Environmental Health Officer, and Sector Social Affairs Officers). These staffs were all given orientations on IRS supervisory activities.

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

During the February spray season, MOPDD conducted spray operations in six sectors of Nyagatare district and the fifteen sectors of Bugesera district. In parallel, AIRS Rwanda provided support to the MOPDD supported sectors during the implementation. In each of the two districts AIRS Rwanda district coordinators worked hand in hand with a point person from the district hospitals who they supported throughout the spray operations period. In addition, two AIRS Rwanda staff dedicated three days per week in each district to support the MOH staff in supervision of the IRS activities. We provided support in planning, development of IRS operational plan, logistics needs assessment, training of trainers (ToT's), training of spray operators and mobilizers and supervision during IRS operations.

Moreover, AIRS Rwanda also donated IRS materials and equipment to MOPDD for use in IRS. Below is a list of materials donated to MOPDD. Table 23 shows a list of materials donated to MOPDD.

TABLE 23: LIST OF MATERIALS DONATED TO MOPDD

Items	Quantity Donated
Pumps	250
Headgears	250
Boots	250
Coveralls	500
Repair Kits	1
Insecticide	16,231

In addition, AIRS Rwanda lent materials and equipment to MOPDD during February 2015 spray operations. Table 24 shows the list of materials lent. All materials were returned after the completion of their spray campaign.

TABLE 24: LIST OF MATERIALS LENT TO MOPDD

#	Item Description	Unit	Quantity lent
1	X-pert spray pumps	Pce	50
2	Coveralls	Pce	200
3	Boots	Pairs	100
4	Hard hat Complete	Pce	110
5	Pump repair kits	Kits	2
6	Water thank	Pce	6
7	Metallic bucket	Pce	8
8	Spade	Pce	8
9	Fire extinguisher	Pce	8
10	Hazard Sign	Pce	16
11	Wrench	Pce	8
12	Plier	Pce	8
13	Screw driver	Pce	8
14	Jug (Measuring cylinder)	Pce	12
15	Meter ruler	Pce	10
16	Rinsing barrels	Pce	42
17	Extension lance	Pce	13

9. ENTOMOLOGY

Entomological monitoring is essential in any insecticide-based vector control intervention such as IRS. It helps to assess the quality of the vector control intervention as well as its efficacy. The entomological monitoring data is used to justify decisions such as the type of insecticide and selection of target areas. Working in collaboration with MOPDD, the IRS program implemented entomology activities. MOPDD sentinel site technicians worked with the AIRS Rwanda entomology coordinator to carry out the entomological monitoring aimed at:

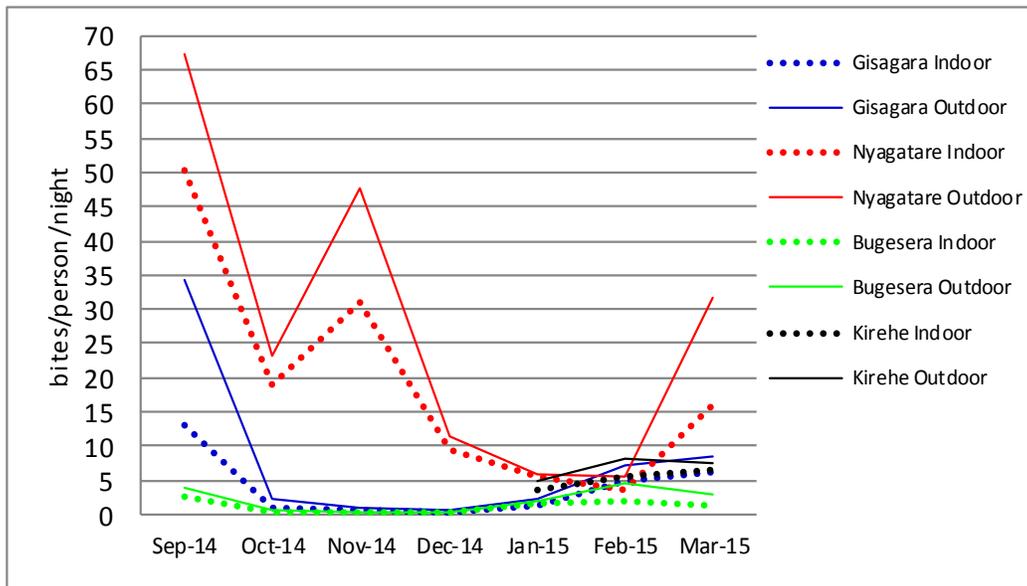
- Assessing malaria vector density and species composition in intervention areas;
- Establishing vector feeding time and location;
- Assessing the quality of insecticide application and monitoring insecticide decay rates.

9.1 VECTOR SPECIES COMPOSITION, DENSITIES, FEEDING TIME AND LOCATION

Monthly vector collections were done to assess the vector species composition, density and behavior in the three IRS districts using human landing collections (HLC) and pyrethrum spray catches (PSC). Pyrethrum Spray Catches were conducted monthly in each of the two sites in each IRS district. The collections were done on two consecutive mornings in 15 houses per site each day. Human Landing Catches were done monthly during two consecutive nights in 6 houses per district (3 houses per site) per night. Vector density was calculated as the average number of *An. gambiae* s.l. collected per house per day from PSC data.

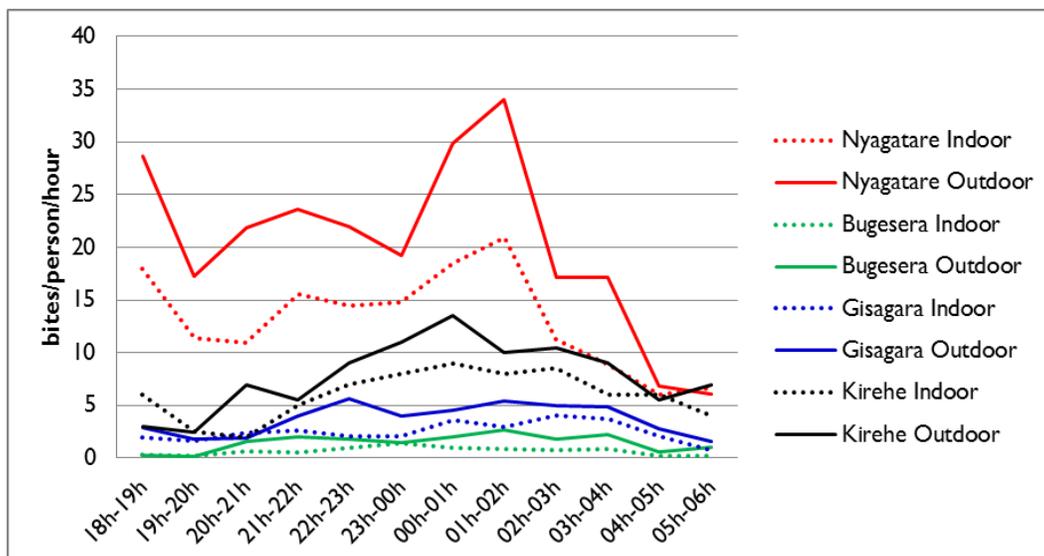
An. gambiae s.l. was the only important malaria vector that was identified during the entomological monitoring collections. *An. gambiae* s.l. generally showed more exophagic than endophagic behavior in the three districts. In all three districts a drop in biting was recorded in October 2014 in comparison to biting during the preceding month. This could be attributed to the September IRS application. In Bugesera, both indoor and outdoor biting was generally low (average less than 5 bites/person/night) compared to the other districts. In Gisagara, biting remained low following the spray in September 2014 and in Nyagatare it was generally higher than in the other districts even though there was a drop after the September spray. In both Nyagatare and Gisagara districts, a rise in both indoor and outdoor biting was observed in March despite IRS application in February. A control site, Kirehe district (a non-IRS district) was established in January 2015. Further data collection will facilitate in making comparative analyses and inferences on trends in the intervention districts. (Figure 5 and Annex 6)

