



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

**RWANDA**  
**END OF SPRAY REPORT**

**SPRAY CAMPAIGN: SEPTEMBER 2 - OCTOBER 12, 2013**

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# ACRONYMS

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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	Entreprise pour la Protection de l'Environnement et Development Rural
HLC	Human Landing Catch
IEC	Information, Communication and Education
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 Wear
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	Wetable Granules
WHO	World Health Organization
WP	Wetable Powder

# EXECUTIVE SUMMARY

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Abt Associates supports the implementation of indoor residual spraying in Rwanda on a three-year Africa-wide Indoor Residual Spraying (IRS) project funded by USAID under the President's Malaria Initiative (PMI). The objective of the project is to limit exposure to malaria and reduce the incidence and prevalence of malaria. The February 2013 spray round targeted 126,515 structures in 20 of 42 sectors in the same three districts sprayed in August 2012. A pyrethroid (Deltamethrin WG 250) was used and the spray campaign took 20 days to complete. The September 2013 spray round targeted 219,462 structures in 37 of 42 sectors in the same three districts sprayed February 2013. A pyrethroid (Deltamethrin WG 250) was used in Bugesera and Gisagara while a carbamate (Ficam 80 WP) was used in Nyagatare district.

The following are project achievements and key highlights of the September 2013 spray campaign, which lasted 30 days:

- A total of 224,708 structures were sprayed out of 229,039 structures found by spray operators in the targeted districts, accounting for a coverage rate of 98.1%. In total, 957,027 residents were protected, including 147,531 (15.4%) children under five years old and 16,023 (1.6%) pregnant women.
- A total of 222,336 structures were mobilized and 219,810 brochures were distributed during the mobilization exercise.
- A total of 5,765 individuals were trained using PMI funds to support IRS activities in the three districts compared to 6,065 people trained in the same target areas for the September 2012 campaign. Of these, 1,298 were spray operators (569 males and 729 females), 299 were team leaders (164 males and 135 females), and 3,211 were village IEC mobilizers (2,869 males and 343 females). Overall, 27.2% (n=1,569) of all IRS trained personnel in 2013 were female compared to 26% (n= 1,556) of female IRS personnel trained during the 2012 campaign.
- A total of 166,324 sachets of insecticide were used to spray 224,708 structures in the 3 IRS districts, with a utilization ratio of approximately 1:1.4 (sachet to structures sprayed).
- A total of 230 dormitories in 44 schools and 3 prisons were sprayed in the target districts protecting 16,311 residents. A total of 768 sachets of insecticide were used.
- Spraying was conducted by "Special Teams" in prisons, police and military camps where 5,865 structures were sprayed with 33,353 residents protected in two PMI districts and seven non-PMI target districts. AIRS Rwanda trained the military and provided remote technical assistance through weekly meetings with focal persons and supervisors. Due to the nature of the institutions sprayed and restrictions on civilian entry, AIRS did not have direct access to conduct hands-on supervision of spray operations.
- All IRS insecticide contaminated wastes, including empty sachets and used masks, were taken to the Gahini Hospital incineration plant in Kayonza for incineration. Other solid wastes, including used gloves, worn-out boots, damaged barrels and other plastic items were disposed of and recycled at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 462 uncontaminated paper cartons were donated to Cards from Africa

Company at Samuduha in Kigali. Other uncontaminated waste, such as empty boxes and papers, were disposed of at the Nduba dumping site.

- World Health Organization (WHO) cone bioassays conducted within one week of spraying in September 2013 to assess the quality of spraying in the target districts recorded mosquito mortalities ranging from 97 to 100%. One month post-IRS, average percentage mortalities of 94.7%, 94.1% and 97.2% were recorded for Gisagara, Bugesera and Nyagatare, respectively.

**TABLE 1: AIRS RWANDA SEPTEMBER 2013: ROUND 2 AT A GLANCE**

Number of districts covered by PMI-supported IRS	3 districts (Bugesera, Gisagara, and Nyagatare)
Insecticide	Pyrethroids in Bugesera and Gisagara; Carbamates in Nyagatare
Number of structures covered by PMI-supported IRS	224,708
Number of structures targeted by PMI-supported IRS	229,039
Spray coverage	98.1%
Population protected by PMI-supported IRS	957,027 (16,023 pregnant women, 147,531 children less than 5 years old)
Dates of PMI-supported IRS campaign	September 2 - October 12, 2013
Length of campaign	30 days
Number of people trained with USG funds to deliver IRS	1,875

# I. COUNTRY BACKGROUND

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Rwanda covers an area of approximately 26,338 square kilometers with a population of approximately 11 million people. The entire population is at risk of malaria, including an estimated 1.8 million children under five years of age and 450,000 pregnant women per year.<sup>1</sup> The country has two distinct malaria epidemiological strata: in two thirds of the districts, malaria is characterized by seasonal peaks of transmission, and in the remaining one third of the districts, malaria transmission is comparatively stable year-round.<sup>2</sup> 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 2012 -2017, , 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.<sup>3</sup>

Among the malaria control strategies applied in Rwanda, Indoor Residual Spraying (IRS) has been featured since 2007. Beginning in 2008, declining malaria incidence in some areas prompted adjustments, from district-wide IRS coverage, to more targeted focal spraying to cover high risk areas. With time, the focal targets were reconsidered because of generalized increases in malaria caseloads, but expansion to cover entire districts depended on the availability of resources.<sup>4</sup> Much of the IRS in Rwanda has been funded by the President's Malaria Initiative (PMI). In August 2011, Abt Associates Inc. 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 through September of 2012. Considering that malaria transmission takes place year round and peaks during the periods of October to December and March to May, a second spray round was conducted in February 2013 to supplement the August to September 2012 spray round, 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 sectors' 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 same three districts for IRS. Working in collaboration with the MOH/MOPDD and other stakeholders, Abt Associates was tasked to achieve at least 85 percent spray coverage in the

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<sup>1</sup> 2012 Population and Housing Census, Nov 2012

<sup>2</sup> Trends in malaria cases, hospital admissions and deaths following scale-up of antimalarial interventions, 2000-2010, Rwanda, (Karema *et al*, 2012)

<sup>3</sup> Malaria Strategic Plan 2012-2017

<sup>4</sup> MOP, 2011

IRS target districts targeting 219,462 structures using a carbamate in Nyagatare and pyrethroid in Bugesera and Gisagara districts.

