



PRESIDENT'S MALARIA INITIATIVE



PMI | Africa IRS (AIRS) Project

Indoor Residual Spraying (IRS 2) Task Order Six

RWANDA

END OF SPRAY REPORT

SPRAY CAMPAIGN: SEPTEMBER 14 – OCTOBER 10, 2015

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Abt Associates Inc. | 4550 Montgomery Avenue | Suite 800 North
Bethesda, Maryland 20814 | T. 301.347.5000 | F. 301.913.9061
www.abtassociates.com

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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 with the 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 September – October 2015 with the target set at 213,329 structures in 34 of 54 sectors in four districts, Gisagara (4 sectors), Nyagatare (4 sectors), Bugesera (14 sectors) and Kirehe (12 sectors) using Bendiocarb (a carbamate).

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

- A total of 215,981 structures were sprayed out of 220,114 structures found by spray operators in the targeted districts, accounting for a coverage rate of 98.1%. In total, 889,326 residents were protected, including 132,568 (14.9 %) children under five years old and 14,375 (1.6%) pregnant women.
- A total of 211,431 structures were mobilized.
- A total of 5,761 individuals were trained using PMI funds to support IRS activities in the four districts. Of these, 1,398 were spray operators (SOPs) (543 males and 855 females), 331 were team leaders (178 males and 153 females), and 2,981 were village IEC mobilizers (2,761 males and 220 females). Over 61.2% of all SOPs trained to implement IRS were female. Overall, 28.2% (n=1,622) of all IRS trained personnel for the September – October 2015 campaign were female.
- A total of 180,588 sachets of insecticide were used to spray 215,981 structures in the four IRS districts, with a utilization ratio of approximately 1:1.2 (sachet to structures sprayed).
- A total of 222 dormitories in 43 schools, one prison and one police station were sprayed in the target districts protecting 11,688 residents. A total of 382 sachets of insecticide were used for these structures.
- All (3,308.2 kg) IRS insecticide contaminated wastes, including 180,970 empty sachets and 55,530 used masks, were incinerated at four different incineration plants: Nyagatare Hospital incineration plant for wastes from Nyagatare; Kibilizi Hospital incineration plant for wastes from Gisagara; Nyamata Hospital incineration plant for wasted from Bugesera; and Kirehe Hospital incineration plant for Kirehe. Other wastes, including 1,295 used gloves, and assorted plastics items (40 damaged barrels and 20 jerry cans) were disposed of at the Enterprise pour la Protection de l'Environnement et Developement Rural (EPEDR) Recycling plant. A total 2,355 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 September 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 mortalities of 100% was recorded in all the four districts.

TABLE 1: AIRS RWANDA IRS CAMPAIGN SUMMARY: SEPTEMBER 2015

Number of districts covered by PMI-supported IRS	4 districts (Gisagara, Nyagatare, Bugesera and Kirehe)
Insecticide	Carbamates
Number of structures covered by PMI-supported IRS	215,981
Number of structures targeted by PMI-supported IRS	220,114
Spray coverage	98.1%
Population protected by PMI-supported IRS	889,326 (14,375 pregnant women, 132,568 children less than 5 years old)
Dates of PMI-supported IRS campaign	September 14 - October 10, 2015
Length of campaign	24 days
Number of people trained with USG funds to deliver IRS ¹	2,005

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 target 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 (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

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

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 high-burden malaria districts. In February 2015, a total of 20 out of 27 sectors in two IRS districts (Gisagara and Nyagatare) were sprayed covering a total of 127,150 using Bendiocarb.

The September - October 2015 spray campaign was the 14th round to be implemented since IRS started in Rwanda. In this spray campaign a total of 34 out of 54 sectors in the four districts (Bugesera, Gisagara, Kirehe and Nyagatare) were selected by PMI and the MOPDD to be sprayed with a total of 213,329 structures targeted for spray. Since 2011 when Abt Associates Inc. was contracted to implement IRS in Rwanda, there were three PMI IRS districts (Bugesera, Gisagara and Nyagatare). Due to high malaria prevalence in Kirehe District from this year's epi data, PMI and the Rwanda Ministry of Health (MOH), through MOPDD reached a consensus to include Kirehe District to be sprayed during the September 2015 IRS campaign.

The project also provided technical support in the following activities:

- Training, capacity building, and advocacy at the national and district level as a means of achieving IRS sustainability. 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.
- Technical assistance during spray rounds conducted by MOH/MOPDD.

2. PRE-SEASON ACTIVITIES

2.1 SELECTION OF IRS DISTRICTS AND SECTORS

Four districts, Bugesera, Gisagara, Kirehe and Nyagatare were selected for IRS during the September 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 213,329 structures were targeted for spraying in 34 sectors.

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

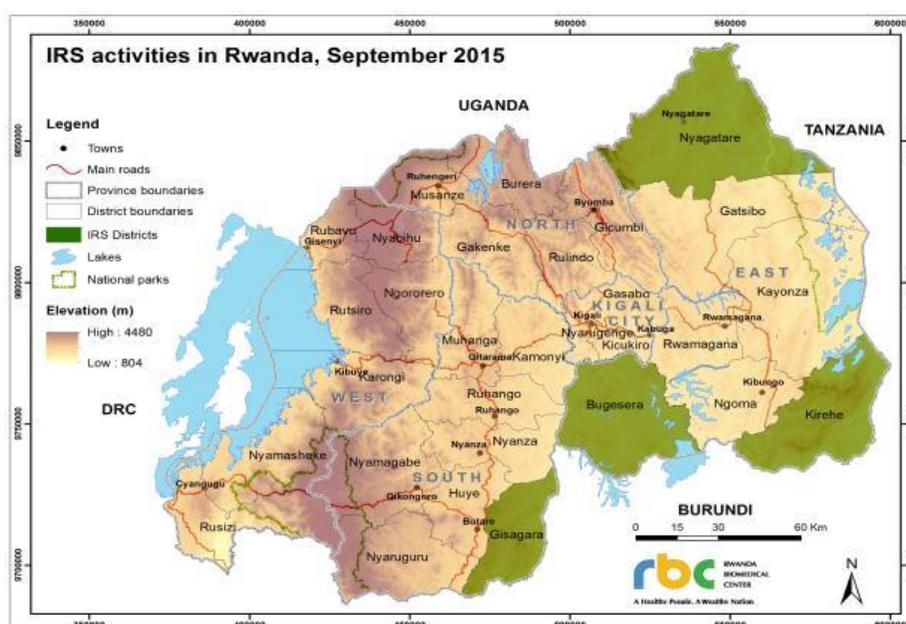


Table 2 shows a summary of the number of target structures and the target population in the 34 sectors.

TABLE 2: TARGET STRUCTURES FOR IRS ROUND 14

District	Number of Sectors	Number of Target Structures	Target Population		Total
			Females	Males	
Bugesera	14 of 15	74,639	152,629	143,330	295,959
Gisagara	4 of 13	24,638	52,772	47,308	100,080
Kirehe	12 of 12	80,192	176,219	163,506	339,725
Nyagatare	4 of 14	33,860	74,467	70,256	144,723
Total	34 of 54	213,329	456,087	424,400	880,487

2.2 DISTRICT PLANNING MEETINGS

Following the choice of the target sectors in the four IRS districts, collaboration and coordination between stakeholders was intensified. Micro-planning meetings with district and sector authorities in the four districts and 34 sectors were conducted in July and August 2015. This was done in collaboration with MOPDD who facilitated invitations of counterparts from the local government, district hospitals 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. The MOPDD/MOH has to endorse the required support expected from the local government counterparts and in each district, 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.

In total, 157 participants (108 males and 49 females) attended micro-planning meetings in Bugesera, Gisagara, Kirehe and Nyagatare districts.

2.3 INSECTICIDE SELECTION

A carbamate, Bendiocarb (Ficam 80 WP), was used during the September - October IRS campaign in the four districts. The selection was based on data obtained from insecticide susceptibility assays that were carried out in 2014-2015. The susceptibility assays showed that the predominant local vector species (i.e. *Anopheles gambiae*) exhibited varying levels of susceptibility to the different classes of insecticides. Within the carbamate class, the local vector species in the IRS target districts sites showed between 94% and 100% mortalities.

In addition, the Rwanda insecticide resistance management (IRM)⁵ 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 followed by a phased transition to organophosphate (pirimiphos methyl, Actellic CS) for two years. Rotation would be the main strategy implemented in the mid-term of four years with a hope that IRS would 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 IRS districts was fully implemented starting February 2014 and continued in the following IRS campaigns including the just concluded September 2015 IRS campaign. (See Annex 1, MoH Letter on Insecticide Choice for 2013/2014, dated March 22, 2013 and Annex 2, Insecticide Resistance Tests Results).

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

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. Besides reference to the inventory records from the previous IRS campaign, a logistics needs assessment was conducted in April-May 2015, reviewing the following:

- 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 3).

2.4.1 INTERNATIONAL PROCUREMENT

Internationally procured commodities included 172,435 sachets of carbamate insecticide (Ficam VC 80 WP) from Bayer South Africa and other IRS commodities. 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 in Stock after the Campaign
Sprayer pumps	1,523	190	1713	1,713	1,713
Insecticide	14,288	172,435	186,723	180,970	5,753
Dust Mask	31,968	31,920	63,888	55,530	8,358
Hard Hat (Shell)	2,102	736	2,838	624	2,214
Face shield	2,102	736	2,838	624	2,214
Face shield bracket	2,102	736	2,838	624	2,214
Apron	80	130	210	21	189
First Aid Kits	134	56	190	120	70
Gloves	2,982	1,008	3,990	1,295	2,695
Coverall	3,439	1,137	4576	4,576	4,576
Boot (Rubber)	1,444	714	2,158	107	2,051
Valve body cap	80	100	180	48	132
Control flow valve (CFV)	0	1,685	0	0	1,685
Extension lance	184	300	484	205	279
Gasket Nozzle	390	1,500	1,890	531	1,359
Lance	0	100	100	100	0
Stop cock	31	100	131	63	68
Nozzle regulator	0	100	100	100	0
Hose assembly	278	25	303	120	183
Repair kit	29	20	49	13	36
Pressure gauge	54	100	154	140	14

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used	Quantity in Stock after the Campaign
Gaskets, simplex cover	0	100	100	100	0
Wash valve pin	0	100	100	100	0
Body shutoff	125	100	225	76	149

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 3 for the detailed list.

2.4.3 MATERIAL DISTRIBUTION TO THE DISTRICTS AND OPERATION SITES

IRS materials such as coveralls, boots, helmets, gloves, masks and pumps were retained in the district storage facilities, except in Kirehe which was not sprayed in February 2015. Materials that were distributed to Kirehe District were pooled from the other three districts. Other items such as respiratory masks and gloves were distributed from the central warehouse to all district stores in August 2015 and insecticide was distributed in the first week of September 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
Bugesera	1,598	706	888	26,239	66,029	598
Gisagara	541	245	387	7,949	21,840	185
Kirehe	1537	746	682	20,000	67,200	642
Nyagatare	866	381	487	8,600	31,654	261
Total	4,542	2078	2,444	62,788	186,723	1,686

2.5 HUMAN RESOURCE REQUIREMENTS

The project recruited and deployed a total of 264 support staff that provided support during the IRS operations across the four districts. Seasonal staff were comprised of: 4 district IEC assistants, 22 data clerks, 4 district storekeepers, 35 sector store keepers, 5 logistics assistants, 4 pump technicians, 5 finance assistants, 35 sector coordinators, 111 sector supervisors, 35 sector IEC assistants, and 4 office cleaners.