FIGURE 5: AN. GAMBIAE S.L. AVERAGE MONTHLY BITING TRENDS



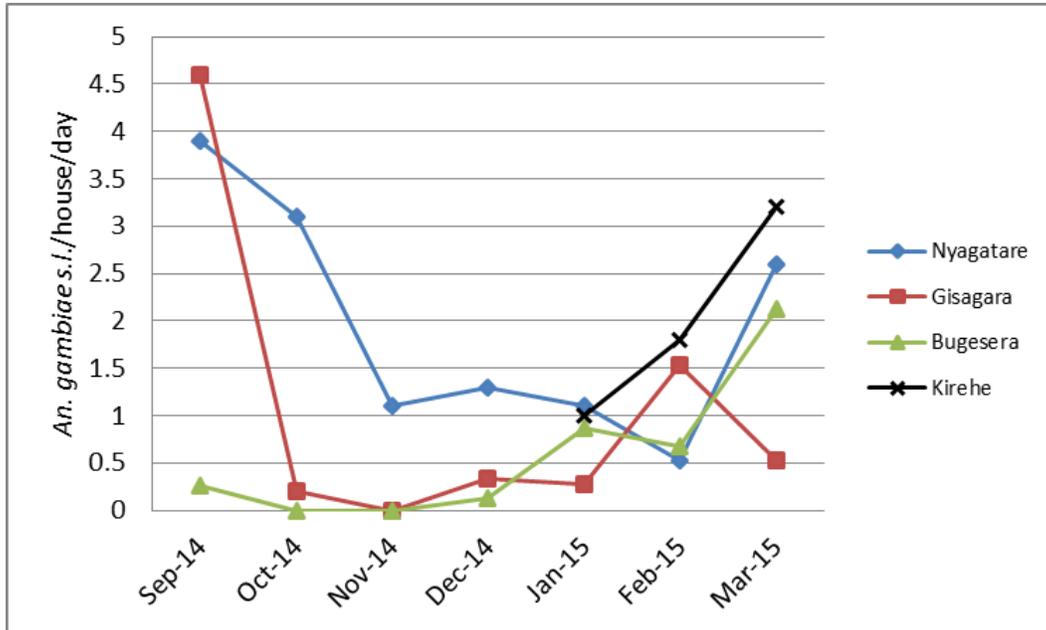
Hourly biting rates per person varied across the three districts; they were highest in Nyagatare, followed by Kirehe (control site), then Gisagara and Bugesera showed the least bites/person/hour. The relatively higher biting in Nyagatare could be due to the fact that apart from the rains there is more rice farming in the district relative to the other districts. In all the four sites (the three intervention sites and the control site) biting was higher outdoors than indoors. In Nyagatare, Gisagara, and Kirehe districts, biting was generally high at 1800h dropped at 1900h, was observed to rise at around 2000h, peaked at 0001h and remained high until 0003h. In Bugesera, hourly biting rose at around 2100h and remained relatively constant through the rest of the night. Figure 6 below shows average *An. gambiae* s.l. bites per person per hour through the night across the three districts.

FIGURE 6: AVERAGE AN. GAMBIAE S.L. HOURLY BITING



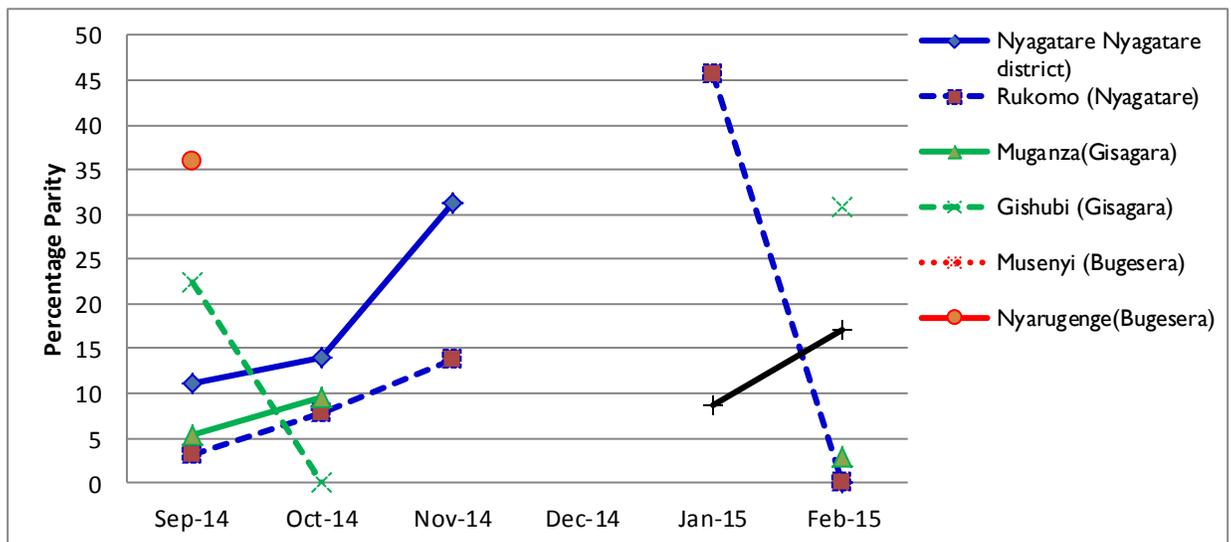
Vector density (average *An. gambiae* s.l./house/day) in the three districts was generally high in September 2014 (Nyagatare 3.9 *An. gambiae* s.l. per house per day; Gisagara 4.6 and Bugesera 0.26). A sharp drop was however observed in October following IRS application (Nyagatare 3.1 *An. gambiae* s.l. per house per day; Gisagara 0.2 and Bugesera 0). The densities remained low in the next 3 months, but in January it was observed to rise in Gisagara. Environmental factors which might have favored the proliferation of the vector but also by this time the residual effectiveness of the insecticide on the walls was waning. Data for the three months since the establishment of a control site show that vector density was generally higher in the control site than the intervention sites. Bugesera and Nyagatare districts however showed rises in density while there was a drop in Gisagara in March (see Figure 7 and Annex 7).

FIGURE 7: AN. GAMBIAE S.L. DENSITY



Ovary dissection of the *An. gambiae* s.l. collected by HLC was performed to determine the parity rates. Except in September when one of the sites recorded parity rates of over 35%, both study sites in Bugesera recorded parity rates of zero through the data collection period. In Gisagara there was a general decline between October 2014 to January 2015 and a rise was observed in February 2015. In Nyagatare, parity was comparatively higher in September-November 2014 after which there was a decline in December 2014 to January 2015 but a sharp increase was observed in January 2015 in one of the Nyagatare district sites. Comparatively, by March parity in the control site was higher than in the IRS sites. (see Figure 8 and Annex 8).