In addition, the project provided technical support in the following activities:

- Training, capacity building, and advocacy at the national, regional, and district levels as a means of achieving IRS sustainability. This included building the capacity of government officials and partners to undertake high-quality IRS.
- Daily and weekly monitoring of the IRS program via supervision of spray quality and 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 of IRS, and to encourage ownership.

## 2. PRE-SPRAY ACTIVITIES

### 2.1 SELECTION OF IRS DISTRICTS AND SECTORS

Three districts, Bugesera, Gisagara and Nyagatare, were selected for IRS during the September 2013 campaign (see Figure 1 below). The IRS districts were selected based on malaria burden as was reported in the epidemiological data from health facilities. A total of 219,462 structures were targeted for spraying in 37 sectors located within the three target districts.

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

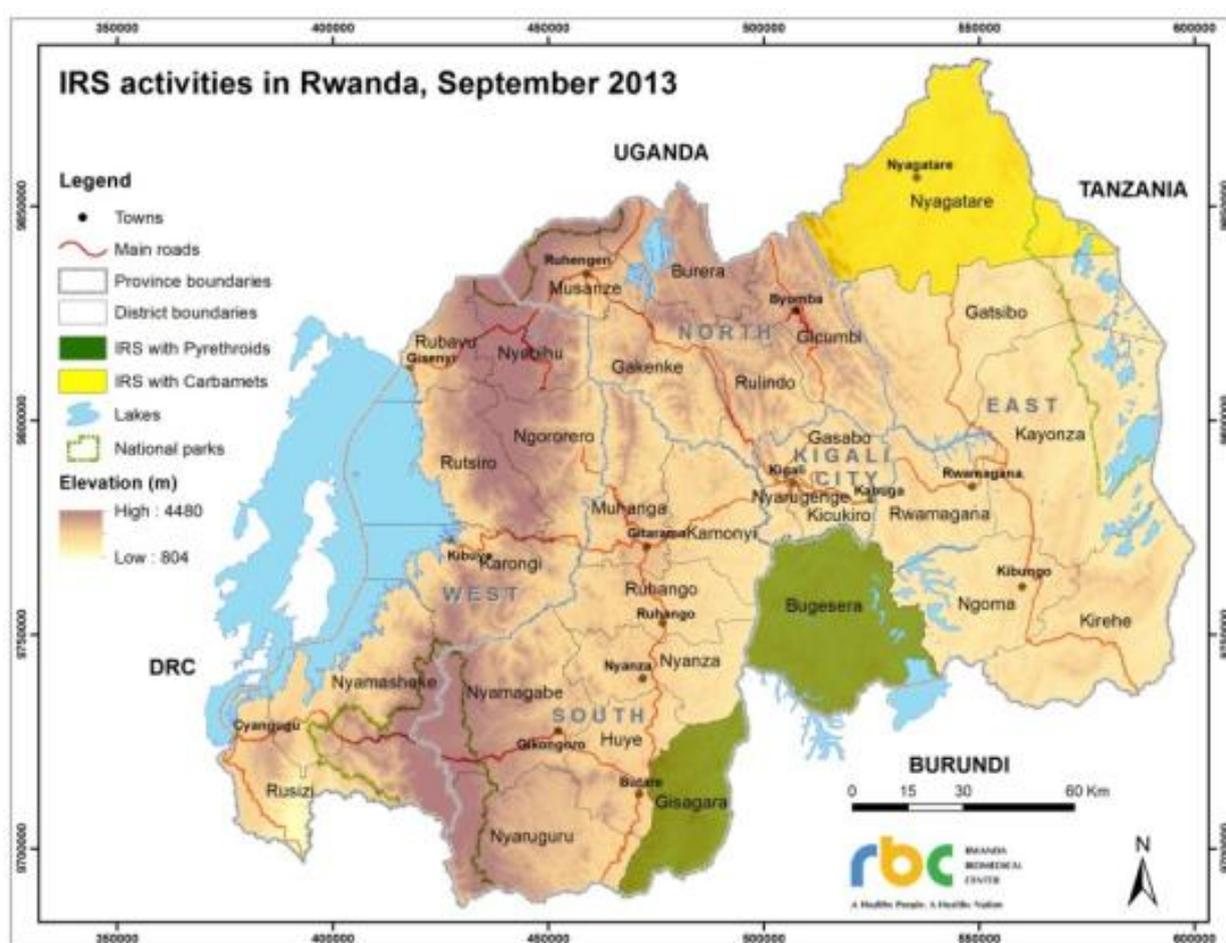


Table 2 shows a summary of the target structures in the 37 sectors.

**TABLE 2: TARGET STRUCTURES FOR IRS ROUND 10**

District	Number of Sectors	Number of Target Structures	Target Population	
			Females	Males
Bugesera	12	65,066	141,065	132,235
Gisagara	11	61,889	136,465	119,713
Nyagatare	14	92,507	214,413	204,651

## 2.2 DISTRICT PLANNING MEETINGS

Following the choice of the target sectors in the three IRS districts, collaboration and coordination between stakeholders was initiated. Micro-planning meetings with district and sector authorities in the three districts and 37 sectors were conducted in July 2013. In each of the districts, a one-day planning meeting was organized to discuss and develop an IRS operational plan with local leaders. In addition, the roles and responsibilities of each of the partners were discussed and agreed upon. The issues discussed during the micro-planning meetings included:

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

## 2.3 INSECTICIDE SELECTION

A carbamate, Bendiocarb, was used during the September 2013 IRS campaign in Nyagatare district. The selection was based on data obtained from insecticide susceptibility assays that were carried out in 2012. 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 (see Annex 1). Within the carbamate class, the local vector species in the IRS target districts sites showed between 84% and 100% mortalities. Based on these results, a switch to carbamate was recommended (see Annex 2, MoH Letter on Insecticide Choice for 2013/2014). The balance of Deltamethrin WG 250 sachets from the February 2013 stock was used in Bugesera and Gisagara districts. This was based on a decision between MOPDD and PMI to use any remaining pyrethroid in the country following the switch to carbamates.