Implementation of IRS operations in the sectors was conducted by spray operators (1,321), team leaders (331), washers (118), cell IEC mobilizers (177), and village IEC mobilizers (2,981). A total of 96 nurses (side effect managers) and security guards (89) 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 27.3% (n=1,468) females of the 5,377 people hired as seasonal staff. It is noteworthy that more than half of hired spray operators (60%) were female; of the 331 team leaders, 46.2% were women. Table 5 enumerates the IRS seasonal support staff by gender and district. In February 2015, 29.2% (n=903) of all seasonal staff were females and (54.9 %) 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	Total		% Females Hired
	Male	Female	
District IEC Assistants	2	2	50.0%
Data Clerks	15	7	31.8%
District Storekeepers	2	2	50.0%
Sector Storekeepers	12	23	65.7%
Logistics Assistants	2	3	60.0%
Finance Assistants	0	5	100.0%
Sector Coordinators	20	15	42.9%
Sector Supervisors	55	56	50.5%
Sectors IEC Assistants	23	12	34.3%
Spray Operators	529	792	60.0%
Team Leaders	178	153	46.2%
Cell IEC Mobilizers	118	59	33.3%
Village IEC Mobilizers	2761	220	7.4%
Security Guards	86	3	3.4%
Adverse effect Managers/ Clinicians	68	28	29.2%
Washers	32	86	72.9%
Pump Technicians	4	0	0.0%

Staff Position	Total		% Females Hired
	Male	Female	
Cleaners	2	2	50.0%
Total	3,909	1,468	27.3%

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;
- Supervision of IRS activities; and
- m-Health.

2.6.1 TRAINING OF TRAINERS

A refresher training of trainers (ToT) was organized and conducted in collaboration with MOPDD on August 24-26, 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 most participants had gone through the ToT during the February 2015 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, including group discussions, demonstrations, lectures and question and answer methods. The participants included 35 IRS sector coordinators and 148 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	20	15	35
Sector Supervisors	74	74	148
Total	94	89	183

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 September 7 - 11, 2015. In the four 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. All females with potential exposure to insecticide, including SOPs, TLs, storekeepers, sector supervisors, and sector coordinators, were also screened for pregnancy.

Nine women were found pregnant during training. Because the AIRS Rwanda team had not given contracts these women were not given jobs on the project. Recruitment for positions without exposure to insecticide, such as mobilizers, had already taken place so the project could not encourage these women to apply to these positions. The project will seek to engage these women in the upcoming campaigns.

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 5) 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 1,729 SOPs and TLs were trained; details are provided in Table 7. A total of 146 facilitators (ToT participants) conducted the training. See Annex 4 for a detailed SOP program.

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	4	21	33	61.1%	66	79	54.5%	11	5	31.3%
Nyagatare	4	32	60	65.2%	62	119	65.7%	13	9	40.9%
Bugesera	14	45	96	68.1%	196	275	58.4%	21	34	61.8%
Kirehe	12	346	299	46.4%	0	0	0	30	23	43.4%
Total	34	444	488	52.4%	324	473	59.3%	75	71	48.6%
		932 (53.9%)			797 (46.1%)			146		

2.6.3 DATA COLLECTION TRAINING

Between August and September 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;
- Mobile data collection.

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 45 logistics assistants and storekeepers (17 males and 28 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 118 washers were given a one-day refresher training/orientation at the 35 operational sites in the four 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	7	10	58.8%
Gisagara	3	11	78.6%
Bugesera	6	36	85.7%
Kirehe	16	29	64.4%
Total	32	86	72.9%

2.6.6 FIRE AND TRANSPORTATION SECURITY TRAINING

Eighty-nine security guards were given an orientation on fire security and a general security protocol for IRS stores. One hundred and six 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.

2.6.7 M-HEALTH TRAINING

AIRS Rwanda, in collaboration with Dimagi, conducted and facilitated two types of trainings: One for 10 AIRS staff (9 males and 1 female) and another one for 35 Sector Coordinators (20 males and 15 females). The main objectives of those trainings were to highlight the m-Health functionalities such as, daily reporting for performance monitoring tracking (PMT) and mobile application supervisory checklists.

3. INFORMATION, EDUCATION AND COMMUNICATION

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 August 27, 2015 by AIRS Rwanda in collaboration with MOPDD. 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.

During the ToT, MOPDD facilitated the following sessions: introduction to malaria; malaria prevention and control interventions; malaria burden in Rwanda and mosquito characteristics. The trainees included the District IEC Assistants, Sector IEC Assistants, Sector Supervisors and Sector Coordinators. They 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 124 candidates (67 males and 57 females) participated in this training; 4 District IEC Assistants, 35 Sector IEC Assistants, 35 Sector Coordinators, and 50 Sector Supervisors.

3.1.2 TRAINING OF IEC COMMUNITY MOBILIZERS

The training of IEC mobilizers was conducted on 3rd September 2015 in Bugesera, Gisagara and Nyagatare districts and on 2nd and 3rd September 2015 in Kirehe District in designated training sites in the sectors. Since Kirehe District was a new IRS district, mobilizer trainings took two days in order to strengthen the capacity of cell and village mobilizers to conduct effective community mobilization. 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 3,158 mobilizers (279 females and 2,879 males) were trained at the cell and village level. 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	12	5	285	23	325	8.6 %
Bugesera	45	19	1,019	80	1,163	8.5 %
Kirehe	38	24	1,127	97	1,286	9.4 %
Nyagatare	23	11	330	20	384	8.1 %
TOTAL	118	59	2,761	220	3,158	8.8 %

3.2 DOOR-TO-DOOR MOBILIZATION

Door-to-door mobilization of structures was conducted for two days in each village during the period of September 11 - October 10, 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. 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 211,431 structures were mobilized with a 98.8% IRS acceptance rate recorded. 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
		Male	Female		
Gisagara	24,102	22,582	28,207	24,168	100.2%
Nyagatare	23,702	23,030	26,433	23,351	98.5%
Bugesera	77,821	75,706	202,947	76,831	98.7 %
Kirehe	85,806	78,540	96,857	84,688	98.7 %
TOTAL	211,540	199,858	354,444	209,038	98.8 %

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 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 were 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 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 September 26, 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 community members were unlikely to open their structures for spraying, leaders made arrangements with the community to conduct IRS as their Umuganda day activity.

3.4.3 MASS MEDIA COMMUNICATION

Radio spots were aired twice daily from September 11 - 24, 2015 in Bugesera, Gisagara, Kirehe 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. In addition, Kirehe district conducted a radio talk show about IRS campaign in the district. The radio talk show highlighted the progress of spray operations in Kirehe district, feedback from the community on IRS acceptance and challenges throughout the campaign. During the talk show community members called in to express their appreciation and ask questions about IRS.

Mass media communication was further enriched using 39 banners which were placed at IRS district offices (4) and at sector administrative offices (35). The message printed on the banners was “*Birakureba*” (Kinyarwanda for “This concerns you”). Table 11 presents details the mass media communication activities done during the IRS operations.

TABLE 11: MASS MEDIA COMMUNICATION ACTIVITIES

Dates	Type of IEC Activity/Material	Frequency/Number Produced
September 11 - 24, 2015	Radio spots aired 2 times per day for each radio station	28 times on Radio Huye station, Gisagara; 28 times on Radio Nyagatare station, Nyagatare; and, 28 times on Rwanda Broadcasting Agency (RBA) in Kirehe and Bugesera districts.
September 2 - October 10, 2015	IRS Banner	1 banner at each IRS district office and 1 at each sector administrative office
September 26	Umuganda	One meeting in every sector

4. IMPLEMENTATION OF IRS ACTIVITIES

The September 2015 IRS campaign was the 14th round of IRS implementation since the start of IRS campaigns in 2007. It was conducted over a 24-day period from September 14 - October 10 in Bugesera, Gisagara, Kirehe, and Nyagatare districts.

4.1 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 five AIRS staff in addition to the district coordinators were 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. In addition, during supervision in the field, all supervisors in all target districts and sectors used m-Health e-checklists on mobile phones which were comprised of all environmental checklists. This promoted real time tracking and addressing issues observed during spray operations.

- 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, updated the district Performance Tracking Sheet and submitted a report to the central level (Abt management and MOPDD IRS focal point) daily. This daily report comprised the district performance data for that day, the data for all past days, and the 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.

Some of the issues of concern that were observed during supervision included;

- Spraying wrong surfaces (e.g. bed, glass windows, curtains); sixteen cases were reported (out of 636 total inspections) of the SOP observed to be spraying the wrong surfaces. The affected SOPs were immediately provided retraining on the right surfaces to spray. Training in this area will be enhanced in future campaigns
- Non-compliance on spray speed and 5 cm swath overlap guidelines; Out of the 636 supervisions which were conducted using the homeowner preparation and spray operator performance checklist there were 3 cases of SOPs not in compliance with the spray speed and 5 cm swath overlap guidelines.
- Spray operators not marking and recording unsprayed structures. This was noted within the first three days of the spray campaign. It was resolved by enhancing supervision and information regularly passed to the spray operators.

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/CDC/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 Rwanda supervisors convened at the Kigali office every Friday during the IRS operations period for a feedback meeting to review the progress of IRS activities. Staff from MOPDD occasionally joined AIRS Rwanda staff during progress review meetings. During these interactions, MOPDD representatives and the AIRS Rwanda team discussed the issues at hand and provided guidance to the district coordinators and the teams in the field. In September 2015, the Home Office-based AIRS Rwanda Technical Program Manager also came to Rwanda to provide support and oversight during spray operations.

4.2 M-HEALTH

During September 2015 spray campaign, AIRS Rwanda introduced the m-Health system in order to gain faster access to daily data of spray operations and improve supervisory efforts by different levels of IRS supervisors.

AIRS Rwanda worked with Dimagi LLC to build a three-part mobile system to support management of spray campaigns in Rwanda. Dimagi (www.dimagi.com) is a software company that develops the open source mobile health (m-Health) platform CommCare (www.commcarehq.org). During past IRS campaigns all data in the field was reported using paper forms and supervisors used paper checklists to conduct supervision. Reporting and follow-up of issues encountered in the field took up to three days. The introduction of m-Health for reporting and supervision solved this in that issues were reported on the same day and follow-up was done immediately. It was also easy to track progress of the rectify issues. The CommCare application configuration on phones was performed by the AIRS Rwanda IT Specialist with support from a consultant from Dimagi.

Prior to the commencement of September 2015 spray operations, a total of forty-four (43) mobile phones were deployed in all target districts as follows (14 phones in Kirehe, 16 phones in Bugesera, 7 phones in Nyagatare and 6 phones in Gisagara). A gateway phone which was based at the central level was used to receive data from all sectors and synchronize all data to the Dimagi server.

The mobiles phones were used for three major functions;

Reporting: During spray operations, all sector coordinators sent daily reports on four operational indicators to the gateway phone. The gateway phone would then send the data to the Dimagi server for processing and storage. The indicators included the total number of spray operators who worked, the total number of structures found, the total number of structures sprayed, and, the total number of insecticide sachets used.

Supervision: Sector coordinators and supervisors used checklists in the mobile phones on a daily basis to supervise spray operations including environmental compliance. At the end of each day, completed supervisory forms were submitted to the CommCare system. The CommCare system was used to send the submitted reports to both the country-level staff and AIRS home office staff. The reports were used to address gaps which were noted during supervision or “red flag” areas for immediate action as required.