FIGURE 8: PARITY



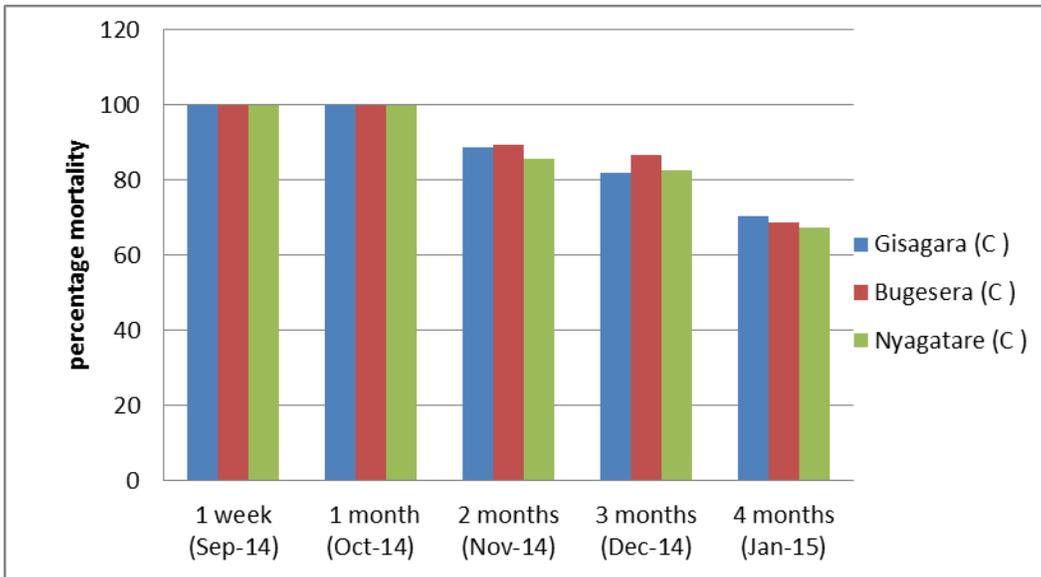
9.2 WALL BIOASSAYS

Cone bioassays were conducted in 12 sprayed structures in each of the IRS districts. In each district, two different sectors were sampled and in each sector, six structures were sampled. Control tests were conducted alongside on surfaces that were known to have no insecticide. The cone bioassays were conducted using susceptible *An. gambiae* s.s. (Kisumu colony)

Cone bioassays conducted within one week of spraying to assess the quality of spraying in September 2014 showed 100% mortality of susceptible *An. gambiae* s.s. indicating quality spraying took place. Bioassay tests conducted in the month of October (one month post IRS) also recorded 100% mortality of the *An. gambiae* s.s. in all the test sites.

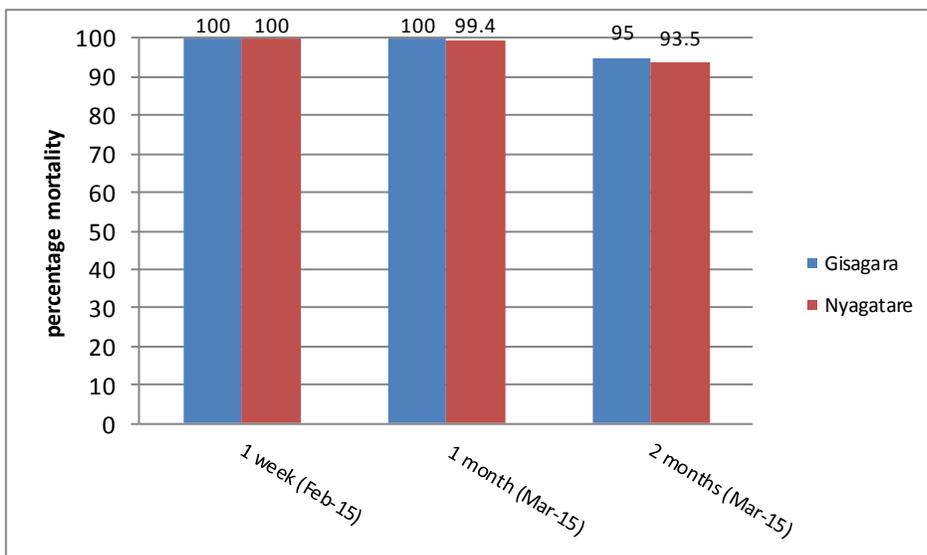
Monthly WHO cone bioassay tests were conducted following the September 2014 IRS campaign in 36 sprayed structures. Test mortality of over 80% was observed in all the three districts up to three months after spraying but dropped below this level in two of the three districts four months post spraying. At four months post IRS in January 2015, mortality rates had gone below the 80% threshold in Gisagara (70.3%) and Bugesera (68.6%) and 67.5 in Nyagatare (Figure 9).

FIGURE 9: WALL BIOASSAY TEST RESULTS (SEP 2014 – JANUARY 2015)



Quality control wall bioassay tests were conducted for the second spray round in February 2015 in 24 structures in two districts (Nyagatare and Gisagara) within week one of spraying. In all test cones 100% mortality of susceptible *An. gambiae* s.s. was recorded. One month post IRS in March, test mortalities of 100% and 99.4% were recorded in Gisagara and Nyagatare respectively. In April, test mortalities dropped further to 95% and 93.5% in Gisagara and Nyagatare respectively (Figure 10).

FIGURE 10: WALL BIOASSAY TESTS RESULTS FEB-MARCH 2015



10. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

10.1 CHALLENGES

The main challenges experienced during the IRS campaign included:

- Approximately 38.2% of IRS structure cards are lost by structure owners.
- Absence of some households during time of spraying because of farming, market days, work days, funerals and some refusals meant that some structures could not be covered, even after mop-up.
- Competing government functions/meetings during IRS at the sector level requiring the mobilizers and spray operators (village leaders) led to occasional interruption of spraying operations in some instances.
- Some structures/rooms in structures were used for storage of harvested food and this limited their availability for spraying.

10.2 LESSONS LEARNED AND RECOMMENDATIONS

- Engagement of community health workers supervisors at operational sites level for IEC coordination in the sectors enhanced coordination of IRS activities at the community level. Further, while local leaders are critical in mobilizing and enhancing IRS acceptability, their role and engagement in IRS needs to be re-evaluated to maximize their involvement.
- During supervision, AIRS Rwanda team members found that SOPs were not marking all unsprayed structures both physically and in their data collection forms. In future campaign, to facilitate identification of mobilized, 'sprayed' and 'not sprayed' structures the mobilizers and SOPs marked the structures as follows: the mobilizers marked the IRS card number on the doors of structures and the SOPs marked the door with for the date or their team number to indicate 'sprayed'. This way SOPs will be able to mark unsprayed structures, with their IRS Card number, on their data collection form, and teams will be able to visibly see if an eligible structure has not been sprayed.
- Building the capacity of local leaders by training them on all components of IRS operations enhanced their interest and ownership of the project activities.
- The procedure for recruitment of SOPs by 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 should be adhered to.
- Enhanced supervision by the AIRS staff, MOPDD, district and sector staff and regular feedback meetings were instrumental to the smooth implementation and high spray coverage recorded.

- Data cleaning conducted regularly during IRS data entry was instrumental in identifying any errors and taking immediate remedial action. This also provided an opportunity for comparing insecticide used as per the database and daily logistics records.
- Data collection verification was conducted by all supervisors to validate the accuracy of data collected in the field by interviewing household owners. This provided an opportunity to confirm the correctness of SOP data records on regular basis leading to improved integrity of the IRS campaign.
- Cell offices can provide storage facilities and IRS operation sites where space is unavailable at sector offices.