## 2.4 ENVIRONMENTAL ASSESSMENT

During the period of August 26 to September 5, 2013, the Rwanda AIRS team conducted pre-spray environmental assessments in the three IRS districts at the operation sites at the sector level. This was done using smartphones which were pre-programmed with environmental assessment checklists. Data was entered in the e-forms on the smartphones while at the field operational sites and submitted to a central database on an automated server at Abt Associates' Bethesda office. A work list was generated which was then instantly shared with the AIRS Chief of Party (COP), Technical Manager and the Environmental Compliance Manager to guide them on the actions to be taken in preparing the operation sites for IRS. The assessments involved identifying storage facilities and determining the suitability of soak pits that were used in the previous IRS round. In total, 17 storage facilities were rented while 22 were provided by the sector authorities at the sector office premises compared to 14 storage facilities rented and 28 provided by the sector authorities at the sector office premises in the August 2012 spray round. A total of 25 soak pits were refurbished and 14 new soak pits were constructed compared to 27 soak-pits refurbished and 15 new soak-pits constructed in August 2012. The refurbishments generally included clearing bushes in and around the soak pits, adding compacted murrum, fixing a

polythene sheet to the murrum, and fixing poles to further stabilize the fence. Table 3 shows the details of the refurbishments that were done at the operation sites.

The 2012 Supplemental Environmental Assessment (SEA) that was amended in 2013 in preparation for the February 2013 IRS campaign was sufficient for the September 2013 IRS campaign.

**TABLE 3: CONSTRUCTION AND REFURBISHMENTS AT IRS OPERATION SITES**

District/Province	Number of Operation Sites	Site Refurbished (soak pit, storeroom, fence, etc.)
Bugesera/ Eastern Province	12	7 soak pits refurbished 5 new soak pits constructed 3 offices and storage facilities provided by sector authorities 9 offices and storage facilities rented
Nyagatare/ Eastern province	16	15 soak pits refurbished 1 new soak pit constructed 8 offices and storage facilities provided by sector authorities 8 offices and storage facilities were rented
Gisagara/ Southern Province	11	3 soak pits refurbished 8 new soak pit constructed 11 offices and storage facilities provided at the sector offices

## 2.5 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 2013. During the logistics needs assessment the following were considered:

- Available stock of materials, consumables, and equipment;
- Transport arrangements, including vehicle hiring for spray operations and supervision;
- Estimation of insecticide, PPE, and spray equipment required to meet the needs of spraying; and
- Mobilization and distribution of equipment, materials, and supplies (see Annex 3).

### 2.5.1 INTERNATIONAL PROCUREMENT

International procured commodities included 85,449 sachets of carbamate insecticide (Ficam VP 80 WP). Table 4 shows the items and quantities that were procured internationally.

**TABLE 4: INTERNATIONAL PURCHASES**

Description	Quantity in Stock Before Campaign	Quantity Received	Total Quantity	Quantity Used	Quantity Damaged	Quantity in Stock after the Campaign
Spray Pump repair kits	3	20	23	10	0	13
USAID stickers	1,247	0	1,247	637	0	637
Respiratory masks	19,781	50,640	70,421	49,637	0	20,784
First aid kits	37	139	176	153	0	23
Latex nitrile gloves	4,216	3,168	7,316	3,741	0	3,575
Face shields	869	1,400	2,269	2,230	39	2,230
Suspension for hard hats (Inner part)	2,311	912	3,223	1,733	26	3,187
Head gears (Hard hat adapters)	2,449	900	3,349	1,914	1	3,349
Insecticide sachets (Ficam VC 80WP)	0	85,449	85,449	68,563	0	16,886
Measuring cylinder	25	0	25	23	0	25
Pump hose	100	0	100	30	0	70
Pressure gauge	28	0	28	21	0	7
Steel nozzle tip	685	0	685	572	0	113
Extension assembly (Lance)	82	0	82	29	0	53

### 2.5.2 LOCAL PROCUREMENT

Local procurement involved an open competitive tendering process in which a solicitation for quotes for the services or items was performed. The selection was done by the Abt Associates Rwanda procurement committee based on the best value according to the criteria given in the solicitation for the quotations. The services/items procured locally included the following. Please see Annex 3 for the detailed list.

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

### 2.5.3 MATERIAL DISTRIBUTION TO THE DISTRICTS AND OPERATION SITES

Following the February 2013 IRS campaign, IRS materials, such as coveralls, boots, helmets and pumps, were retained in the district storage facilities. Other items, such as respiratory masks, gloves and insecticide, were distributed from the central warehouse to the district stores in August and September. 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 5).

**TABLE 5: IRS COMMODITY DISTRIBUTION**

Site	Coveralls	Boots	Helmets	Gloves	Respiratory Masks	Deltamethrin WG 250	Carbamate	Pumps
Bugesera	1090	558	645	1625	15391	50974	0	408
Nyagatare	1624	833	872	2683	22871	0	71159	621
Gisagara	1256	633	684	1550	15420	52407	0	456

## 2.6 HUMAN RESOURCE REQUIREMENTS

The project recruited and deployed a total of 217 seasonal staff that provided support during the IRS operations across the three districts. Seasonal staff were comprised of three district coordinators, three district IEC assistants, 16 data clerks, four storekeepers, four logistics assistants, three pump technicians, three finance assistants, 39 sector coordinators, 100 sector supervisors, 39 sector IEC assistants, and three office cleaners.

The implementation of IRS operations in the sectors was conducted by spray operators (1,219), team leaders (299), washers (112), cell IEC supervisors (214), and village IEC mobilizers (3,211). A total of 102 nurses (side effect managers) and security guards (87) 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 slightly more females (26.6%) as seasonal staff compared to the 25.7% women hired for the August 2012 campaign. In February 2013, 30.8% of all IRS personnel hired were female. It is noteworthy that this past spray round, more than half of hired spray operators and team leaders (53.3%) were female. Table 6 enumerates the IRS seasonal support staff by gender and district.