Job aids messaging: All seasonal workers received different job aid messages on spray operations and gender issues daily. These messages were meant to regularly remind the seasonal staff important IRS messages which would in turn lead to increased awareness of SOPs and better quality of spraying. (See Annex 5 for Job aid messages that were sent to seasonal staff)

The mobile phone application for reporting and supervision of IRS operations added value to the operations. A number of areas should however be improved to make it better as an effective operational tool during spray operations. Below are areas of improvement for m-Health system for AIRS Rwanda:

- I. **Spray date:** Due to connectivity and other unpredictable issues in the field, sector coordinators sometimes failed to submit their reports on daily basis. This was most common during the first week when up to an average 10% of all reports were not sent. This however improved with time to an average 3.9% in the last week of IRS. The implication of this was that when they submitted their reports on a later date, the SMS indicator report would not record which spray date the specific data was for.

2. **Mobile supervisory application:** During the spray operations, AIRS Rwanda was only receiving reports on daily supervisory reports with red flags but was not able to track supervisory reports without red flags. It was also not possible to track if all supervisors were filling the checklists since there was no report on the checklists filled when there was no red flag reported.
3. **Job aid messages and general troubleshooting:** Job aid messages were sent as planned to all seasonal workers through the spray operations. It would be more beneficial if this tool were used to send more communication to seasonal workers depending on spray operational issues that arise. AIRS Rwanda suggests that administrative credentials and further training be given to AIRS Rwanda focal point to be able to change and send messages depending on the times and/or troubleshoot any other issue observed in the field instead of completely relying on external support.

4.3 LOGISTICS

4.3.1 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. Each of 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 35 storage facilities at the operation sites in the four districts, 29 of which were provided at the sector offices at no cost, as the district/sector contribution to the IRS campaign. The other 6 facilities (5 in Bugesera district and 1 in Nyagatare District) were rented at locations near the sector offices. This mainly affected Bugesera district where in the past we would rent up to ten stores out of the fifteen sectors. With constructions ongoing in the districts, we will continue to negotiate with the sector authorities for provision of storage facilities for free. 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, team or sector had received and used. Stock records were documented on stock cards and commodity ledger books.

4.3.2 IRS VEHICLES

A total of 108 vehicles were contracted for the support of the IRS operations in the four districts. The vehicles were managed in such a way that the 102 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 64. 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\$12,000. 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
Bugesera	36	2	38	20	2	38
Gisagara	12	1	13	7	1	13
Kirehe	38	2	40	27	2	40
Nyagatare	16	1	17	10	1	17
Total	102	6	108	64	6	108

4.4 IRS PAYMENTS

Before the start of the spray operations, a one-day refresher training was conducted bringing together the five 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 AIRS 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 September 2015 spray round, experiences and achievements of the IRS round;
- Review IRS challenges in the four 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 campaigns.

The review meetings were convened by district authorities in collaboration with the AIRS Rwanda 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
- AIRS Rwanda 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	October 14, 2015	16	5	21
Bugesera	October 19, 2015	31	28	59
Kirehe	October 21, 2015	34	17	51
Nyagatare	October 15, 2015	12	8	20
Total		93	58	151

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.
- They agreed on a plan for 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. For instance, spray operations and village mobilizers in some sectors in Bugesera District missed a spray day in order to attend a community meeting which was scheduled to take place on a spray day. They however made up for the skipped spray day on a Sunday.

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.. See Annex 6 for IRS commodities stock.

6. MONITORING AND EVALUATION

Monitoring and evaluation for the September 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 September 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 ~16,030 structures (~7.2%) 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 15 shows the number of M&E forms completed during September 2015 spray operations, errors found and measures taken.

Table 15: 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	33,694	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	3,594	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	1,603	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 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 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.

6.3.2 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, 215,981 structures of the 220,114 structures found were sprayed, resulting in 98.1 % spray coverage. A total of 889,326 people were protected, including 14,375 pregnant women and 132,568 children under five years old (see Table 16).

TABLE 16: SUMMARY OF RWANDA IRS RESULTS FOR SEPTEMBER 2015 CAMPAIGN

District	Total Structures Found	Total Structures Sprayed	Spray Coverage (%)	Total Population Protected			
				Male	Female	Pregnant Women	Children <5 Years
Bugesera	75,334	73,947	98.2%	143,439	154,454	5,057	47,067
Gisagara	25,082	24,883	99.2%	48,007	53,472	1,538	13,805
Kirehe	82,946	81,764	98.6%	163,506	176,219	5,064	48,158
Nyagatare	36,752	35,387	96.3%	72,962	77,267	2,716	23,538
Total	220,114	215,981	98.1%	427,914	461,412	14,375	132,568

The spray operations progressed at a higher pace than the planned pace. The major reason was that during the planning it was assumed that by week two there would be rains which would slow the spray progress. This however did not happen; the rains came in week three.

6.4.1 SCHOOLS AND PRISONS IN IRS TARGET DISTRICTS⁶

During the September 2015 spray campaign, a total of 222 dormitories were sprayed in 43 schools, one prison and one police station in the four IRS target districts, protecting 11,688 people. Three hundred and eighty two (382) insecticide sachets were used (see Table 17).

⁶ 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.

TABLE 17: IRS RESULTS FOR SCHOOLS AND PRISONS 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				
Bugesera	20	115	18	1	115	4579	1719	0	0	243	242	1,020	202
Gisagara	4	12	4	0	12	291	223	0	0	12	12	137	16
Kirehe	7	55	9	0	55	1630	1236	0	4	86	82	709	94
Nyagatare	20	40	13	0	40	904	1106	0	1	189	132	1,603	70
Total	51	222	44	1	222	7,404	4,284	0	5	530	468	3,469	382

6.4.2 INSECTICIDE USAGE

The total number of sachets used during the September 2015 campaign was 180, 970 (180,588 plus 382 sachets for other structures and schools in the four target districts). On average, one sachet sprayed 1.2 structures (see Table 18). The average number of sachets used by a spray operator per day was 6.6, and each operator, on average, sprayed 7.9 structures per day in the three target districts.

TABLE 18: 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
Bugesera	73,947	63,793	1.2	6.5	7.6
Gisagara	24,883	21,489	1.2	7.1	8.2
Kirehe	81,764	65,554	1.2	6.5	8.1
Nyagatare	35,387	29,752	1.2	6.7	7.9
Total	215,981	180,588	1.2	6.7	7.9

7. ENVIRONMENTAL COMPLIANCE

7.1 ENVIRONMENTAL COMPLIANCE DOCUMENTATION

The 2011 SEA that was amended in 2013 is valid throughout 2016. A letter report which was submitted in July 2015 highlighted the environmental compliance plan for the September 2015 IRS campaign, choice of pesticides for IRS, and reported on the preparations and readiness for the IRS campaign.

7.2 PRE-SEASON ENVIRONMENTAL ASSESSMENT

During the period of Sept 7-11 2015, the AIRS Rwanda team conducted pre-spray environmental assessments in the four IRS districts at the operation sites at the sector level. Data was entered on 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 Officer 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, six storage facilities were rented while 29 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 was 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 19 shows the details of the refurbishments that were done at the operation sites.

TABLE 19: CONSTRUCTION AND REFURBISHMENTS AT IRS OPERATION SITES

District/Province	Number of Operation Sites	Site Refurbished (soak pit, storeroom, fence, etc.)
Nyagatare/ Eastern province	5	5 soak pits refurbished 0 new soak pit constructed 4 offices and storage facility provided by sector and cell authorities 1 office and storage facilities were rented
Gisagara/ Southern Province	4	3 soak pits refurbished 1 new soak pit constructed 4 offices and storage facilities provided at the sector and cell offices 0 rented offices and storage facilities
Bugesera Eastern province	14	12 soak pits refurbished 2 new soak pit constructed 9 offices and storage facility provided by sector and cell authorities. 5 rented offices and storage facilities

District/Province	Number of Operation Sites	Site Refurbished (soak pit, storeroom, fence, etc.)
Kirehe/ Eastern province	12	0 soak pits refurbished 13 new soak pit constructed 12 offices and storage facility provided by sector and cell authorities 0 offices and storage facilities were rented

7.3 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 August 2015, forty three SOPs and washers were found unfit for IRS operations and were replaced immediately before IRS training and operations. Table 20 shows the number of SOPs, washers and supervisors that underwent medical checkup in each IRS district.

TABLE 20: MEDICAL CHECKUP FOR IRS STAFF

District	SOPs, Washers and storekeepers examined		SOPs, Washers a storekeepers found unfit	
	Male	Female	Male	Female
Nyagatare	115	180	0	2
Gisagara	110	89	3	6
Kirehe	297	355	0	1
Bugesera	268	379	15	16
Total	790	1,003	18	25

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 trucks. The trucks were certified according on the PMI/AIRS BMP⁷ criteria for vehicles which transport pesticide Distribution from the district warehouse to the operations sites was done using trucks covered with tarpaulins. Each vehicle was equipped with a kit 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

⁷<http://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/best-practices-indoor-residual-spraying-feb-2015.pdf?sfvrsn=4>

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 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 four IRS districts to ensure that mitigation measures put in place during spray operations were adhered to. The inspection was done by AIRS Rwanda 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.

7.4 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS AND OTHER INCIDENTS

Each of the four 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 worked closely with the ECO and 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, the teams received refresher training at each district on management of IRS adverse effects. During the September 2015 spray campaign, one case of adverse effect was reported in Bugesera district (Nyamata sector). A spray operator of Nyamata sector had skin irritation on her face supposedly due to insecticide contact from her face shield after spraying. In an attempt to scratch herself she touched her face before washing her hands. The associated symptoms of the reported case were mild, limited to localized irritations of eyes and headache. This case was attended to at the Nyamata District hospital and the person affected recovered within a few hours of attention. Post-Season Environmental Assessment

The post-season environmental assessment was conducted in the four districts using smartphones. During the assessment it was confirmed that all IRS items were collected from the operation sites and that insecticides and IRS wastewere 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.

Nyagatare: A total of 439 kg of contaminated wastes from Nyagatare district, comprising 29,822 empty insecticide sachets and 7,121 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 (Annex 5). Other wastes, including 145 used gloves, and assorted plastics items were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 328 uncontaminated cardboard 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.

Gisagara: A total of 339.2 kg of contaminated wastes from Gisagara district comprising 21,505 empty insecticide sachets and 4,949 used masks from Gisagara District were sent to Kibilizi Hospital incineration plant. Incineration certificates were issued by each of the incineration plants (Annex 5). Other wastes, including 150 damaged gloves, and assorted plastics items (4 damaged barrels and 7 Jerrycans) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 425 uncontaminated cardboard boxes were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as papers, used dry cell batteries were disposed of at the Nduba dumping site.

Kirehe: A total of 1,230 kg of contaminated wastes from Kirehe district comprising 65,648 empty insecticide sachets and 17,960 used masks from Kirehe District were sent to Kirehe Hospital incineration plant. Incineration certificate was issued by the Kirehe Hospital incineration plant (Annex 5). Other wastes, including 736 used gloves, and assorted plastics items (16 damaged barrels and 13 damaged jerrycans) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 572 uncontaminated cardboard 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.