ANNEX 1: MOH LETTER ON INSECTICIDE SELECTION 2013/ 2014



ANNEX 2: LOCAL PROCUREMENT

Description	Quantity / Number
IRS Transportation	
Rented Vehicles used in micro-planning and logistic assessments	2
Rented Vehicles used in IRS implementation	64
IRS Supervision vehicles(Country Office)	2
Rented vehicles that facilitated the Post IRS activities	2
Printed Materials	
Stock cards (A4 size as per sample) –150 g bristol paper in pink color, print in black ink both sides	545
Goods Issued Note book (A4 size, total 150pages, one original in white, two carbonized copies in green and yellow respectively as per sample	40
Delivery note book(A4 size, total 150pages, one original in white, two carbonized copies in green and yellow respectively as per sample)	20
Request book(A4 size, total 150pages, one original in white, two carbonized copies in green and yellow respectively as per sample	17
Spray Operator form, A4 size printed in black on Bristol 150g blue	15,386
Team leader forms, A4 size printed in black on Bristol 150g green	4,724
Village IEC Form (A4 size as per sample) – 150g Bristol Paper in yellow color - print in Black ink both sides	8,649
IRS Cards(A5 size – 150g Bristol Paper in Blue Color as per sample) 4 colors and print in Black ink both sides	67,636
Spray Performance Sheets (Sector) A3 (6 pages)	84
Spray Performance Sheets (District) A3 (6 pages)	18
Daily Health Team Leader Checklist	3,119
Daily Summary report for sector coordinators	217
Storekeeper performance Checklist (3 pages)	210
Morning Mobilization and Transport (3 pages)	702
Morning Mobilization (1 page)	558
End of day cleanup (2 pages)	2,358
Homeowner preparation and SOP performance checklist (4 pages)	61,860
Homeowner preparation (IEC) (2 pages)	1,808
Insecticide Distribution Cards	392
Error Eliminator Form for spray Data	5,425
Error Eliminator Form for Mob Data	762
Daily Tracking Form for insecticide returned from the field	4,823
Photocopies of assorted documents	40,000

Description	Quantity / Number
Assorted Materials	
Sisal rope – cylinder roll, 80m length, 2mm diameter	30
Bathing soap (protex–250mg)	1,127
Dry cell batteries (for torches)	250
Duracell batteries for digital thermometers	80
Powder soap 100g (white Omo)	3295
Liquid washing soap (jerrycans) 5liters	4
Lubricant oil, original 125ml (general purpose)	522
Empty sacs (100kg)	485
SOP Bags	563
Toothbrush (for cleaning nozzles)	2,232
Washing soap (Tembo)	3,152
Padlocks	40
Filter (tea strainers)	1,000
Torches	700
Light bulbs	1,400
Polythene sheeting rolls	30
Warning sign - IRS store	40
Warning sign - soak pit	50
Pump hangers	11
Megaphones	10
Plastic Wallets for Mobilizers	2,000
Meter ruler (100 cm)-Plastic	30
Box files (plastic and assorted colors)	746
Clear sheet protector A4 size (transparent plastic pocket for keeping documents on file)	1,885
Pens – Bic, blue color	5,064
Note Books	5,176
Permanent markers (box)	25
Flip chart pads	10

ANNEX 3: SOP TRAINING PROGRAM

TIME	SUBJECT	FACILITATOR
DAY I		
08.30 am – 09.00 am	Session I: Opening Ceremony	Sector Authorities
08.30 am - 08.45 am	Arrival and Registration	Sector Supervisor
08.45 am – 09.00 am	Introduction and Opening remarks	Sector Coordinator
09.15 am – 09.30 am	Objective of the training	Sector Coordinator
09.30 am – 10.00 am	Introduction to Indoor residual spraying	Trainer
10.00 am – 11.00 am	Parts of Compression Pumps handling, progressive rising and Pump maintenance	Trainer
11.30 am - 12.30 pm	Introduction to the spraying surface	Trainers
12.30 pm – 01.00 pm	Safety of population and Environment	Trainers
01.00 pm – 02.00 pm	LUNCH	
02.00 pm – 03.00 pm	Personal Protection & dressing rehearsal	Trainers
03.00 pm - 04.00 pm	Filling of daily collection data forms	
04.15 pm - 04.45 pm	Filling of Daily collection data forms	
04.45 pm - 05.00 pm	Filling day evaluation Chart	
DAY 2		
	Session 3: Safety of IRS	
08.00 am - 09.00 am	Filling of daily collection data forms	Trainers
09.00 am – 10.00 am	Preparing Structures for IRS, Community mobilization	Trainers
10.00 am - 11.00 am	Basics in Management of adverse effects	Sector Coordinator
11.00 am - 01.00 am	Supervision and reporting of all IRS activities, Roles of Team leader) (Use of supervision checklists and Spray and team leader Pocket guides)	Sector Coordinator
1.00 pm – 2.00 pm	Lunch	
2.00 pm – 5.00 pm	Supervision and reporting of all IRS activities (Use of supervision checklists)	
DAY 3 - 5		
	Quality Control	
08.00 am – 10.00 am	Wall spraying techniques (Theory & demonstration)	Trainers
10.00 am – 01.00 pm	Spraying Walls techniques practices Maintaining 45cm distance from Walls Maintaining 75cm Swath and 5cm overlap Spray rhythm (Speed top – down)	
02.00 pm – 04.00 pm	Spraying walls techniques - practice	Trainers, Storekeeper

ANNEX 4: STOCK UPDATE

Category	Item	Initial Stock	New Procurement	Used	Equipment Damaged/ Needing Repair)	Usable Stock Remaining
PPE						
	Coveralls	5,477	0	2,375	0	3,102
	Boots	1,365	408	79	0	1,444
	Helmets	3,026	0	69	0	3,103
	Gloves	4,978	0	2,040	0	2,938
	Dust masks	11,676	46,320	25,307	0	32,689
Spray pumps						
	Spray pumps	1,758	0	250	257	1,534
	Repair kits	29	11	7	0	33
	Nozzle gaskets	53	840	504	0	389
	Nozzle tips	308	0	60	0	248
	Strainers	3,236	1,000	318	0	3,918
	Extension Assembly	0	215	31	0	184
	Pressure Gauge	17	50	15	0	52
	Pump Hose	0	100	0	0	100
	Measuring cylinder	25	0	0	0	25
Insecticides						
		0	122,895	108,607	0	14,288

ANNEX 5: WASTE DISPOSAL CERTIFICATES

REPUBLIC OF RWANDA



EASTERN PROVINCE

NYAGATARE DISTRICT

NYAGATARE HOSPITAL

PO BOX 43

CERTIFICATE OF INCINERATION

THIS IS TO CERTIFY THAT 706 KG OF IRS CONTAMINATED WASTES WERE RECEIVED ON MARCH 16TH 2015 FROM ABT ASSOCIATES INC, NYAGATARE OFFICE, AND INCINERATED ON 17TH MARCH 2015.

Kind Regards

Dr RUHIRWA Radoviko

Nyagatare Hospital Director

REPUBLIC OF RWANDA



**SOUTHERN PROVINCE
GISAGARA DISTRICT
KIBILIZI HOSPITAL
Po Box: 86 Butare**

CERTIFICATE OF INCINERATION

*KIBILIZI Hospital in collaboration with Abt associates certify that:
have incinerated infectious waste from IRS activity conducted in Gisagara District
from 9th february to 4th March 2015.*

The total waste incinerated is 1136 Kgs

Done at Kibilizi on 12th March 2015

UWIZEYE Protogene
Environmental health officer

A handwritten signature in blue ink, appearing to read 'Uwizeye Protogene'.