**TABLE 6: SEASONAL IRS STAFF HIRED BY DISTRICT**

Staff Position	Bugesera		Gisagara		Nyagatare		Total	% Females Hired
	Male	Female	Male	Female	Male	Female		
District Coordinators	1	0	1	0	1	0	3	0.0%
District IEC Assistants	1	0	1	0	0	1	3	33.3%
Data Clerks	2	3	2	3	4	2	16	50.0%
Storekeepers	1	1	1	0	1	0	4	25.0%
Logistics Assistants	2	0	1	0	1	0	4	0.0%
Finance Assistants	0	1	0	1	0	1	3	100.0%
Sector Coordinators	8	4	5	6	9	7	39	43.6%
Sector Supervisors	14	15	14	14	22	21	100	50.0%
Sectors IEC Assistants	3	9	8	3	9	7	39	48.7%
Spray Operators	165	197	165	179	215	298	1,219	55.3%
Team Leaders	50	40	51	33	63	62	299	45.2%
Cell IEC Supervisors	49	8	27	24	62	44	214	35.5%
Village IEC Mobilizers	968	80	724	178	1,176	85	3,211	10.7%
Security Guards	31	2	22	0	32	0	87	2.3%
Adverse effect Managers	16	15	18	9	28	16	102	39.2%

Washers	3	29	9	23	16	32	112	75.0%
Pump Technicians	1	0	1	0	1	0	3	0.0%
Cleaners	1	0	1	0	1	0	3	0.0%
<b>Total</b>	<b>1316</b>	<b>404</b>	<b>1051</b>	<b>473</b>	<b>1,641</b>	<b>576</b>	<b>5,461</b>	<b>26.6%</b>

## 2.7 IRS TRAININGS

Prior to the commencement of IRS activities, a team of Abt Associates staff members reviewed and updated the IRS training manuals and materials, including IRS brochures, data forms, supervision checklists and the IRS structure cards. In addition, training sites and external trainers were identified in advance of the trainings. The trainings covered the following key topics:

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

### 2.7.1 TRAINING OF TRAINERS

A refresher training of trainers (ToT) was organized and conducted in collaboration with MOPDD on August 5-8, 2013. Since all participants had gone through the ToT during the 2012 and February 2013 IRS preparations, the ToT was aimed at refreshing the participants' skills and knowledge of IRS. During the training, they received instructions on methods to conduct IRS training and supervision to the IRS implementers. The training consisted of both theory and practical sessions through group discussions, demonstrations, lectures and question and answer methods. The participants included 39 IRS sector coordinators, 100 IRS Sector Supervisors and 32 reserves. 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 numbers of the trainers are shown in Table 7.

**TABLE 7: NUMBERS OF TOT PARTICIPANTS, BY GENDER**

IRS Role	Number of Participants		Total
	Male	Female	
Sector Coordinators	23	16	39
Sector Supervisors	62	70	132
<b>Total</b>	<b>85</b>	<b>86</b>	<b>171</b>

**FIGURE 2: IRS PRACTICAL TRAINING SESSION**



### **2.7.2 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 periods of August 26-30 in Gisagara and Bugesera, and September 2-7 in Nyagatare in designated training sites provided by sector authorities and others rented by Abt Associates. The major objective of the training was to equip the SOPs and TLs with skills to conduct quality IRS.

Prior to training, all the SOPs and TLs went through a medical examination in their respective district hospitals to ensure that they were medically and physically fit to perform IRS activities. The female SOPs and TLs were screened for pregnancy. In addition, the SOPs and TLs had to fully meet the selection criteria to be eligible for training and IRS operations. The selection criteria required an SOP or TL to be:

- A native 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 4) 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 1,597 spray operators were trained and details are provided in Table 8. A total of 140 facilitators (TOT participants) conducted the training. Females comprised of roughly 50% of facilitators and spray operators trained.

**TABLE 8: NUMBER OF SPRAY OPERATORS TRAINED TO IMPLEMENT IRS**

District	Training Sites	Spray Operators Newly Trained			Spray Operators Previously Trained			Facilitators		
		Male	Female	% Females	Male	Female	% Females	Male	Female	% Females
Nyagatare	14	117	149	56.0%	166	243	59.4%	30	28	48.3%
Gisagara	6	104	136	56.7%	122	87	41.6%	18	21	53.8%
Bugesera	10	92	122	57.6%	132	127	49.0%	24	19	44.2%
<b>Total</b>	<b>30</b>	<b>313</b>	<b>407</b>	<b>56.5%</b>	<b>420</b>	<b>457</b>	<b>52.1%</b>	<b>72</b>	<b>68</b>	<b>48.6%</b>
		<b>720</b>			<b>877</b>			<b>140</b>		

### 2.7.3 DATA COLLECTION TRAINING

Between August and September 2013, the AIRS Rwanda team, led by the M&E and Database Manager, facilitated data collection training sessions during the ToT for sector coordinators, supervisors and sector IEC assistants. They also facilitated the data collection training for spray operators, team leaders, IEC mobilizers and data entry clerks. The training focused on the following key topics:

- Familiarity with data collection forms (spray operator and team leader forms, IEC village and cell mobilizer forms) and the AIRS Supervisory Toolkit;
- Understanding key IRS definitions (e.g. eligible structure) and indicators;
- Supervisory roles and responsibilities;
- Reviewing collected data and spotting irregularities;
- Timely, consistent, and accurate reporting;
- Setting appropriate and realistic reporting timelines;
- Establishing a backup reporting/ communication protocols;
- AIRS database and security protocols; and
- Data Quality Assurance and Control.

### 2.7.4 LOGISTICS TRAINING

All the staff who would be involved in logistics and storekeeping during the implementation of IRS were trained. Sector coordinators, sector supervisors and IEC assistants were given basic skills in logistics and stores management during the ToT sessions. A comprehensive, two-day training was conducted for four logistics assistants and four storekeepers at the Abt Associates office in Kigali. Participants were trained on the following topics:

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

### 2.7.5 WASHER TRAINING

A total of 112 washers were given a one-day refresher training/orientation at 39 operational sites in the three IRS districts before the commencement of IRS operations. Sector Coordinators and Sector Supervisors were responsible for this refresher training at their respective operational sites. The washers were instructed on the use of PPE, soak pit maintenance, effluent waste disposal, and insecticide effects on humans and the environment. They were also advised on how to respond to insecticide adverse effects that

they might experience. Table 9 shows the numbers of washers trained by gender per district.

**TABLE 9: WASHERS TRAINED BY GENDER PER DISTRICT**

<b>District</b>	<b>Male</b>	<b>Female</b>	<b>% Females</b>
Nyagatare	16	32	66.7%
Gisagara	9	23	71.9%
Bugesera	3	29	90.6%
<b>Total</b>	<b>28</b>	<b>84</b>	<b>75.0%</b>

### 2.7.6 FIRE AND TRANSPORTATION SECURITY TRAINING

Eighty-seven security guards were given an orientation on fire security and general security protocol for the IRS stores. Ninety-five IRS drivers were given an orientation on safety procedures while transporting insecticides and 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 occurs leading to an insecticide spill.