Bugesera: A total of 1,300kg of contaminated wastes from Bugesera district comprising 63,995 empty insecticide sachets and 25,500 used masks from Bugesera District were sent to ADEPER Nyamata Hospital incineration plant. Incineration certificate was issued by ADEPER Nyamata Hospital incineration plant (Annex 5). Other wastes, including 264 used gloves (247 from Bugesera and 17 gloves from central warehouse), and assorted plastics items (20 damaged barrels, 7 jugs, 1 plastic torch, 12 aprons, 39 plastic wallets, 44 nozzle brushes, 29 head torches, 47 plastic sheeting, 1 megaphone, 5 safety goggles, 3 meter rulers, 25 clothes lines, 6 dustin bins, 1 banner) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 1,030 uncontaminated cardboard boxes were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as papers, 2,272 use dry cell batteries and 1 sprayer bag, 6 stapler machines, 51 towels small size were disposed of at the Nduba dumping site.

8. CAPACITY BUILDING OF THE MINISTRY OF HEALTH

8.1 CAPACITY BUILDING DURING IRS TRAINING

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.

8.2 TECHNICAL SUPPORT FOR MOH IRS OPERATIONS

During the September 2015 spray season, MOH/MOPDD conducted spray operations in one sector of Bugesera district and the five sectors of Nyanza district. In parallel, AIRS Rwanda provided support to the MOPDD supported sectors during the implementation. In Bugesera District, AIRS Rwanda district coordinator and AIRS Rwanda staff worked hand in hand with a point person from the Bugesera district hospital who they supported throughout the spray operations period. In Nyanza District, AIRS Rwanda appointed one AIRS District Coordinator to support Nyanza Hospital in planning and implementation of spray operations. In addition, AIRS Rwanda provided technical support during all trainings (ToT's for sector coordinators and supervisors, ToT for sector IEC's, ToT for store keepers and trainings for mobilizers and spray operators) conducted by Nyanza Hospital. Also, AIRS Rwanda staff dedicated three days per week in Nyanza district to support the MOH staff in supervision of the IRS activities. Moreover, AIRS Rwanda lent materials and equipment to MOH/Nyanza Hospital during September 2015 spray operations. Table 21 shows the list of materials lent. All materials will be returned after the completion of their spray campaign.

TABLE 21: LIST OF MATERIALS LENT TO MOPDD

#	Item Description	Unit	Quantity lent
1	X-pert spray pumps	Pce	124
2	Hard hat Complete	Pce	176

8.3 IRS MANAGEMENT AND SUPERVISORY TRAINING WITH ENCOMPASS

In July 2015, with support from the AIRS Director of Operations, AIRS Rwanda worked with EnCompass, a woman-owned small business to build the capacity of Rwanda AIRS staff alongside MOH staff. EnCompass provided technical assistance to the PMI AIRS Project management team in capacity-building plans and activities designed to build MOPDD/MOH and district capacities in the various technical and functional components of IRS. They developed adult learning materials and curricula for district IRS managers to help them assume leadership for management, planning, implementation, and monitoring of IRS campaigns. EnCompass also developed training curricula and materials for a cadre of national IRS managers drawn primarily for the MOPDD and other institutions involved in IRS. The capacity building activities undertaken included:

- A National-level IRS Managers Training Seminar for Rwanda AIRS project staff and NMCP/MOH/Government officials responsible for managing IRS activities in Rwanda. The activity took three days.
- An IRS District Managers' Boot camp which was attended by district-level officials involved in IRS management and supervision. The activity lasted five days.

The training was invaluable not only for MOH staff but also for AIRS staff. During the training, evaluation was conducted daily by the facilitators to get feedback from the participants. Even though a report has not been shared, participants from both the national level and IRS District Managers appreciated what they learned during the workshops. Participants noted that the training was an eye-opener to their role in planning and implementing IRS including conducting training needs assessments, how to prepare training materials, adults' training methodologies, how to relate with trainees and, when and how to provide feedback. Improvement was observed during the preparations and actual training during the TOTs. Adult teaching methodologies were better applied during the TOTs and this trickled down to SOP and TL training at the sector levels. The participants also appreciated the content they learned in preparing for IRS. Table 22 below provides a summary of the number of staff who participated in the two trainings with EnCompass.

TABLE 22: PARTICIPANTS DURING CAPACITY BUILDING WITH ENCOMPASS

Type of Training	Males	Females	Total
A National-level IRS Managers Training Seminar	15	4	19
IRS District Managers' Boot camp	32	9	41
Total	47	13	60

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:

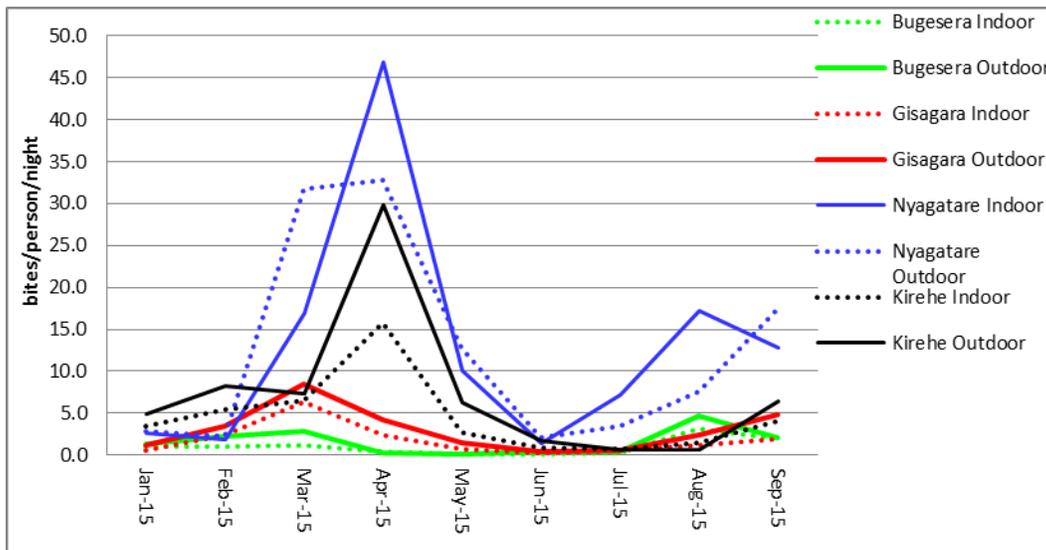
- Assessing malaria vector density and species composition in intervention areas;
- Determining vector behavior
- Establishing vector feeding time and location; and
- Assessing the quality of insecticide application and monitoring insecticide decay rates.

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 catches (HLCs) and pyrethrum spray catches (PSCs). Human Landing Catches were done monthly during two consecutive nights in 6 houses per district (3 houses per site) per night. Pyrethrum spray catches were conducted monthly in each of two sites in each IRS district and one site in the control district. The collections were done on two consecutive mornings in 15 houses per site each day. Vector density was calculated as the average number of *An. gambiae* s.l. collected per house per day from PSC data.

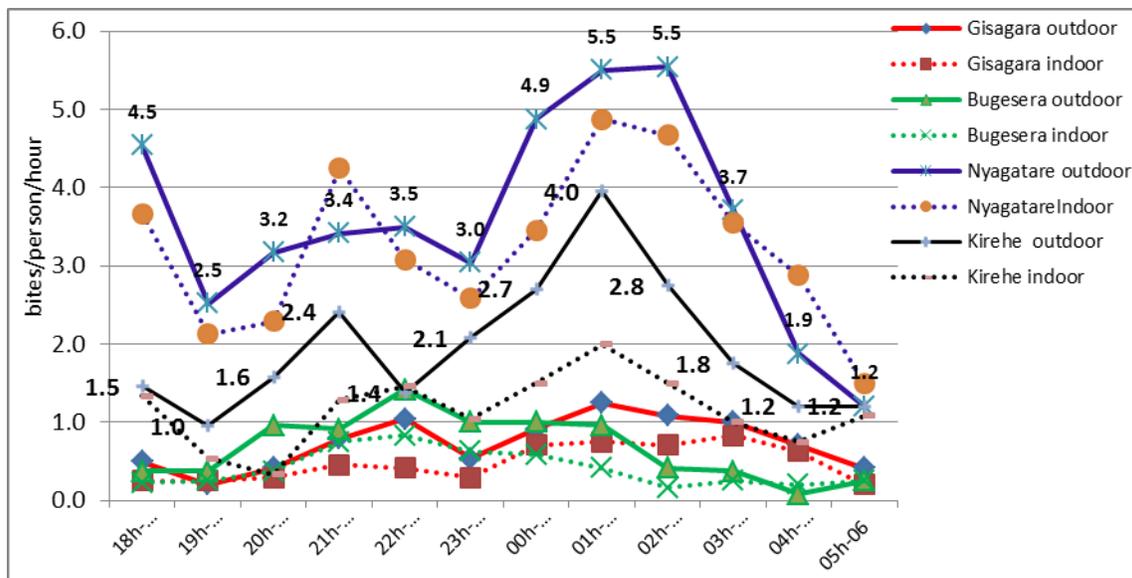
An. gambiae s.l. was the only important malaria vector that was identified during the entomological monitoring collections. *An. ziemanni*, a minor vector of malaria was also collected in some of the sites. *An. gambiae* s.l. generally showed slightly more exophagic than endophagic behavior in the four districts, including the control district. In all Bugesera and Gisagara districts a smaller peak in the vector biting density was observed in the month of March both indoor and outdoor. After March, biting rates gradually dropped in the following months through to July but slightly rose in August. This coincided with the period around which the residual efficacy of the insecticide dropped to levels below 80% mortality of susceptible *An. gambiae* s.l. In Nyagatare district both indoor and outdoor biting was generally higher than in the other districts and the trend was similar to that of the control District (Kirehe). In both districts (Nyagatare and Kirehe) a rise in both indoor and outdoor biting was observed in March despite IRS application in February in Nyagatare. Biting in both districts was observed to rise and reached a peak in April, after which there was a gradual drop in May and June. (Figure 4 and Annex 6)

FIGURE 4: AN. GAMBIAE S.L. AVERAGE MONTHLY BITING TRENDS



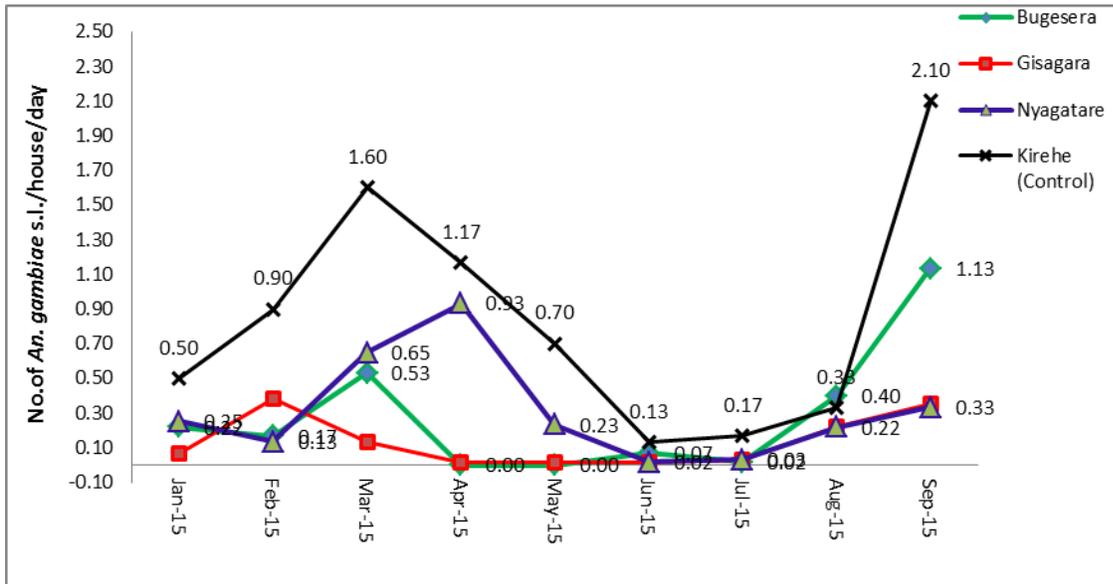
Hourly biting rates per person varied across the three districts; they were highest in Nyagatare, followed by Kirehe (control site), then Gisagara and Bugesera showed the least bites/person/hour. The relatively higher biting in Nyagatare and Kirehe could be due to the fact that apart from the rains there is more rice farming in the districts relative to the other districts. In all the four sites (the three intervention sites and the control site) biting was slightly higher outdoors than indoors. In Nyagatare, and Kirehe districts, biting was generally high at 1800h dropped at 1900h. An increase in biting density was observed 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 5 below shows average *An. gambiae* s.l. bites per person per hour through the night across the three districts.