Dr NDAGIJIMANA Sylvestre
Director of Kibilizi Hospital



ANNEX 6: HUMAN BITING RATES (BITES/PERSON/NIGHT)

	Gisagara		Nyagatare		Bugesera		Kirehe	
	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor
Sep-14	12.9	34.4	50.38	67.5	2.65	3.85		
Oct-14	1.05	2.25	18.8	23.25	0.29	0.5		
Nov-14	0.58	1	31.16	47.74	0.4	0.4		
Dec-14	0.31	0.69	9.32	11.38	0.12	0.18		
Jan-15	1.24	2.26	5.39	5.71	1.65	2.05	3.40	4.90
Feb-15	4.77	7.03	3.66	5.39	1.91	4.49	5.51	8.19
Mar-15	6.32	8.4	16.1	31.79	1.25	2.85	6.49	7.41

ANNEX 7: PYRETHRUM SPRAY CATCH RESULTS

Month	District	Sector	Unfed	fed	Half Gravid	Gravid	Total	Density (An. gambiae s.l./house)
Sep-14	Nyagatare	Nyagatare	12	19	3	1	35	2.33
		Rukomo	8	11	2	3	24	1.60
	Gisagara	Muganza	6	19	3	5	33	2.20
		Gishubi	8	18	7	4	37	2.47
	Bugesera	Musenyi	0	0	0	0	0	0.00
		Nyarugenge	1	3	0	0	4	0.27
Oct-14	Nyagatare	Nyagatare	13	8	3	0	24	1.60
		Rukomo	13	5	4	1	23	1.53
	Gisagara	Muganza	1	0	0	0	1	0.07
		Gishubi	0	1	1	0	2	0.13
	Bugesera	Musenyi	0	0	0	0	0	0.00
		Nyarugenge	0	0	0	0	0	0.00
Nov-14	Nyagatare	Nyagatare	4	4	0	0	8	0.53
		Rukomo	5	4	0	0	9	0.60
	Gisagara	Muganza	0	0	0	0	0	0.00
		Gishubi	0	0	0	0	0	0.00
	Bugesera	Musenyi	0	0	0	0	0	0.00
		Nyarugenge	0	0	0	0	0	0.00
Dec-14	Nyagatare	Nyagatare	5	0	0	0	5	0.33
		Rukomo	6	7	1	0	14	0.93
	Bugesera	Musenyi	1	0	1	0	2	0.13
		Nyarugenge	0	0	0	0	0	0.00
	Gisagara	Muganza	0	0	0	1	1	0.07
		Gishubi	0	0	0	0	0	0.00

Month	District	Sector	Unfed	fed	Half Gravid	Gravid	Total	Density (An. gambiae s.l./house)
Jan-15	Gisagara	Muganza	0	2	0	0	2	0.13
		Gishubi	0	2	0	0	2	0.13
	Bugesera	Musenyei	3	2	1	1	7	0.47
		Nyarugenge	6	0	0	0	6	0.40
	Nyagatare	Nyagatare	4	0	0	0	4	0.27
		Rukomo	7	1	4	1	13	0.87
	Kirehe	Gatore	9	1	1	4	15	1.00
Feb-15	Bugesera	Musenyei	1	0	0	1	2	0.13
		Nyarugenge	1	2	1	4	8	0.53
	Nyagatare	Nyagatare	3	1	0	1	5	0.33
		Rukomo	1	2	0	0	3	0.20
	Gisagara	Muganza	1	2	0	0	3	0.20
		Gishubi	11	4	5	0	20	1.33
	Kirehe	Gatore	12	13	1	1	27	1.80
Mar-15	Bugesera	Musenyei	1	0	0	0	1	0.07
		Nyarugenge	7	16	7	1	31	2.07
	Nyagatare	Nyagatare	5	1	4	0	10	0.67
		Rukomo	8	21	0	0	29	1.93
	Gisagara	Muganza	2	4	0	1	7	0.47
		Gishubi	0	1	0	0	1	0.07
	Kirehe	Gatore	15	20	5	8	48	3.20

ANNEX 8: PARITY RATES (PERCENTAGE)⁸

District	Sector	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15
Nyagatare	Nyagatare	11,2(116)	13,9 (72)	31,3 (32)	0 (0)	0 (0)	0 (9)	9.8(81)
	Rukomo	3,1 (65)	7,8 (77)	13,8(29)	0 (0)	45.7 (35)	0 (10)	1.4(72)
Gisagara	Muganza	5,3 (75)	9,5 (21)	0 (0)	0 (0)	0 (0)	3 (33)	3.1(64)
	Gishubi	22,5 (40)	0,0 (6)	0 (0)	0 (0)	0 (0)	30.8 (26)	0(0)
Bugesera	Musenyi	0,0 (0)	0(0)	0(0)	0(0)	0 (0)	0 (0)	0(0)
	Nyarugenge	36,0 (25)	0(0)	0(0)	0(0)	0 (0)	0 (0)	6.3(19)
Kirehe	Gatore					8.7(23)	17(47)	44.4(54)

⁸ The figures in brackets show the number dissected.

ANNEX 9: PEOPLE TRAINED TO DELIVER 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
Sector coordinators	10	10																							20
Sector Supervisors	28	44																							72
Spray Operators			336	493																					829
Team Leaders			116	77																					193
Data Entry Clerks					8	6																			14
Logisticians							1	1																	2
District Store Keepers							1	1																	2
Sector Store Keepers							12	9																	21
Finance Assistants																					1	2			3
Pump Technicians									2	0															2
District IEC Assistants											1	1													2
Sector IEC Assistants & Supervisors											34	32													66
Cell IEC Mobilizers													56	49											105
Village IEC Mobilizers													1525	166											1,691
Adverse Effects Teams															19	19									38

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
(Clinicians)																									
Environmental Compliance Officers															2	0									
Washers																	23	48							
Security Guards																			42	1					
Drivers																						61	0		
TOTAL M/F	38	54	452	570	8	6	14	11	2	0	35	33	1,581	215	21	19	23	48	42	1	1	2	61	0	
TOTAL/Training	92		1,022		14		25		2		68		1,796		40		71		43		3		61		

ANNEX 10: SUMMARY OF MID-SPRAY ENVIRONMENTAL INSPECTIONS- STORAGE FACILITY AND SOAK PITS

Operation Site	Date Inspection Performed	Are the store keepers, SOs and wash persons wearing appropriate PPE?	Do spray teams have clean PPE at the start of each work day?	Are overalls washed daily, and dried over the soak pit?	During transport, are all spray operator comfortably seated with pumps well placed between their legs in the transport vehicle?	Are spray operators fed before start of spray? (before wearing of PPE	Is the store well arranged? (height of arranged items, allowing for free movement, proper stacking of items, allowing for ventilation)	Are warning signs correctly displayed? (danger sign, insecticide safety notice)	Is there firefighting equipment (not expired)?	Are the surroundings of the store and soak pit clear of IRS solid wastes (empty sachets, masks, gloves)?	Are contents of drums 1, 3, 5 and 7 emptied into spray pumps before spray operators depart for field?
Mamba	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gikonko	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mukindo	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Muganza	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mugombwa	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gishubi	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Save	4/3/2015	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Kansi	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ndora	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Operation Site	Date Inspection Performed	Are the store keepers, SOs and wash persons wearing appropriate PPE?	Do spray teams have clean PPE at the start of each work day?	Are overalls washed daily, and dried over the soak pit?	During transport, are all spray operator comfortably seated with pumps well placed between their legs in the transport vehicle?	Are spray operators fed before start of spray? (before wearing of PPE	Is the store well arranged? (height of arranged items, allowing for free movement, proper stacking of items, allowing for ventilation)	Are warning signs correctly displayed? (danger sign, insecticide safety notice)	Is there firefighting equipment (not expired)?	Are the surroundings of the store and soak pit clear of IRS solid wastes (empty sachets, masks, gloves)?	Are contents of drums 1, 3, 5 and 7 emptied into spray pumps before spray operators depart for field?
Musha	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nyanza	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kigembe	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kibilizi	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Karama	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mukama	3/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mimuli	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gatunda	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Katabagemu	4/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tabagwe	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rukomo	5/3/2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