Table 10 shows the number staff in all roles trained to deliver IRS.

**TABLE 10: 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 / Env. Compliance		Coveralls Washing		Fire Security			Transport Security	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F
Sector Coordinators	23	16																					39
Sector Supervisors	62	70																					132
Spray Operators			569	729																			1,298
Team Leaders			164	135																			299
Data Entry Clerks					9	12																	21
Logisticians							4	0															4
Store Keepers							3	1															4
Pump Technicians									3	0													3
District IEC Assistants											2	1											3
Sector IEC Assistants											71	65											136
Cell IEC Mobilizers													138	76									214
Village IEC Mobilizers													2,868	343									3,211
Clinicians															72	35							107
Washers																	28	84					112
Security Guards																			85	2			87
Drivers																					95	0	95
<b>TOTAL M/F</b>	<b>85</b>	<b>86</b>	<b>733</b>	<b>864</b>	<b>9</b>	<b>12</b>	<b>7</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>73</b>	<b>66</b>	<b>3,006</b>	<b>419</b>	<b>72</b>	<b>35</b>	<b>28</b>	<b>84</b>	<b>85</b>	<b>2</b>	<b>95</b>	<b>0</b>	<b>5,765</b>
<b>TOTAL/Training</b>	<b>171</b>		<b>1,597</b>		<b>21</b>		<b>8</b>		<b>3</b>		<b>139</b>		<b>3,425</b>		<b>107</b>		<b>112</b>		<b>87</b>		<b>95</b>		<b>5,765</b>
<b>GRAND TOTAL</b>	<b>5,765</b>																						

## 3. INFORMATION, EDUCATION AND COMMUNICATION

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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 two-day training of trainers on mobilization was conducted in Kigali on August 9-10, 2013 by AIRS Rwanda in collaboration with MOPDD. The trainees included the District Coordinators, District IEC Assistants, Sector IEC Assistants, Sector Supervisors and Sector Coordinators. They were trained to train the IEC mobilizers at the cell and village level, and to be in charge of coordinating and supervising all IEC/IRS activities. A total of 139 candidates (73 males and 66 females) participated in this training, including three District Coordinators, three District IEC Assistants, 39 Sector IEC Assistants, 39 Sector Coordinators, and 55 Sector Supervisors.

The main objective of the training was to strengthen participants' knowledge and capacity to train and disseminate IEC and Behavior Change Communication (BCC) messages to IEC community mobilizers and to also effectively plan, coordinate and supervise IEC IRS activities. The training included both theory and practical sessions among which were mock sessions to practice IRS mobilization and filling of data collection tools. The trainees were also taught how to develop and update a community mobilization plan.

#### 3.1.2 TRAINING OF IEC COMMUNITY MOBILIZERS

The training of IEC mobilizers was conducted on August 20-22, 2013 in Bugesera and Gisagara District and August 27-29, 2013 in Nyagatare District in designated training sites in the sectors. The trainees were village and cell leaders who were recruited based on the criteria that: 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 with help from District Coordinators, District IEC Assistants and local leaders at the sector and cell levels. Overall coordination was done by 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 three 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 3,425 mobilizers (419 females and 3,006 males) were trained. Each sector and cell team also developed an individual community mobilization implementation plan. Table 11 below shows the number of mobilizers that received training by district.

**TABLE 11: NUMBER OF IEC MOBILIZERS TRAINED TO IMPLEMENT IRS**

District	Number of IEC Mobilizers Trained				TOTAL	% Females Trained
	Cell		Village			
	Male	Female	Male	Female		
Bugesera	49	8	968	80	1,105	8.0%
Gisagara	27	24	724	178	953	21.2%
Nyagatare	62	44	1,176	85	1,367	9.4%
<b>TOTAL</b>	<b>138</b>	<b>76</b>	<b>2,868</b>	<b>343</b>	<b>3,425</b>	<b>12.2%</b>

### 3.2 DOOR-TO-DOOR MOBILIZATION<sup>5</sup>

Door-to-door mobilization of structures was conducted for two to four days in each village during the period of August 30 to October 11, 2013. During this exercise, village mobilizers reached eligible structures with IRS messages and distributed IRS structure cards to those who lost/never received cards, and brochures to each identified eligible structure. They also collect data using the IEC Mobilizer Form/Card and communicated the dates of spraying to the structure owners. They marked the outside doors of the structures that were mobilized with the given IRS structure number located on the IRS card (Figure 3). A total of 222,336 structures were mobilized with a 98.7% IRS acceptance rate recorded. Some 219,810 brochures were distributed. Table 12 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 collected.

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<sup>5</sup> Mobilization results were calculated using *totals* data (vs. *details* data.)

**FIGURE 3: MOBILIZATION**



*Left: A village mobilizer sensitizes a household owner; Right: A marked door of a structure that has been mobilized.*

**TABLE 12: RESULTS OF IRS MOBILIZATION ACTIVITY**

District	Structures Sensitized	Adults Reached with IRS Messages		Number of Structures Accepting IRS	Percent of Structures Accepting IRS	Brochures Distributed
		Male	Female			
Bugesera	67,897	67,354	81,953	66,727	98.30%	66,729
Gisagara	60,687	66,527	85,198	60,609	99.90%	60,389
Nyagatare	93,752	96,242	114,189	92,037	98.20%	92,692
<b>TOTAL</b>	<b>222,336</b>	<b>230,123</b>	<b>281,340</b>	<b>219,373</b>	<b>98.70%</b>	<b>219,810</b>

### 3.3 IEC COORDINATION

During the entire period of spraying, local leaders at all levels readily provided support. Sector executives and social affairs officers were very instrumental in linking spray operations teams to target communities. Each of the IRS districts had a district IEC staff member who coordinated and supervised district IEC activities. They worked closely with the District Vice Mayors in charge of social affairs and district health officers to supervise the district IEC activities. Sector IEC staff worked closely with sector and cell social affairs, and sector coordinators to supervise the sector IEC activities. The Sector IEC supervisors issued the village mobilizers the materials (structure cards, brochures and IEC data collection tools) a day before the mobilization date of the village. The supervision team ensured that the cell and village mobilizers mobilized all eligible structures; all structure owners were informed of the date of spraying, at least a day in advance; and that the data collected was accurate. IEC teams worked according to the updated IRS schedule each day.

On the actual spraying date, the IEC mobilizers directed spray operators to the mobilized structures. The IEC mobilizers also noted structures that were not sprayed on the planned day and coordinated with spray operators to have them sprayed the following day.