FIGURE 5: AVERAGE AN. GAMBIAE S.L. HOURLY BITING



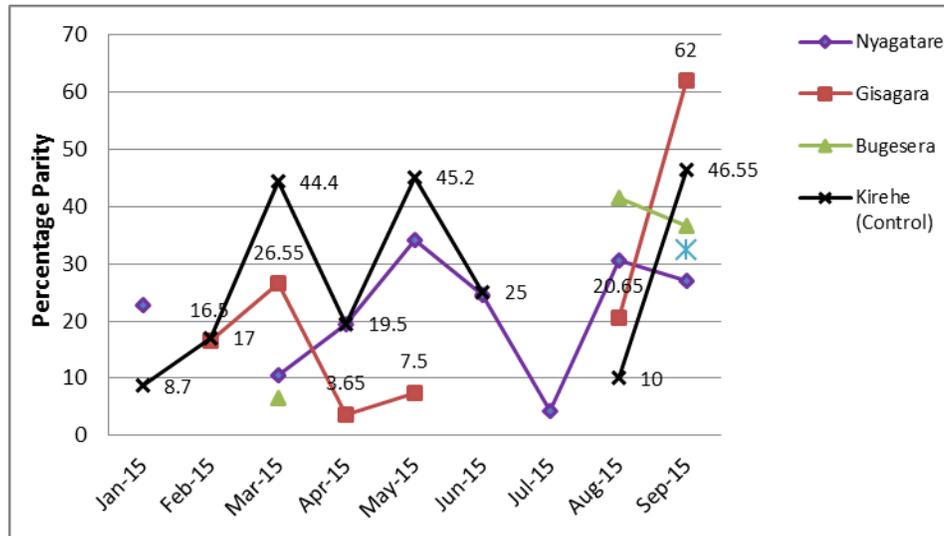
Vector density (average *An. gambiae* s.l./house/day) was highest in the control district through the reporting period. Nyagatare district showed the highest vector density relative to the IRS districts. Vector density in the four districts (including the control district) rose in February and March but tended to drop in April and remained low until August when an increase was observed. In Nyagatare however, the density peaked in April after which there was a drop. The highest density was recorded in Bugesera in September as 1.13 *An. gambiae* s.l./house/day; in Gisagara it was 0.38 *An. gambiae* s.l./house/day in February; in Nyagatare it was 0.93 *An. gambiae* s.l./house/day in April and in Kirehe (the control district) it was 2.10 *An. gambiae* s.l./house/day in September. There doesn't seem to be any difference between the control and intervention in terms of trend in vector density. Environmental factors (rains and sunny days) might have favored the proliferation of the vector but also by this time the residual effectiveness of the insecticide on the walls was waning. (see Figure 6 and Annex 7).

FIGURE 6: AN. GAMBIAE S.L. DENSITY



Ovary dissection of the *An. gambiae* s.l. collected by HLC was performed to determine parity rates. Parity in the IRS districts tended to be higher during the months of August and September when values of 41-62% were recorded in Bugesera and Gisagara districts. Comparatively, parity in the control site was generally slightly higher than in the IRS sites during the period February to June. (See Figure7 and Annex 8).

FIGURE 7: PARITY



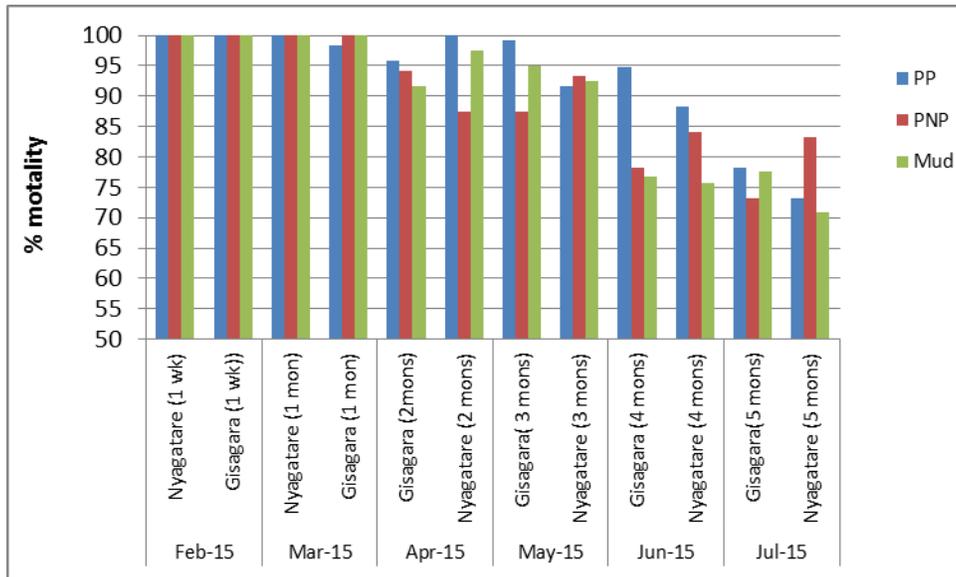
9.2 WALL BIOASSAYS

Cone bioassays were conducted in 24 sprayed structures on three different wall surfaces (Mud, plastered not painted (PNP) and plastered and painted (PP) in each of the IRS districts. In each district, two different sectors were sampled, and in each sector six structures were sampled. Out of the six structures in each sector two were of mud, two were of PNP and two were of PP surface. 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 February 2015 showed 100% mortality of susceptible *An. gambiae* s.s. indicating quality spraying took place.

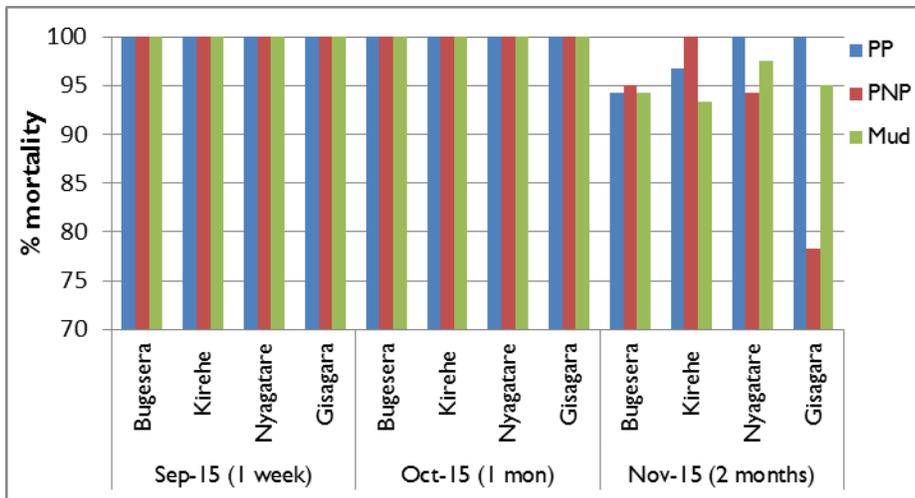
Monthly WHO cone bioassay tests conducted following the February 2015 IRS campaign showed the following results; mortality of over 80% was observed in all the three surface types in the two districts up to three months after spraying. At four months post spraying the plastered and painted surfaces recorded over 80% mortality rates in both districts. The plastered and not painted surfaces in Nyagatare district recorded above 80% mortality up to the fifth month after IRS, (Figure 8).

FIGURE 8: WALL BIOASSAY TEST RESULTS (FEBRUARY-JULY 2015)



Quality control wall bioassay tests were conducted for the second spray round in September 2015 in 48 structures in the four districts (Bugesera, Kirehe, 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 October; test mortalities of 100% were recorded in all the four districts. (Figure 9).

FIGURE 9: WALL BIOASSAY TESTS RESULTS SEPTEMBER-NOVEMBER 2015



10. GENDER

The PMI AIRS project aims to be gender inclusive, and thus increase the number of women working on the project. To start off the implementation, AIRS Rwanda selected a gender point person, the Operations Manager. He was tasked with working across the project to ensure gender inclusion and work with the team to increase the number of women working on the project.

To achieve this goal, AIRS Rwanda was tasked to implement new policies that seek to protect female seasonal workers. These policies included:

- Putting in place a sexual awareness guideline for all employees, including seasonal workers to promote a respectful working environment.
- Revising training and mobilization documents to include more pictures and information about women.
- Ensuring recruitment, mobilization, and training includes women and is responsive to their time constraints.
- Provide sex-disaggregated data for all indicators.

10.1 GENDER TRAININGS

In March 2015, AIRS Rwanda hosted a regional training for all PMI AIRS gender focal point persons to discuss the project-wide goals for gender inclusion. This training established a universal meaning of gender and goals with gender inclusion and ensured agreement on policy implementation. During this training, AIRS Rwanda was represented by three people namely, the gender focal person and two district coordinators; additionally, there was one participant from the MOPDD. During this training the Rwanda team prepared a gender SWOT analysis and a Gender Operational Plan which were later approved by the AIRS Project and MOPDD for implementation during forthcoming spray operations.

Soon after the regional training AIRS Rwanda organized and conducted training for all AIRS Staff on the gender inclusion initiative. During this training, AIRS staff discussed and reviewed the SWOT analysis and gender operational plan and also strategized on their implementation during the September 2015 spray operations.

AIRS Rwanda also conducted gender training for partners from three IRS districts (Bugesera, Gisagara and Nyagatare) during the IRS District Managers' Boot Camp. Participants in this training included hospital directors and other designated people from the hospitals such as IRS focal points people, environmental health officers and, logistics and procurement officers. During this training, participants discussed the relevance of gender initiatives and the roles and responsibilities of each partner in the implementation of gender activities during spray operations.

Gender training sessions were incorporated in all IRS training materials and were discussed during the IRS trainings (ToT's and mobilizer and spray operator trainings).