ANNEX 11. SUMMARY OF MID-SPRAY ENVIRONMENTAL INSPECTIONS- HOUSEHOLD PREPARATION BEFORE IRS

Operation Site	Have all personal belongings, animals, and sick persons been removed from the house?	Have all immovable items been moved to center of the house and properly covered with polythene sheet?	Are the residents instructed on what to do during and after spraying?
Mamba	Yes	Yes	Yes
Gikonko	Yes	Yes	Yes
Mukindo	Yes	Yes	Yes
Muganza	Yes	Yes	Yes
Mugombwa	Yes	Yes	Yes
Gishubi	Yes	Yes	Yes
Save	Yes	Yes	Yes
Kansi	Yes	Yes	Yes
Ndora	Yes	Yes	Yes
Musha	Yes	Yes	Yes
Nyanza	Yes	Yes	Yes
Kigembe	Yes	Yes	Yes
kibilizi	Yes	Yes	Yes
Karama	Yes	Yes	Yes
Mukama	Yes	Yes	Yes
Mimuri	Yes	Yes	Yes

Operation Site	Have all personal belongings, animals, and sick persons been removed from the house?	Have all immovable items been moved to center of the house and properly covered with polythene sheet?	Are the residents instructed on what to do during and after spraying?
Gatunda	Yes	Yes	Yes

Operation Site	Have all personal belongings, animals, and sick persons been removed from the house?	Have all immovable items been moved to center of the house and properly covered with polythene sheet?	Are the residents instructed on what to do during and after spraying?
Katabagemu	Yes	Yes	Yes
Tabagwe	Yes	Yes	Yes
Rukomo	Yes	Yes	Yes

ANNEX 12. SUMMARY OF MID-SPRAY ENVIRONMENTAL INSPECTIONS- OBSERVATION OF SPRAY OPERATORS IN THE FIELD

Operation Site	Are SOs in full PPE? (helmet, overalls, boots, gloves, mask)	Is mixing of the insecticide witnessed by any household resident?	Are SOs spraying only the recommended surfaces?	Do SOs correctly record household details?	Is any SOs observed eating/drinking/smoking while at work?	Do SOs correctly follow the spraying techniques (standing 45cm from the wall, using vertical swaths, 5cm swath overlap, frequently shaking the can and constant observation of the pressure gauge)
Mamba	Yes	Yes	Yes	Yes	No	Yes
Gikonko	Yes	Yes	Yes	Yes	No	Yes
Mukindo	Yes	Yes	Yes	Yes	No	Yes
Muganza	Yes	Yes	Yes	Yes	No	Yes
Mugombwa	Yes	Yes	Yes	Yes	No	Yes
Gishubi	Yes	Yes	Yes	Yes	No	Yes
Save	Yes	Yes	Yes	Yes	No	Yes
Kansi	Yes	Yes	Yes	Yes	No	Yes
Ndora	Yes	Yes	Yes	Yes	No	Yes
Musha	Yes	Yes	Yes	Yes	No	Yes
Nyanza	Yes	Yes	Yes	Yes	No	Yes

Operation Site	Are SOs in full PPE? (helmet, overalls, boots, gloves, mask)	Is mixing of the insecticide witnessed by any household resident?	Are SOs spraying only the recommended surfaces?	Do SOs correctly record household details?	Is any SOs observed eating/drinking/smoking while at work?	Do SOs correctly follow the spraying techniques (standing 45cm from the wall, using vertical swaths, 5cm swath overlap, frequently shaking the can and constant observation of the pressure gauge)
Kigembe	Yes	Yes	Yes	Yes	No	Yes
Kibirizi	Yes	Yes	Yes	Yes	No	Yes
Karama	Yes	Yes	Yes	Yes	No	Yes
Mukama	Yes	Yes	Yes	Yes	No	Yes
Mimuri	Yes	Yes	Yes	Yes	No	Yes
Gatunda	Yes	Yes	Yes	Yes	No	Yes
Katabagemu	Yes	Yes	Yes	Yes	No	Yes
Tabagwe	Yes	Yes	Yes	Yes	No	Yes
Rukomo	Yes	Yes	Yes	Yes	No	Yes

ANNEX 13. SUMMARY OF MID-SPRAY ENVIRONMENTAL INSPECTIONS- OBSERVATIONS OF SPRAY OPERATORS AT OPERATION SITES AFTER COMPLETING SPRAYING

Operation Site	At the end of the shift, are both full and empty sachets returned, counted and recorded in inventory?	Empty sachets and used masks are stored in separate designated and labeled containers in the store room?	Are 7 barrels placed and arranged on an impermeable ground or polythene sheet (for permeable grounds) along the wash bay?	Do barrels #2, 4, and 6 contain enough water for triple rinsing?	Do SOs correctly conduct triple rinsing whiles wearing PPE?	Are all IRS PPE and haversacks handed over to the store keeper at the end of the day's work?	Are washed pumps orderly arranged in the store?	Are SOs provided with soap to wash and bathe?	Do spray teams bathe after the day's work?	Is the insecticide usage rate and average no. of houses sprayed per SO within acceptable limits?(At least 2.5 – 3 and 10 houses/SO/day)
Mamba	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gikonko	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mukindo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Muganza	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mugombwa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gishubi	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Save	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kansi	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Operation Site	At the end of the shift, are both full and empty sachets returned, counted and recorded in inventory?	Empty sachets and used masks are stored in separate designated and labeled containers in the store room?	Are 7 barrels placed and arranged on an impermeable ground or polythene sheet (for permeable grounds) along the wash bay?	Do barrels #2, 4, and 6 contain enough water for triple rinsing?	Do SOs correctly conduct triple rinsing while wearing PPE?	Are all IRS PPE and haversacks handed over to the store keeper at the end of the day's work?	Are washed pumps orderly arranged in the store?	Are SOs provided with soap to wash and bathe?	Do spray teams bathe after the day's work?	Is the insecticide usage rate and average no. of houses sprayed per SO within acceptable limits?(At least 2.5 – 3 and 10 houses/SO/day)
Ndora	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Musha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nyanza	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kigembe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kibirizi	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Karama	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mukama	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gatunda	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mimuri	Yes	Yes	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes
Katabagemu	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tabagwe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rukomo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

ANNEX 14: SUMMARY OF POST-SPRAY ENVIRONMENTAL INSPECTIONS- INSPECTION OF STORE AFTER COLLECTION OF LOGISTICS TO THE DISTRICT STORES