## 3.4 OTHER IEC ACTIVITIES

### 3.4.1 COMMUNITY MOBILIZATION MEETINGS BY LOCAL LEADERS

Local leaders participated in mobilization activities. The Mayor of Gisagara District presided over the IRS launch in the district which was held at Gikore Health Center in Kansi sector on September 2, 2013. The sector executive secretaries and social affairs officers 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 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 August 31 and September 28, 2013.

AIRS had earlier 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 villages leaders who are also the IEC mobilizers for IRS. The main message was to encourage the community members to prioritize the spraying of their houses, since the spraying season coincided with the season in which they prepare their farms for planting. The Vice Mayors and Sector Executive secretaries helped deliver the IRS message to the population in the IRS districts.

### 3.4.3 MASS MEDIA COMMUNICATION

Six live radio talk shows were aired on District Community Radios: two on Radio Nyagatare, two on Radio Huye, and two on Radio Huguka Bugesera. During the first set of radio talk shows, community members called in to ask for clarifications on matters of IRS. IRS myths and fears were discussed during these sessions. A second radio talk show for every radio station was aired mid-way during operations to update the community on the ongoing spraying activities. Both sets of talk shows were live on Radio Huye and Radio Nyagatare, and were hosted by the District Health officers and IRS District Coordinators.

Radio spots were aired twice daily from August 26 to September 19, 2013 for Gisagara and Bugesera District and from September 2 to 26, 2013 for Nyagatare District. The key messages relayed during the radio spots were the importance of IRS in the fight against malaria, the IRS campaign dates, the role of the community in IRS activities (before, during and after spraying), adverse effects management, and information on the funding agency.

Mass media communication was further enriched using 45 banners which were placed at hospitals and district and sector offices. The message printed on the banners was "*Birakureba*" (Kinyarwanda for "This concerns you") (see Figure 4). Table 13 presents details on the mass media communication activities done during the IRS operations.

**FIGURE 4: IRS BANNER**



**TABLE 13: MASS MEDIA COMMUNICATION ACTIVITIES**

<b>Dates</b>	<b>Type of IEC Activity/Material</b>	<b>Frequency/Number Produced</b>
August 29, 2013	Radio Talk show	1 Radio Talk Show on Radio Huye and 1 Radio Talk show on Huguka Bugesera
September 8, 2013	Radio Talk show	1 Radio Talk Show on Radio Nyagatare
September 18, 2013	Radio Talk show	1 Radio Talk Show on Radio Huguka Bugesera
September 20, 2013	Radio Talk show	1 Radio Talk Show on Radio Huye
October 3, 2013	Radio Talk show	1 Radio Talk Show on Radio Nyagatare
August 26 to September 19, 2013	Radio spots	50 times on Radio Huye station and 50 times on Radio Huguka Bugesera station aired 2 times per day for each radio station.
September 2 -26, 2013	Radio Spots	50 times on Radio Nyagatare station aired 2 times per day

## 4. IMPLEMENTATION OF IRS ACTIVITIES

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The 10<sup>th</sup> round of IRS implementation was carried out over a 30-day period from September 2 to October 5 in Bugesera and Gisagara, and September 9 to October 12 in Nyagatare.

### 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 such teams. Supervisors reported directly to the sector coordinator, who in turn reported to the district coordinator.
- A full-time AIRS staff member was appointed to be in charge of each district to coordinate routine daily supervision by working closely with the district staff and all other supervisors (from AIRS and other stakeholders). At least three AIRS staff were in the field Monday through Thursday every week in each district to provide supportive supervision to the district staff.
- 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 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 the operations.
- Supervision was also augmented by use of supervision checklists (see Annex 5), 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.
- Regular meetings were held at all levels (national, district and sector) to review the progress of IRS and check on implementation of recommendations reached during the operations.

Table 14 summarizes the institutions/stakeholders which participated in supervision.

**TABLE 14: INSTITUTIONS/ STAKEHOLDERS THAT PARTICIPATED IN IRS SUPERVISION**

<b>Level</b>	<b>Institution</b>	<b>Responsibilities</b>
National Level	MOH/MOPDD/Rwanda Biomedical Center (RBC), Rwanda Environmental Management Authority (REMA) USAID/PMI Abt Associates	Overall supervision for IRS activities
District and Sector Level (Local Authorities)	District Vice Mayor/Social Affairs District Health Director District Environmental Health Officer Sector Social Affairs	Close supervision in districts and environmental protection

As part of supervision activities, AIRS supervisors convened at the Abt Kigali office every Friday during the IRS operations period for a feedback meeting to review the progress of IRS activities. One such meeting bringing together the MOPDD, district coordinators and AIRS supervisors, was held in Kigali after the concluded spray round. Each district coordinator delivered a presentation on their progress and outlined challenges and solutions. During these interactions, MOPDD representatives and the Abt Kigali team discussed the issues at hand and provided guidance to the district coordinators.

## **4.2 LOGISTICS**

### **4.2.1 IRS STORAGE AND INSECTICIDE STOCK MANAGEMENT**

District level storage facilities in each district served as distribution centers for IRS materials, equipment, and supplies which were used during the IRS operations. The district storage facilities were attended by a logistics assistant and a storekeeper who also ensured distribution and close supervision of supplies and materials at the operation sites storage facilities. There were 39 storage facilities at the operation sites in the three districts, 22 of which were provided at the sector offices at no cost, as the district/sector authority contribution to the IRS campaign. The other 17 facilities were rented at premises near the sector offices. Each of the Sector Coordinators was in charge of storage management at the sector level with oversight from the District Logistics Assistant and storekeeper.

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

### **4.2.2 IRS VEHICLES**

A total of 101 vehicles were contracted for the support of the IRS operations in the three districts. Table 15 shows the number of vehicles assigned to each district.

**TABLE 15: DISTRIBUTION OF VEHICLES IN THE DISTRICTS**

District	Vehicles for SOP's	Vehicles for Supervision	Total
Bugesera	28	2	30
Gisagara	27	2	29
Nyagatare	40	2	42
<b>Total</b>	<b>95</b>	<b>6</b>	<b>101</b>

### 4.3 SAFETY AND ENVIRONMENTAL COMPLIANCE

Prior to the start of operations, all the team leaders, spray operators and washers underwent medical tests to ensure their fitness to participate in the IRS operations. Anyone who was found unfit did not participate in the operations.