10.2 GENDER INCLUSION IMPLEMENTATION

During the implementation of September 2015 spray operations all planned activities in the gender inclusion initiative were successfully implemented as per the operational plan. Below are details of all activities carried out:

- *Increased women's recruitment:* AIRS Rwanda reinforced the existing system of recruiting only CHW's with previous IRS experience. This was done through micro-planning meetings where all district and sector authorities discussed the importance of maintaining and increasing the number of women SOP's during IRS operations by respecting the criteria of only recruiting CHW's with IRS previous experience. Also, AIRS Rwanda continued to advocate to MOH in the discussions of increasing the number of women mobilizers during IRS operations. AIRS Rwanda also revised all vehicle tenders adverts and encouraged vehicle vendors to hire at least 30% of women drivers during IRS operations. We did not get any female drivers but we had an opportunity to communicate the essence of the requirement to increase women in IRS activities to the winning transporting vendor during a meeting to sign their contract. It is envisaged that with more sensitization, the project will soon work with a female driver.
- *Gender friendly work environment:* AIRS Rwanda improved the work environment to be more gender friendly by constructing separate stand-alone double bathrooms for both men and women in each operational site. This was an improvement to the former setting where we had the bathrooms for men and women constructed as one structure with a partition separating the side for men from that of women. *Alternative duties were provided to IRS workers who were found pregnant:* A SOP who was found pregnant after recruitment was assigned another the responsibility of mobilization in her cell of residence. In addition a sector storekeeper who was pregnant was assigned sector IEC responsibility.
- *Gender Awareness Guidelines and messages:* AIRS Rwanda posted gender awareness guidelines at each operational site to help all seasonal workers, especially women feel respected and comfortable in the AIRS work setting. In addition, AIRS Rwanda prepared and disseminated gender messages regularly to all seasonal workers throughout the spray campaign to enhance the gender awareness and encourage them to express any gender related issues encountered during IRS operations.
- *Gender norms survey:* AIRS Rwanda conducted the Gender Norms and Attitudes survey before the start of the spray campaign and at the end of the spray campaign. The objective of this survey was to assess the gender norms and attitudes with regards to decision making and agency (ability to act on decisions) of men and women within the home among all IRS seasonal workers of the sampled sectors in the four IRS target districts. The team has analyzed the data and there was no statistically significant change in the gender norms for both men and women employed by the project. We did see a statistically significant change in an increase in women's gender norms by .3 points when we controlled for sex of the respondent. The team will continue to implement this survey to see how gender norms change over the life of the contract.

II. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

II.1 CHALLENGES

The main challenges experienced during the IRS campaign included:

- 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. Out of 4,133 structures that were not sprayed, 393 (9.5%) were because of refusals.
- SOPs were not recording and marking structure in the first week of spraying
- Competing government functions/meetings during IRS at the sector level requiring the mobilizers and spray operators (village leaders) led to occasional interruption of spray operations in some instances.
- Some structures/rooms in structures were used for storage of harvested food and this limited their availability for spraying.

II.2 LESSONS LEARNED AND RECOMMENDATIONS

- Engagement of CHW supervisors at operational sites 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, it was noted that SOPs were not marking all unsprayed structures both physically and in their data collection forms. Close supervision was enhanced and the structures would be marked as follows: the mobilizers marked the IRS card number on the doors of structures and the SOPs marked the door with 'Y' and the date to indicate 'sprayed' and 'N' and date to indicate 'unsprayed'. This way SOPs would be able to mark unsprayed structures, with their IRS Card number, on their data collection form, and teams would 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 to identifying any errors and taking immediate remedial action. This also provided an opportunity to compare 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 I: MOH LETTER ON INSECTICIDE SELECTION 2013/2014



ANNEX 2: INSECTICIDE RESISTANCE TESTING RESULTS

District	Sites	Pyrethroids			Organophosphates		Carbamates	Organochlorine	Date Tests were conducted
		Lamdacyhalothrin 0,05%	Deltamethrin 0.05%	Permethrin 0.75%	Pirimiphos methyl 0,25%	Fenitrothion 1%	Bendiocarb 0,1%	DDT 4%	
Nyagatare	Ngarama	67	83	91	100	100	100	94	August 2014
Nyagatare	Nyagatare	80.4	81	91.9	100	100	100	95	August 2014
Bugesera	Mwogo	86	97	89	100	100	100	84	August 2014
Bugesera	Gashora	46	58	41	100	100	100	70	January 2015
Bugesera	Mareba	43	67	63	100	100	100	80	January 2015
Gisagara	Gakoma	92	90	95	100	100	100	95	September 2014
Gisagara	Kirarambogo	66	90	84	100	100	100	90	December 2014
Kirehe	Bukora	36	67	54	100	100	94	62	January 2015
Nyanza	Busoro	62	63	47	100	100	100	89	May 2015

ANNEX 3: LOCAL PROCUREMENT

Description	Quantity /Number
IRS Transportation	
Rented Vehicles used in micro-planning and logistics assessments	2
Rented Vehicles used in IRS implementation	102
IRS Supervision vehicles (Country Office)	4
Rented vehicles that facilitated the Post IRS activities	4
Printed Materials	
Cell IEC Form	2,997
Daily Health Team Leader Checklist	7,339
Daily mixed insecticide returned from field tracking form	1,465
Daily Summary report for sector coordinators	812
Error Eliminator Form for Mob Data	3,718
Error Eliminator Form for spray Data	10,863
Homeowner preparation(IEC)	3,655
Insecticide Distribution Card	861
IRS Cards	209,590
Request Book	11
Central warehouse commodity ledger book	13
Sector store commodity ledger book	20
Spray Operator Form	35,447
Stock card	803
Team Leader Form	10,286
Village IEC Form	24,125
Photocopies of assorted documents	35,000
Good issues notes	40
Request books	70
Release request book	10
Assorted Materials	
Dry cell batteries (Pair)	2016
Dry cell batteries (Pair)	240
Banner	6
Cloth Lines	5
Dustbins for women	40
Boxes (Cartons)	134
Empty sac	905

Description	Quantity /Number
Jerrycans	50
Liquid washing soap (jerry cans)	4
Lubricant oil	100
Megaphone	12
Polythene sheeting/Tarpaulin	175
Powder	2652
Powder soap, OMO	2729
Laundry soap	288
Sprayer Bag	1658
Stop Watch	40
Toilet soap	1583
Torches	1658
Gloves	4000
HP Laser Jet	1
HP Laser Jet	2
Marker pen	28
Office file	100
Paper ream	100
Pen	4652
Note pad/books	3683
Flip chart Pad	24
Flip chat stand	31
Post it	40
Paper clip	30
Staples	82
Paper clips (attaches)	5
Glue stick	30

ANNEX 4: SOP TRAINING PROGRAM

TIME	SUBJECT	FACILITOR
DAY I		
08.30 am – 09.00 am	Session 1: 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 – 4.00 pm	Supervision and reporting of all IRS activities (Use of supervision checklists)	Trainers
4.00-5.00 pm	Gender Awareness in IRS	Sector Coordinator
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
Closing		

ANNEX 5: JOB AID MESSAGES THAT WERE SENT TO SEASONAL STAFF

Time	Recipient	Message	Total Number to be submitted in a spray season
What time of day should this message be sent? For sprayers, they are not allowed to have phones during the work day.	Who will receive this message		
1h30	Team Leaders	Team Leaders MUST carefully check the filled spray operators' data collection forms at the close of the day before submitting to the supervisors.	12
2h00 PM	Cell and Sector IEC's; and, Sector Coordinators	Ensure mobilizers notify the communities to prepare a day ahead of the arrival of the spray team.	7
9h00 AM	Spray Operators, Team Leaders, Supervisors and Sector Coordinators	Eating, drinking or smoking during the spraying period will result in dismissal. It is not allowed.	6
7h00	Spray Operators and Team Leaders	Good morning! Remember the spray target is 9 structures per spray operator per day. All rooms should be sprayed as well. Thanks for the good job.	6
16h30	M&E Assistant	Attention! {case.name} have not submitted their SMS report for today.	24
1h30	Sector Coordinator	a.#team members. Structures found.#structures sprayed.#IUs used	1
6h30 AM	Spray Operators, Team Leaders, Supervisors and Sector Coordinators	Full PPE use remains mandatory for the duration of the spray operation.	4
4h00 PM	Spray Operators and Team Leaders	For tomorrow, remember only heavy, non-edible, bulky items should be packed in the center of the room and covered with the polythene sheet before spraying.	4
7h30	Team Leader	Remember your spray nozzle should be 45cm from the surface. Spray pressure is between 35 and 55psi.	5
6h50 AM	Spray Operators, Team Leaders, Supervisors and Sector Coordinators	To ensure the Safety of all seasonal staff and community, report the health status and any adverse effect to your supervisor.	8
15h00	Spray Operators, Team Leaders, washers, security guards, Supervisors, Sector Coordinators	PMI AIRS Project will not tolerate sexually-oriented conduct, whether it is intended or not, that is unwelcome.	9

Time	Recipient	Message	Total Number to be submitted in a spray season
15h00	Spray Operators, Team Leaders, washers, security guards, Supervisors, Sector Coordinators	Sexual harassment is defined as: Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature	8
14h30	Spray Operators, Team Leaders, washers, security guards, Supervisors, Sector Coordinators	Other work-related harassment is the unwelcome, deliberate or repeated unsolicited verbal, physical, or visual contact or solicitation of favors that are offensive, abusive, intimidating, hostile, denigrating, or demeaning.	7
14h30	Spray Operators, Team Leaders, washers, security guards, Supervisors, Sector Coordinators	The PMI AIRS Project takes any allegations of sexual harassment seriously. All complaints should be made to your <u>Gender Focal Point</u> at 0786477460 . Please also contact the Rwanda National Police, Gender Based Violence Unit at 3512 for further support.	9
		14	110

ANNEX 6: STOCK UPDATE

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used	Quantity in Stock after the Campaign
Sprayer pumps	1,523	190	1,713	1,713	1,713
Dust Mask	31,968	31,920	63,888	55,530	8,358
Hard Hat (Shell)	2,102	736	2,838	624	2,214
Face shield	2,102	736	2,838	624	2,214
Face shield bracket	2,102	736	2,838	624	2,214
Apron	80	130	210	21	189
First Aid Kits	134	56	190	120	70
Gloves	2,982	1,008	3,990	1,295	2,695
Coverall	3,439	1,137	4,576	4,576	4,576
Boot (Rubber)	1,444	714	2,158	107	2,051
Valve body cap	80	100	180	48	132
Control flow valve (CFV)	0	1,685	0	0	1,685
Extension lance	184	300	484	205	279
Gasket Nozzle	390	1,500	1,890	531	1,359
Lance	0	100	100	100	0
Stop cock	31	100	131	63	68
Nozzle regulator	0	100	100	100	0
Hose assembly	278	25	303	120	183
Repair kit	29	20	49	13	36
Pressure gauge	54	100	154	140	14
Gaskets, simplex cover	0	100	100	100	0
Wash valve pin	0	100	100	100	0
Body shutoff	125	100	225	76	149
Insecticide (Carbamate)	14,288	172,435	186,723	180,970	5,753*

*Expiry date: July 2016

ANNEX 7: WASTE DISPOSAL CERTIFICATES



 Kibilizi DH 

CERTIFICATE OF INCINERATION

Kibilizi District Hospital is conforming that

has fully incinerated waste from IRS activities carried out in Gisagara District by Abt Associate from 14th September to 10th October 2015. The waste incinerated were 339.2kg that is why this certificate is given.

Done at Kibilizi on 13th October 2015


UWIZEYE Protogene
Environmental Health Officer Kibilizi DH


Dr NGABOYEKA Faustic
Acting . Director of Kibilizi DH 



REPUBLIC OF RWANDA



EASTERN PROVINCE
NYAGATARE DISTRICT
NYAGATARE HOSPITAL
PO BOX 43

CERTIFICATION OF INCINERATION

THIS IS TO CERTIFY THAT 439 KG OF IRS CONTAMINATED WASTES WERE RECEIVED ON 12/OCT 2015 FROM ABT ASSOCIATES INC, NYAGATARE OFFICE, AND INCINERATED ON 13/OCTOBER 2015.