Operation Site	Date Inspection Conducted	Are all the IRS items, insecticides and wastes taken back to the district store?	Does the addition of used insecticides and unused insecticides equal the beginning inventory?	Is the store cleaned before being handed over to the owners?	Is the soak pit covered and the gate closed and locked?	Are the soak pit and its surroundings left clean?	Was the working relationship between the IRS team and owners of the store good?
Mamba	10/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Gikonko	10/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Mukindo	10/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Muganza	10/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Mugombwa	11/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Gishubi	11/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Save	11/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Kansi	11/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Ndora	11/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Musha	12/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Nyanza	12/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Kigembe	12/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Kibilizi	12/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Karama	16/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Mukama	16/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Gatunda	16/3/2015	Yes	Yes	Yes	Yes	Yes	Yes

Operation Site	Date Inspection Conducted	Are all the IRS items, insecticides and wastes taken back to the district store?	Does the addition of used insecticides and unused insecticides equal the beginning inventory?	Is the store cleaned before being handed over to the owners?	Is the soak pit covered and the gate closed and locked?	Are the soak pit and its surroundings left clean?	Was the working relationship between the IRS team and owners of the store good?
Katabagemu	16/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Tabagwe	17/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Mimuli	17/3/2015	Yes	Yes	Yes	Yes	Yes	Yes
Rukomo	17/3/2015	Yes	Yes	Yes	Yes	Yes	Yes

ANNEX 15: ENVIRONMENTAL MITIGATION AND MONITORING REPORT – THE PMI AIRS PROJECT

- **The Environmental Reporting Form (EMMR)**, 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 will be the best way to document mitigation and should be 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
1a. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	ECO and logistic manager inspected vehicles during operation period	No outstanding issues	There was total compliance
1b. Driver training	We conducted training for drivers on safety issues while driving.	No outstanding issues	There was total compliance
1c. Cell phone, personal protective equipment (PPE) and spill kits on board during pesticide transportation.	All responsible people in handling pesticides were given PPE and we emphasized on use of PPE whenever on operational sites	No outstanding issues	There was total compliance
1d. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	Training and screening of SOPs was done in order to see those who were unhealthy and who pregnant.	No outstanding issues	There was total compliance
1e. Health fitness testing for all operators	All SOPs were medically tested for any illness which could render them unfit.	No outstanding issues	There was total compliance
1f. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	Training on the use of PPE while handling and distribution of pesticide was done	No outstanding issues	There was total compliance
1g. Training on mixing pesticides and the proper use and maintenance of spray pumps.	SOPs were trained on mixing pesticides before spraying	No outstanding issues	There was total compliance
1h. Provision of adequate facilities and supplies for end-of-day cleanup,	Washing soap and other supplies was provided to facilitate end of day clean up	No outstanding issues	There was total compliance
1i. Enforce clean-up procedures.	Seven progressive rinsing procedures was emphasized to SOP and washers	No outstanding issues	There was total compliance
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	This was done effectively and by IEC	No outstanding issues	There was total compliance
2b. Prohibition of spraying houses that is not properly prepared.	Households were prepared before spraying activities by IEC	No outstanding issues	There was total compliance
2c. Two-hour exclusion from house after spraying	This was emphasized by IEC and supervisors	No outstanding issues	There was total compliance

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.	All Home owners were being instructed to wash itchy skins with soap and visit health centers in case of contact with insecticide	No outstanding issues	There was total compliance
3a. Indoor spraying only.	Spraying was done Inside the households	No outstanding issues	There was total compliance
3b. Training on proper spray technique	Training of SOPs was conducted with application of spraying techniques	No outstanding issues	There was total compliance
3c. Maintenance of pumps	Pump repair and maintenance was done before spraying operation	No outstanding issues	There was total compliance
4a. Choose sites for disposal of liquid wastes according to PMI BMPs.	All contaminated liquid wastes were disposed in soak pits	No outstanding issues	There was total compliance
4b. Construct soak pits with charcoal to adsorb pesticide from rinsewater.	Construction of soak was supervised by ECO and district coordinators to see if there is no flooding.	No outstanding issues	There was total compliance
4c. Maintain soak pits as necessary during season.	Cleaning and Re-construction of new soak pits was done before and after spraying operations	No outstanding issues	There was total compliance
4d. Inspection and certification of solid waste disposal sites before spray campaign.	This was done by ECO in all district sectors	No outstanding issues	Report was given with photos of disposal sites
4e. Monitoring waste storage and management during campaign.	All wastes from district sectors were properly stored in district stores prior to final disposal	No outstanding issues	There was total compliance
4f. Monitoring disposal procedures post-campaign.	All IRS wastes were accompanied to disposal sites by ECO	No outstanding issues	There was total compliance
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	Proper records of the stock was maintained and checked	No outstanding issues	There was total compliance
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	The ledger books was being reconciled on daily basis	No outstanding issues	There was total compliance
5c. Visual examination of houses sprayed to confirm pesticide application.	Supervisors examined houses sprayed and to see if all SOPs used spraying techniques acquired from training.	No outstanding issues	There was to total compliance
5d. Perform physical inventory counts during the spray season.	All inventory check was done by coordinators store keepers and supervisors during the spraying periods in all districts sectors	No outstanding issues	There was to total compliance

ANNEX 16. SUCCESS STORY

SEASONAL WORKERS SHARE THE WEALTH

Incomes generated from IRS campaigns improve quality of life as seasonal workers pay it forward

The President's Malaria Initiative Africa Indoor Residual Spraying (PMI AIRS) Project is not only protecting people against malaria but also providing much needed income for communities. In Rwanda, the additional income seasonal workers have earned through IRS campaigns has allowed them to improve their quality of life. For example, PMI AIRS Team Leader Nikuze Esperance, a genocide widow and mother of four, used her income to build a more stable home. Previously, she and her adult children lived in a one-room structure.

The benefits of additional income from the IRS campaigns have gone even further as seasonal workers pay it forward. In two sectors of Gisagara District in Southern Province, the project's spray operators are also community health workers (CHWs) familiar with those in the community who are in need. The CHWs decided to use part of their wages to help others.

In Kansi Sector, spray operators built a house for community member Nyirandorimana Purcherie. "We had planned to make contributions when we received our wages from IRS to assist a needy person in the community. During the spray operations Purcherie's house could not be sprayed because it had so many gaping holes on the walls. We thus agreed that we would build her a house which can be sprayed next time," said spray operator Nzaramyimana Eugene.

In Kigembe Sector, spray operators contributed part of their incomes to purchase piglets for six families, one family from each of the six cells in the sector. The CHW president Kantarama Bernadette said, "Part of our work as community health workers is to encourage families to put up vegetable gardens in order to grow vegetables and therefore improve their nutrition status but especially of children under five years old."

The pigs produce manure which can be used to boost the growth of the vegetables. Elated beneficiary Mukansanga Beatha promised to take good care of the piglet and generate manure to grow vegetables. She hopes the grown pig will produce its own piglets she can sell to generate more income and further improve quality of life for her family.

Local leaders praised the spray operators for their outreach to community members and also thanked PMI for funding IRS activities in the sectors through which lives have been improved.