The tests comprised of:

- A routine physical examination;
- Pregnancy tests for females; and
- Hematocrit and liver function tests (AST, ALT).

At the third week into the IRS operations, pregnancy tests were repeated for the females and eight SOPs were found to be pregnant. Unfortunately, since the IEC positions were already filled, these operators could not be re-assigned to those positions.

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

Soak pits were monitored throughout operations. Plastic sheeting used at the wash areas to ensure that insecticide contaminated effluent does not pollute the environment was replaced where and when it was deemed necessary. The soak pit and wash areas were fenced and gated to ensure that non-authorized entities did not access the premises. The progressive (triple) rinsing system was used at each soak pit for washing spray pumps. Trained washers washed the PPE over the soak pits at the end of each spray day. The spray operations teams also washed their bodies in the provided washrooms at the end of every work day to decontaminate themselves.

The mid-spray environmental compliance inspections were carried out during the spray operations in the three IRS districts to ensure that mitigation measures put in place during spray operations were adhered to. The inspection was done by Abt AIRS staff in

conjunction with the district environmental officers using smartphones as well as paper checklists.

The inspection teams assessed the use of PPE during spraying and washing activities, stores records and arrangement, transportation of SOPs, and use of warning signs and first aid kits. Additionally, the validity of 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.

#### 4.4 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS

Each of the three IRS districts had a team in charge of adverse effects. The team was comprised of a coordinator, a doctor who was based at the district hospital and two nurses based at each health center affiliated with each IRS operation site. These teams were responsible for addressing any adverse effects experienced by community members and/or the spray operations support staff during the spray operations. Before the start of the IRS operations, this team received refresher training at each district on management of IRS adverse effects. A total of 14 cases were reported in the three districts throughout the operations. The associated symptoms of the reported cases were mild, limited to localized irritations of eyes or dermal rashes and headaches. All of the cases were attended to appropriately and the persons affected recovered within a few hours of attention. Table 16 below provides a summary of the adverse effects that were reported in all districts and were attended to at either a health center or district hospital.

**TABLE 16: NUMBER OF ADVERSE EFFECTS CASES**

District	Number of Cases	Symptoms
Bugesera	9	Itchy skin and rashes Eye irritation Headache
Nyagatare	4	Itchy skin and rashes Headache, nausea
Gisagara	1	Headache, eye irritation and running nose

#### 4.5 IRS PAYMENTS

Before the start of the spray operations, a one-day refresher training was conducted bringing together District Coordinators (3), Finance Assistants (3), Accountant (1) and Receptionist (1). The participants were briefed on responsibilities to ensure efficient management of funds and facilitation of logistical support. The responsibilities of the District Coordinator and the finance assistant included:

- Distribution and collection of signed contracts from all the seasonal staff (SOPs, TLs, washers, security guards and mobilizers).
- Collection of all timesheets for seasonal staff before preparing payrolls.
- Preparation of payrolls that were approved and submitted by the District Coordinator based on the schedule of payments made by the Finance Manager at the start of the IRS campaign.

- Follow up with the Savings and Credit Cooperatives (SACCO) banks (Microfinance Banks) to ensure that all the seasonal staff received their payments and signed the payroll.
- Collection of invoices from food vendors and sending them to the Abt Associates' Rwanda finance office for payments.
- Collection and reconciling of IRS vehicle logs sheets.

IRS support staff hired by AIRS at the district level were paid through their bank accounts by electronic transfer. Other seasonal staff 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 a proof of payment.

During the September 2013 IRS round, the following funds were transferred through SACCOs:

- 127,374,693 Rwf (\$199,023) in Nyagatare District.
- 89,229,161 Rwf (\$139,421) in Bugesera District.
- 87,011,250 Rwf (\$135,955) in Gisagara District.



# 5. Post-Spray Activities

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## 5.1 POST SPRAY REVIEW MEETINGS

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

- Review the overall IRS programmatic implementation process for the 2013 spray round, experiences and achievements of the IRS round;
- Disseminate IRS results and findings of the Entomological studies conducted in collaboration with MOPDD-RBC;
- Review IRS challenges in the three IRS target districts and come up with recommendations for the next spray cycle; and
- Reach a consensus on the recommendations and way forward for next spray cycles.

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

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

At the national level, a partner review meeting took place on November 7, 2013 to evaluate the achievements of the IRS operations. Participants were drawn from MOH (national and district levels), Abt Associates, and PMI. Presentations at the review meeting covered the following topics:

- District malaria trends in the last two years;
- IRS planning and implementation, coverage, achievements and challenges;
- Training and capacity building;
- Logistics management and commodity distribution;
- Advocacy, communication and social mobilization campaign;
- Best practices and environmental/ personal safety; and
- IRS supervision.

The number of participants who attended the review meetings is shown in Table 17.

**TABLE 17: EVALUATION MEETINGS PARTICIPANTS**

District	Review Meeting Dates	Participants		Total
		Male	Female	
Bugesera	October 18, 2013	44	18	62
Gisagara	October 17, 2013	46	21	67
Nyagatare	October 22, 2013	48	16	64
National	November 7, 2013	34	14	48
<b>Total</b>		<b>172</b>	<b>69</b>	<b>241</b>

The summary of recommendations from review meetings were:

- Recruit SOPs only from the pool of existing CHWs with previous IRS experience and strictly adhere to all criteria laid down by the MOH during recruitment of SOPs.
- The recruitment exercise should be conducted by the President In-charge of CHWs at the sector and list verified by the health facility in-charge, Sector Social Affairs and signed off by the Sector Executive Officer.
- Review the recruitment criteria for community mobilizers to involve more women, CHWs and other critical community groups.
- Review the staffing structure of community mobilizers to be proportionate to village size to enhance mobilization coverage and also utilize all available avenues for mobilization including community leaders meetings, Umuganda, etc.
- Conduct training for district and sector IRS focal persons to enhance their knowledge and capacity for conducting and supervising IRS.
- Incorporate IRS in district and sector annual plans of action to avoid disruption of IRS activities.
- Involve a wide range of stakeholders at district and sector levels including MOA, MOE in IRS planning and implementation.
- Local leaders should have weekly meetings with IRS staff during IRS preparations, implementation and supervision to address the key issues of mobilization and IRS operations.
- Conduct a mobilization meeting at cell level at the start of the spray campaign involving cell leaders and IEC supervisors.