Kind Regards


Dr. INYANGIRE MARIUS TRESOR
Acting Director of Nyagatare District Hospital 

ANNEX 8: HUMAN BITING RATES (BITES/PERSON/NIGHT)

Month	Bugesera				Gisagara				Nyagatare				Kirehe	
	Musenyi		Nyarugenge		Muganza		Gishubi		Nyagatare		Rukomo		Gatore	
	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	outdoor
Jan-15	0.66	0.74	1.50	2.00	0.99	1.31	0.26	0.94	0.40	0.40	4.99	5.31	3.40	4.90
Feb-15	0.17	0.43	1.74	4.06	4.01	4.09	0.76	2.94	0.64	2.86	3.02	1.68	5.51	8.19
Mar-15	0.16	1.64	2.33	4.07	12.57	16.73	0.08	0.23	16.79	36.51	17.02	27.08	6.49	7.41
Apr-15	0.41	0.49	0.33	0.17	4.76	7.94	0.09	0.61	73.86	36.54	19.93	29.17	15.82	29.78
May-15	0.10	0.00	0.20	0.10	1.35	2.45	0.17	0.43	8.77	14.43	11.40	11.00	2.66	6.34
Jun-15	0.00	0.80	0.23	0.08	0.51	0.69	0.00	0.10	0.74	3.56	2.20	0.50	0.93	1.77
Jul-15	0.17	0.33	0.36	0.44	0.66	0.74	0.35	0.35	0.50	0.50	13.78	6.42	0.65	0.65
Aug-15	0.51	0.59	5.75	8.65	2.19	4.11	0.09	0.71	2.09	9.01	32.49	6.01	1.43	0.67

ANNEX 9: PYRETHRUM SPRAY CATCH RESULTS

	District	Sector	Total	Unfed	Fresh fed	Half gravid	Gravid	Total Fed	Density No of An. gambiae/h ouse/day
Jan-15	Gisagara	Muganza	2	0	2	0	0	2	0.067
		Gishubi	2	0	2	0	0	2	0.067
	Bugesera	Musenyi	7	3	2	1	1	4	0.233
		Nyarugenge	6	6	0	0	0	0	0.200
	Nyagatare	Nyagatare	2	4	0	0	0	0	0.067
		Rukomo	13	7	1	4	1	6	0.433
	Kirehe	Gatore	15	9	1	1	4	6	0.500
Feb-15	Bugesera	Musenyi	2	1	0	0	1	1	0.067
		Nyarugenge	8	1	2	1	4	7	0.267
	Nyagatare	Nyagatare	5	3	1	0	1	2	0.167
		Rukomo	3	1	2	0	0	2	0.100
	Gisagara	Muganza	3	1	2	0	0	2	0.100
		Gishubi	20	11	4	5	0	9	0.667
	Kirehe	Gatore	27	12	13	1	1	15	0.900
Mar-15	Bugesera	Musenyi	1	1	0	0	0	0	0.033
		Nyarugenge	31	7	16	7	1	24	1.033
	Nyagatare	Nyagatare	10	5	1	4	0	5	0.333
		Rukomo	29	8	21	0	0	21	0.967
	Gisagara	Muganza	7	2	4	0	1	5	0.233
		Gishubi	1	0	1	0	0	1	0.033
	Kirehe	Gatore	48	15	20	5	8	33	1.600
Apr-15	Nyagatare	Nyagatare	10	3	7	0	0	7	0.333
		Rukomo	46	8	32	4	2	38	1.533
	Gisagara	Muganza	1	0	0	0	0	1	0.033

	District	Sector	Total	Unfed	Fresh fed	Half gravid	Gravid	Total Fed	Density No of An. gambiae/h ouse/day
May-15		Gishubi	1	0	1	0	0	1	0.033
	Bugesera	Musenyi	0	0	0	0	0	0	0.000
		Nyarugenge	0	0	0	0	0	0	0.000
	Kirehe	Gatore	35	5	23	4	3	30	1.167
	Nyagatare	Nyagatare	7	5	2	0	0	2	0.233
		Rukomo	7	4	2	1	0	3	0.233
	Gisagara	Muganza	1	0	1	0	0	1	0.033
		Gishubi	0	0	0	0	0	0	0.000
	Bugesera	Musenyi	0	0	0	0	0	0	0.000
		Nyarugenge	0	0	0	0	0	0	0.000
Kirehe	Gatore	21	10	7	4	0	11	0.700	
Jun-15	Gisagara	Muganza	0	0	0	0	0	0	0.000
		Gishubi	1	0	1	0	0	1	0.033
	Bugesera	Nyarugenge	4	3	0	1	0	1	0.133
		Musenyi	0	0	0	0	0	0	0.000
	Nyagatare	Nyagatare	1	0	1	0	0	1	0.033
		Rukomo	0	0	0	0	0	0	0.000
	Kirehe	Gatore	4	4	0	0	0	0	0.133
Jul-15	Bugesera	Nyarugenge	1	0	0	0	1	1	0.033
		Musenyi	0	0	0	0	0	0	0.000
	Nyagatare	Nyagatare	0	0	0	0	0	0	0.000
		Rukomo	2	0	2	0	0	2	0.067
	Gisagara	Muganza	0	0	0	0	0	0	0.000
		Gishubi	2	0	0	0	0	0	0.067
	Kirehe	Gatore	5	2	2	1	0	0	0.167
Aug-15	Gisagara	Muganza	11	2	9	0	0	9	0.367
		Gishubi	2	0	2	0	0	2	0.067
	Bugesera	Nyarugenge	24	1	12	6	5	23	0.800
		Musenyi	0	0	0	0	0	0	0.000
	Nyagatare	Nyagatare	5	0	5	0	0	5	0.167

	District	Sector	Total	Unfed	Fresh fed	Half gravid	Gravid	Total Fed	Density No of An. gambiae/h ouse/day
		Rukomo	8	6	2	0	0	2	0.267
	Kirehe	Gatore	10	5	4	1	0	5	0.333
Sep-15	Gisagara	Nyanza	0	0	0	0	0	0	0.000
		Gikonko	21	11	5	3	2	10	0.700
	Ngoma	Remera	232	73	104	19	36	159	7.733
	Kirehe	Gatore	65	33	10	15	7	32	2.167
		Nyamugali	61	33	28	10	0	38	2.033
	Bugesera	Nyarugenge	68	41	16	9	2	27	2.267
		Musenyi	0	0	0	0	0	0	0.000
	Nyagatare	Nyagatare	19	9	8	0	2	10	0.633
		Karangazi	1	0	0	0	1	1	0.033

ANNEX 10: PARITY RATES (PERCENTAGE)⁸

	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 15
Nyagatare	0	0	19.8(81)	24.7(81)	21.1(57)	29(7)	0	33.3(33)	54.1(98)
Rukomo	45.7 (35)	0	1.4(72)	14.3(63)	47.1(70)	20(10)	8.7(85)	27.9(68)	
Muganza	0	3(33)	53.1(64)	7.3(41)	15(20)	0	0	39.3(28)	
Gishubi	0	30(26)	0	0	0	0	0	0	
Musenyi	0	0	0	0	0	0	0	25(4)	25 (4)
Nyarugenge	0	0	13.15(19)	0	0	0	0	58(50)	48.1 (27)
Gatore	8.7(23)	17(47)	44.4(54)	19.5(82)	45.2(31)	25(12)	0	10(10)	57.4(61)
Nyamugali									35.7 (28)
Gikonko									49(51)
Nyanza									75 (8)
Remera									32.5 (80)

⁸ The figures in brackets show the number dissected.

ANNEX I I: 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	M	F
Sector coordinators	20	15																								35	
Sector Supervisors	74	74																								148	
Spray Operators			543	855																						1398	
Team Leaders			178	153																						331	
Data Entry Clerks					18	12																				30	
Logisticians							2	3																		5	
District Store Keepers							2	2																		4	
Sector Store Keepers							13	23																		36	
Finance Assistants																							1	4		5	
Pump Technicians								4	0																	4	
District IEC Assistants										2	2															4	
Sector IEC Assistants & Supervisors										65	55															120	
Cell IEC Mobilizers												118	59													177	
Village IEC Mobilizers												2761	220													2981	
Adverse Effects Teams (Clinicians)														67	26											93	

Categories of Persons Trained	Training on IRS Delivery												Other Trainings								Total						
	Training of Trainers		Spraying Operations		Data Capture		Logistics Training		Technical Maintenance		Structure Enumeration/ IEC TOT		Structure Enumeration/ IEC Training		Poison Control		Environmental Compliance		Coveralls Washing			Fire Security		Finance		Transport Security	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F	M	F	M	F
Environmental Compliance Officers																	3	0									3
Washers																			32	86							118
Security Guards																					130	33					163
Drivers																									106	0	106.1
TOTAL M/F	94	89	72	1008	18	12	17	28	4	0	67	57	2879	279	67	26	3	0	32	86	130	33	1	4	106	0	5761
TOTAL/Training	183		1729		30		45		4		124		3158		93		3		118		163		5		106		5761

ANNEX 12: 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
Ia. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	ECO and logistic coordinator inspected vehicles to be used during IRS operations to see if they met IRS standard requirements. A total of 108 vehicles were inspected and hired for the support of the IRS operations in the four districts.	Vehicles that did not meet PMI IRS requirements (such as insurance, strong benches for SOP to sit on, etc.) were not contracted and old fire extinguishers were replaced with new ones.	
Ib. Driver training	106 drivers were trained on safety issues (including wearing coveralls while on IRS field operations).	A few drivers were not adhering to instructions on the use of coverall. In general, there was a high degree of compliance, but warnings were immediately issued to non-compliant drivers	
Ic. Cell phone, personal protective equipment (PPE) and spill kits on board during pesticide transportation.	Initial spray operator transportation vehicle inspections revealed that most vehicles did not have spill kits on board during transportation of spray operators.	Issuing spill kits for vehicles was reinforced by Mariandrea (TPM) and this was accomplished during the campaign.	
Id. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	Training and screening of SOPs in order to see those who were unhealthy and pregnant. All female SOPs and washers were tested for pregnancy and 9 out of the total screened were eliminated after positive results.	Because the AIRS Rwanda team had not given contracts these women were not given jobs on the project. Recruitment for positions without exposure to insecticide, such as mobilizers, had already taken place so the project could not encourage these women to apply to these positions. The project will seek to engage these women in the upcoming campaigns	
Ie. Health fitness testing for all operators	All SOPs, washers, and supervisors were medically tested for health and fitness. A total of 1,793 SOPs were screened for health and fitness and the 43 found to be unfit were excluded from participating in IRS operations	No outstanding issues	

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	Although training on the use of PPE was conducted for all SOPs, there was one case of adverse effect resulting from insecticide contact when a spray operator attempted to scratch herself before washing her hands. Procurement of neck protectors along with training on the use while handling and distributing insecticides was conducted during the campaign.		This case was attended to at the Nyamata District hospital and the person affected recovered within a few hours of attention. Mariandrea reminded the team to procure neck protectors for the SOPs as recommended in the PMI IRS BMP and this was done to avoid any further risks.
Ig. Training on mixing pesticides and the proper use and maintenance of spray pumps.	All SOPs were trained on mixing pesticides before spraying.	No outstanding issues	
Ih. Provision of adequate facilities and supplies for end-of-day cleanup,	Washing soap and other supplies were available at all operations sites to facilitate end of day clean up. There were 487 smartphone-based end of day cleanup inspections during the campaign and no cases the unavailability of soap and water for cleanup were reported.	No outstanding issues	
Ii. Enforce clean-up procedures.	The seven-barrel progressive rinsing procedure was performed by all SOPs. Of the 487 end of day cleanup inspections conducted, there was only one case of the cleanup not being supervised, The non-compliant issues identified during the inspections included: Slope of the soak pit; disposal of leftover pesticide; washing of the outside of pumps; rinsing of PPE; SOPs washing hands and face; Overalls being cleaned; draining of water into soak pit; soak pit adequately draining; use of leftover pesticide;	All non-compliance issues were immediately corrected.	