ANNEX 17: MONITORING AND EVALUATION PLAN MATRIX – FEBRUARY 2015 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
Component 1: Establish cost-effective supply chain mechanisms and execute logistical plans								
I.1 Procurement								
I.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100%	Round 1; 100%		TBD; 100%	
I.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100%	Round 1; 100%		TBD; 100%	
I.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 1; 100%	TBD; 100%		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
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: 1; 100% Round 2: NA	Round 1: 1; 100%	TBD; 100%		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	Completed		Completed	
1.2 In-Country Exemption and Custom Clearance Process								
1.2.1 Complete exemption and clearance process within the minimum 2 weeks	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: Completed Round 2: Completed	Round 1: Completed	Completed		Completed	
1.3 In-Country Logistics, Warehousing, and Training								
1.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<i>Data source:</i> Training records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign By Gender	Round 1: 26: 15 males 11 females Round 2: 39 Male: 22 Female: 17	Round 1: 25: 14 males 11 females	TBD; 100%		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%	TBD; 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	TBD; 100%		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
Component 2: Implement safe and high-quality IRS programs and provide operational management support								
2.1 Planning and Design of IRS Programs								
2.1.1 Annual 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	
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%	T.B.D.	5%		5%	
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations								
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the PMI 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	
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation ⁹	<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:	Round 1: 3,218: Males: 2,268 Females: 950	TBD		TBD	

⁹Those 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.

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	
			5593 Male: 3941 Female:165 2						
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	TBD		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	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 Soak Pit By Storehouse By Soak Pit By Storehouse	Round 1: 40 Round 1: 20 Round 1: 20 Round 2: 72 Round 2: 36 Round 2: 36	Round 1: 40 Round 1: 20 Round 1: 20	TBD; 100%		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
2.3 Conduct Communications Activities and Community Mobilization								
2.3.1 Number of radio spots and talk shows aired	<i>Data source:</i> Project records <i>Reporting frequency:</i> Per spray campaign	By Spray Campaign	Round 1: 60 Round 2: 90	Round 1: 60	TBD		TBD	
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 Brochures	TBD		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	TBD		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
2.4 Spray Targeted Structures According to Technical Specifications								
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	TBD		TBD	
2.4.2 Number of structures sprayed with IRS	<i>Data source:</i> Daily Spray Operator Forms <i>Reporting frequency:</i> Daily per spray campaign	By Spray Campaign	Round 1: 107,707 Round 2: 181,280	Round 1: 127,150	TBD		TBD	
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%	85%		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	TBD		TBD	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
Component 3: Ongoing Monitoring and Evaluation and Quality Control Measures								
3.1 Submit AIRS Rwanda M&E Plan to PMI for approval	<i>Data source:</i> Project records <i>Reporting frequency:</i> Semi-annual	By Spray Campaign	Completed	Completed	Completed		Completed	
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	<i>Data source:</i> Spray operations reports <i>Reporting frequency:</i> Per spray campaign	By Spray Campaign	Round 1: NA Round 2: NA	Round 1: NA	Completed		Completed	
Component 4: Contribute to Global and Country-Level IRS Policy Setting and Develop and Disseminate Experiences and Best Practices								
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	<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 ¹⁰	Round 1: NA	TBD		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	TBD		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	TBD		TBD	

¹⁰ We shall add the gender guidelines in our training manuals

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
4.4 Number of enterprises engaged through public-private partnerships	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign	Round 1: 4 Round 2: 5	Round 1: 4	TBD		TBD	

Component 5: Contribute to the collection and analysis of Routine entomological and epidemiological data

5.1 Support entomological monitoring activities and insecticide resistance strategies

5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location)	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	Round 1: 12 Round 2: 12	Round 1: 12	TBD		TBD	
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	Round 1: 12; 100% Round 2: 12; 100%	Round 1: 12; 100%	TBD		TBD	
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	Round 1: 12; 100% Round 2: 12; 100%	Round 1: 12; 100%	TBD		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
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	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	TBD		TBD	
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	Round 1: 1 (24 houses) Round 2: 1 (24 houses)	Round 1: 1 (24 houses)	TBD		TBD	
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	Round 1: 2 (24 houses) Round 2: 2 (24 houses)	Round 1: 2 (24 houses)	TBD		TBD	
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign By Type of Insecticide	Round 1: 4 replicates per 6 insecticides Round 2: 4 replicates per 6 insecticides	Round 1: Not yet done	TBD		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
5.2 Support Epidemiological Malaria Data Collection and Analysis								
5.2.1 Collect routine epidemiological data	Data source: <i>Project Reports</i> Reporting Frequency: Annually	By Spray Campaign	Round 1: N/A Round 2: N/A	Round 1: N/A	TBD		TBD	
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI AIRS Project	Data source: Epidemiological reports Reporting frequency: Annually	By Spray Campaign	Round 1: N/A Round 1: N/A	Round 1: N/A	TBD		TBD	
Component 6 (Cross-cutting): Capacity Building, Knowledge Transfer, Gender Inclusion								
6.1 Increasing the Role of Women and Addressing Gender Barriers								
6.1.1 Number of people trained to deliver IRS in target districts *	Data source: Project records – Training reports Reporting frequency: Semi-annually	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 ¹¹ Males: 509 Females: 643; 55.8%	TBD		TBD	

¹¹ This includes only: SOP's, TL's, Sector coordinators and supervisors and clinicians

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.1.2 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; 100% Males: 2,394 Females: 880; 26.9% Round 2: 5,622;100% Male:3,957 Female: 1,665;29.6%	Round 1: 3,237 Male: 2278 Female: 959; 29.6%	TBD		TBD	
6.1.3 Number of women recruited (i.e. number of women on the selection list) for IRS employment	Data source: Project records – Recruitment reports reports Reporting frequency: Semi-annually	By Country By Percentage of women recruited	Round 1: 903; 29.2% Round 2: 1,625; 28.9%	Round 1: 903; 29.2%	TBD		TBD	
6.1.4 Number of people trained as IRS Training of Trainers	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender Percentage of women trained	Round 1: 172;100% Males: 78 Females: 94 54.7% Round 2: 289; 100% Male: 132 Female: 157;54.3%	Round 1:160; 100% Males: 73 Females: 87 54.4%	TBD		TBD	
6.1.5 Total number of people hired to support IRS in target districts	Data source: Project records – Contracts signed Reporting frequency: Semi-annually	By Spray Campaign Gender	Round 1: 2,987 Males: 2,121 Females: 866; 28.9%	Round 1: 3,096 Male: 2,193 Female: 903;	TBD		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
		Percentage of women hired	Round 2: 5,573; Male: 3,948 Female: 1,625; 29%	29.2%				
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 ¹²)	Data source: Project records – Contracts signed Reporting frequency: <i>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%	TBD		TBD	
6.1.7 Number of staff (permanent and seasonal) who have completed gender awareness training	Data source: Project records – Training reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign Gender Percentage of women hired	Round 1: NA Round 2: 5543; 100%	Round 1: NA	TBD		TBD	

¹² Those are: District and Sector IEC Assistants, District Logistics and store keepers, TL's, Sector Coordinators and supervisors,, Cell IEC's and M&E Assistants.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.2 Capacity Building								
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – Training reports Reporting frequency: Semi-annually	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%	TBD		TBD	
6.2.2 Implement all activities outlined in their yearly Capacity Building Action Plan	Data source: Project records – Capacity assessment reports Reporting frequency: Semi-annually	By Spray Campaign	Round 1: Completed Round 2: Completed	Round 1: Completed	Completed		Completed	
6.2.3 Rwanda government implements at least one aspect of the IRS program independently.	Data source: Project records – MOUs Reporting frequency: Semi-annually	By Spray Campaign	Round 1: Completed Round 2: Completed	Round 1: Completed	TBD		TBD	