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	IEC campaigns were effectively carried out before the campaign. A total of 2,981 Village IEC's (2761 male and 220 females) conducted IEC campaigns to inform homeowners of responsibilities and precautions. Village IEC's were being supervised by 177 Cell IEC's(118 male 59 female)	No outstanding issues	
2b. Prohibition of spraying houses that is not properly prepared.	In general, households were prepared before spraying activities were conducted. During the campaign, 636 homeowner preparation inspections were conducted and for 620 instances there were no issues with houses not being properly prepared.	All the 16 instances with non-compliance issues were immediately corrected.	
2c. Two-hour exclusion from house after spraying	Supervisors informed homeowners of a two-hour exclusion from house after spraying. There was only one reported instance of a homeowner not being informed of the two-hour exclusion for the house after spraying.	The homeowner was immediately provided all the post spray requirements.	
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside.	There were 4 reported cases (out of 636 total inspections) of the homeowner not being provided the exposure protocols.	The affected homeowners were immediately provided all the exposure protocols.	Upon further examination, we found out that some of the sector coordinators who used smartphones for inspections filled these checklists with some errors. More training on the use of the smartphone should be provided to sector supervisors and coordinators
3a. Indoor spraying only.	Sector coordinators and supervisors emphasized indoor spraying only. However, there were 16 reported cases (out of 636 total inspections) of the SOP observed to be spraying the wrong surfaces.	The affected SOPs were immediately provided retraining on the right surfaces to spray.	Training in this area will be enhanced for future campaigns.
3b. Training on proper spray technique	Training of SOPs was conducted with application of spraying techniques. There were 3 cases of SOPs not in compliance with the spray speed and 5 cm swath overlap guidelines.	The few raised issues on spraying techniques were addressed immediately by IRS supervisors.	

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
3c. Maintenance of pumps	A pump technician was placed at each district warehouse to repair and maintain pumps before and during IRS operations. There were reported 54 cases of a pump found to be leaking and in all but one of these cases, the SOP had repaired the pump.	No outstanding issues were reported	A greater effort will be made to ensure that leaks are discovered and repaired before going out to the field. Operators will be trained to report leaks and get them repaired.
4a. Choose sites for disposal of liquid wastes according to PMI BMPs.	Contaminated liquid wastes to be disposed in soak pits. All soak pits for the disposal of liquid waste were chosen and inspected and determined to be ready for operations prior to the beginning of the spray campaign. The pre-seasonal environmental compliance inspection was conducted from 27th July to 1st August 2015 to verify the soak pits which required rehabilitation and also best sites to construct new soak pit		
4b. Construct soak pits with charcoal to adsorb pesticide from rinsewater.	Re-construction of new soak pits was done before spraying operations. Rehabilitation and reconstruction of some soak pits was done all based on PMI BMP guidelines.		
4c. Maintain soak pits as necessary during season.	There were 3 reported cases of the soak pit not adequately draining water, but the gravel in the soak pits was found to be adequate. There were also 2 reported cases of the waste water not draining into the soak pit.	Before the start of 2016 spray campaign, all soak pits which had outstanding issues will be re-sited to another area	
4d. Inspection and certification of solid waste disposal sites before spray campaign.	Certification of solid waste disposal sites was conducted before spray campaign by ECO. Site visits to all IRS waste disposal areas was done before start of operations.	There was no issue of concern.	
4e. Monitoring waste storage and management during campaign.	Wastes at district sectors were properly stored in district stores prior to final disposal. Most store keepers complied with the instructions and there were only two reported cases of no a missing label on the waste container.	The waste labels were immediately attached, There are no outstanding issues.	
4f. Monitoring disposal procedures post-campaign.	All IRS wastes were accompanied to disposal sites by ECO and logistic coordinator	There were no issues concerning the disposal of IRS wastes.	

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	Storekeepers are to maintain and check all records of the stock regularly during IRS operations. During the 294 storekeeper performance inspections, there were 9 instances of non-compliance with stock-keeping guidelines. These cases were all addressed immediately.		Non-compliance with stock-keeping guidelines cases were all addressed immediately
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	Daily checking of spray performance sheet to verify insecticide usage rate team by team.	There was no outstanding issue of concern	
5c. Visual examination of houses sprayed to confirm pesticide application.	Quality control wall bioassay tests were conducted for the second spray round in September 2015 in 48 structures in the four districts (Bugesera, Kirehe, Nyagatare and Gisagara) within week one of spraying. In all test cones 100% mortality of susceptible <i>An. gambiae</i> s.s. was recorded. One month post IRS in October; test mortalities of 100% were recorded in all the four districts		
5d. Perform physical inventory counts during the spray season.	Inventory check was done by coordinators, store keepers and supervisors during the spraying periods in all districts sectors	In some few IRS operations sites where inventory checks were done by supervisors, records of the stock was not proper due to inexperience of new storekeepers who lacked proper stock recording knowledge. These issues were addressed immediately by supervisors.	Although most storekeepers' performance was adequate, training will be enhanced in 2016, particularly for inexperienced storekeepers.

ANNEX 13: MONITORING AND EVALUATION PLAN MATRIX – SEPTEMBER 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								
1.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100% Round 2: 100%	Round 1; 100%		TBD; 100%	
1.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1; 100% Round 2: 100%	Round 1; 100%		TBD; 100%	
1.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: 1; 100% Round 2: 1; 100%	Round 1: 1; 100% Round 2: 1; 100%	TBD; 100%		TBD; 100%	
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% Round 2: 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
1.1.5 Successfully completed spray operations without an insecticide stock-out	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Round 1: Acheived Round 2: Achieved	Round 1: Acheived Round 2: 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 Round 2: 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 Round 2: 45: 17 males 28 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% Round 2: 35; 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 Round 2: Not yet 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: 5593 Male: 3941 Female: 1652	Round 1: 3,220: Males: 2,269 Females: 951 Round 2: 5,726 Males: 4,120 Females: 1,606	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	Year 1					
			Year 1		Year 2		Year 2	
			Target	Results	Target	Results	Target	Results
2.2.3 Number of health workers receiving insecticide poisoning case management training	<i>Data source:</i> Project records – Training reports <i>Reporting frequency:</i> Each spray season	By Spray Campaign By Gender	Round 1: 54 Males: 30 Females: 24 Round 2: 88 Male: 44 Female:44	Round 1: 38 Male: 19 Female: 19 Round 2:93 Males:67 Females:26	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 Round 2: 1	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 Round 2: 70 Round 2: 35 Round 2: 35	TBD; 100%		TBD; 100%	
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 Round 2: 84	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 Round 2: 0 Brochures	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
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	<i>Data source: Mobilization Data Collection Forms</i> <i>Reporting frequency: Daily per mobilization conducted</i>	By Spray Campaign By Gender	Round 1: 269,084 Males: 119,947 Females: 149,137 Round 2: 480,643 Males: 209,965 Females: 270,678	Round 1: 267,024 Males: 116,647 Females: 150,377 Round 2: 554,302 Males: 199,858 Females: 354,444	TBD		TBD	
2.4 Spray Targeted Structures According to Technical Specifications								
2.4.1 Number of structures targeted for spraying	<i>Data source: Previous spray campaign data, enumeration data (targets); Daily Spray Operator Forms (results)</i> <i>Reporting frequency: Daily per spray campaign</i>	By Spray Campaign	Round 1: 126,714 Round 2: 213,271	Round 1: 127,892 Round 2: 220,114	TBD		TBD	
2.4.2 Number of structures sprayed with IRS	<i>Data source: Daily Spray Operator Forms</i> <i>Reporting frequency: Daily per spray campaign</i>	By Spray Campaign	Round 1: 107,707 Round 2: 181,280	Round 1: 127,150 Round 2: 215,981	TBD		TBD	
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	<i>Data source: Daily Spray Operator Forms</i> <i>Reporting frequency: Daily per spray campaign</i>	By Spray Campaign	Round 1: 85% Round 2: 85%	Round 1: 99.4% Round 2: 98.1	85%		85%	

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
2.4.4 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	Round 1: 503,259	Round 1: 517,194	TBD		TBD	TBD
		By Gender		Males: 244,275				
		By pregnant women	Round 2: 883,674	Females: 272,919				
		By children <5 years old		Pregnant Women: 8,489;				
				Children <5: 74,279				
				Round 2: 889,326				
				Males: 427,914				
				Females: 461,412				
				Pregnant Women: 14,375				
				Children <5: 132,568				
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	

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
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	Data source: Spray operations reports Reporting frequency: Per spray campaign	By Spray Campaign	Round 1: NA Round 2: NA	Round 1: NA Round 2: 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	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By Guideline/checklist/tool	Round 1: NA Round 2: 1 ¹⁰	Round 1: NA Round 2: NA	TBD		TBD	
4.2 Number of articles/best practices documents published	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	Round 1: NA Round 2: NA	Round 1: NA Round 2: NA	TBD		TBD	
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	Round 1: 1 Round 2: 1	Round 1: 1 Round 2: 1	TBD		TBD	
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 Round 2: 4	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
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 Round 2: 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% Round 2: 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% Round 2: 12; 100%	TBD		TBD	
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	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 Round 2: 12; 100% All four classes of insecticide are being tested at each of the 12 sites	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
				sites				
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) Round 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: 4 replicates per 6 insecticides Round 2: 4 replicates per 6 insecticides	TBD		TBD	
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 Round 2: 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 Round 2: N/A	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 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 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% Round 2: 2,005 ¹² Males: 882 Females: 1,123	TBD		TBD	

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

¹² 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% Round 2: 5,761 Males: 4,139 Females: 1,622; 28.1 %	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% Round 2: 1,485; 27.5%	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% Round 2: 307 Males: 161 Females:146	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 Percentage of	Round 1: 2,987 Males: 2,121 Females: 866; 28.9%	Round 1: 3,096 Male: 2,193 Female: 903; 29.2%	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
		women hired	Round 2: 5,573; Male: 3,948 Female: 1,625; 29%	Round 2: 5,395 Male: 3,909 Female: 1,486				
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 ¹³)	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% Round 2: 329; 44.6%	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 Round 2: 5,329 ¹⁴ ; 100%	TBD		TBD	
6.2 Capacity Building								
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – Training reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign By Gender Percentage of Women Trained	Round 1:63 Males: 33 Females: 30; 47.6% Round 2: 100; Males: 52 Female: 48;48%	Round 1: 40 Males: 21 Females:19 47.5% Round 2: 50; 100% Males:38 Females: 12	TBD		TBD	

¹³ 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.

¹⁴ This includes sector coordinators, supervisors, SOP's, Team Leaders, Data clerks, Logisticians, District and sector store keepers, District and Sector IEC's, Cell and Village Mobilizers; and, National and District Authorities.

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
6.2.2 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 Round 2: 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 Round 2: Completed	TBD		TBD	