## 5.2 POST SEASON ENVIRONMENTAL ASSESSMENT

The post-season environmental assessment was conducted in the three districts using smartphones. During the assessment it was confirmed that all IRS items were collected from the operation sites and that insecticides and IRS wastes were taken to district storage facilities. Soak pits and their surroundings were well cleaned, covered, and the doors securely locked. Soak pits that had been constructed on rented space were pulled down and pit areas restored to previous conditions by filling in and leveling with soil. For soak pits that were constructed at sector premises, AIRS agreed with the district and sector authorities that the sectors would provide security to the soak pits and wash areas to ensure that they

are not vandalized during the non-spraying season. Stores were cleaned/ decontaminated before handing them over to the owners.

### 5.3 IRS WASTE DISPOSAL

IRS wastes were disposed at different sites according to the type generated during the IRS operations. A total of 3,247 kg of contaminated wastes comprised of 171,943 empty insecticide sachets, 49,637 used masks and insecticide boxes, were sent to the Gahini Hospital incineration plant whose combustion temperature is 1100° Celsius for incineration (This is the only incinerator in the country that meets AIRS' specifications). Since the Gahini Hospital incinerator broke down, IRS waste is yet to be incinerated. Repair work on the incinerator is currently being undertaken. An incineration certificate will be issued and shared with PMI once the incineration is done. Other wastes, including 72 pairs of worn-out boots, 3,809 used gloves, and assorted plastics items (9 damaged barrels, 5 jerry cans and 23 basins) were disposed of at the Entreprise pour la Protection de l'Environnement et Development Rural (EPEDR) Recycling plant. A total of 462 uncontaminated cartons were donated to Cards from Africa Company at Samuduha. Other uncontaminated wastes such as empty boxes and papers were disposed of at the Nduba dumping site.

### 5.4 INVENTORY

Following completion of the IRS operations, all the commodities at the sector stores were transported to the district stores. The sector coordinators updated their stock records and handed them over to the district storekeepers/logistics assistants. At the district stores, stock records were updated to show the remaining stock including the commodities that were retrieved from the sector stores and the district inventories were updated accordingly. Table 18 shows a summary of the remaining stock. See Annex 7 for detailed inventory.

**TABLE 18: STOCK OF IRS COMMODITIES**

Item	Quantity Before the Campaign	Unit	Quantity Used	Remaining Stock after the Campaign
Coveralls	5,535	Piece	3,809	5,485
Boots	2,052	Pair	1,904	1,980
Helmets	3,088	Piece	1,669	3,072
Head Gear	3,349	Piece	900	3,349
Inner part for Helmets	3,223	Piece	1,733	3,187
Face Shields	2,884	Piece	2,230	2,845
First Aid kits	176	Piece	153	23
Latex Nitrile Gloves	7,384	Pair	3,809	3,575
Respiratory Masks	70,421	Piece	49,637	20,784
Spray Pumps	1,772	Piece	1,500	1,772
Spray Pump Repair Kits	23	Kit	10	13
Nozzle Tips 8002E	685	Piece	572	113
Pump Hoses	100	Piece	30	70
Pressure Gauges	28	Piece	21	7
Extension Assembly	82	Piece	29	53
Deltamethrin Sachets	103,381	Sachet	103,381	0
Bendiocarb Sachets	85,449	Sachet	68,563	16,886



# 6. MONITORING AND EVALUATION

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Monitoring and evaluation for the September 2013 IRS campaign closely followed the processes outlined in the 2012-2013 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 staff 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 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 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-level.

### 6.3 DATA QUALITY ASSURANCE AND CONTROL

During the September spray round, AIRS Rwanda introduced the AIRS M&E Supervisory Toolkit, which consists of the following three 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. These forms were used to ensure that data collection forms were filled out completely and properly. They highlight common errors that had been recorded in previous spray campaigns, to make it easier for supervisors to identify and make corrections where necessary. 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 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.
- Data Entry Verification (DEV) forms verify data entry accuracy. The DEV forms were used by District IEC Assistants, District Coordinators, M&E Assistants and Abt staff at each data center. (See Annex 5: Summary of M&E supervision checklists completed by AIRS Staff).

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). Annex 5 lists the number of spray operator and mobilizer forms checked for both data collection and data entry with the new supervisory tools. We provide more detail below about the specific activities we performed to ensure high-quality data, regarding physical data verification (spray and mobilization), database quality control, and random spot checks.

### 6.3.1 PHYSICAL DATA VERIFICATION

Physical data verification was performed at three different levels with the EE:

- Spray Operator Level: 100% of spray data collected on spray operator forms were reviewed, arithmetically verified, and signed off by the team leaders and sector supervisors.
- District Level: Sector and District Coordinators collected the Daily Spray Operator Forms from team leaders and checked the accuracy of the spray data. Spray forms were then transmitted to the data centers each evening.
- Data Entry Level: Data clerks reviewed each form for typos and transcription errors and verified the arithmetic before entering the data into the database.

### 6.3.2 DATABASE QUALITY CONTROL

As in previous spray campaigns, the Access database used programmed audit checks and data locks that prevent data clerks from mis-entering data. For this particular campaign, however, Abt Associates' Client Technology Center (CTC) introduced 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 (greater than 80,000 structures per data center). CTC also developed the IRS cleaning/reporting tool to help data clerks to clean and reconcile data. We hired sufficient data clerks this campaign to allow enough time for one clerk to use the IRS cleaning/reporting tool every day to clean data. As a result, the time to complete data cleaning was reduced considerably from two weeks to just under five days. The cleaning/reporting tool also enabled them to generate local reports for each district.

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

### 6.3.3 RANDOM SPOT CHECKS

The M&E and Database Managers performed daily data verification activities of the Access database to guarantee the quality of the data. They scanned the database and ran spray progress reports to identify anomalies and data entry errors. AIRS supervisory staff also retrieved paper spray forms and randomly crosschecked these with the data that had been entered into the database using the DEV in each data center. 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 the DEV and IRS cleaner/reporter to identify data entry errors and provided corrections and feedback to the data clerks.

Finally, AIRS supervisory staff conducted field checks by visiting random structures found by spray operators (based on spray form records) and interviewed the residents to collect spray campaign information. Using the DCV, supervisory staff compared the data collected

from the field checks with data collected by spray operators on the data collection forms. Any discrepancies were addressed and rectified with the appropriate AIRS staff.

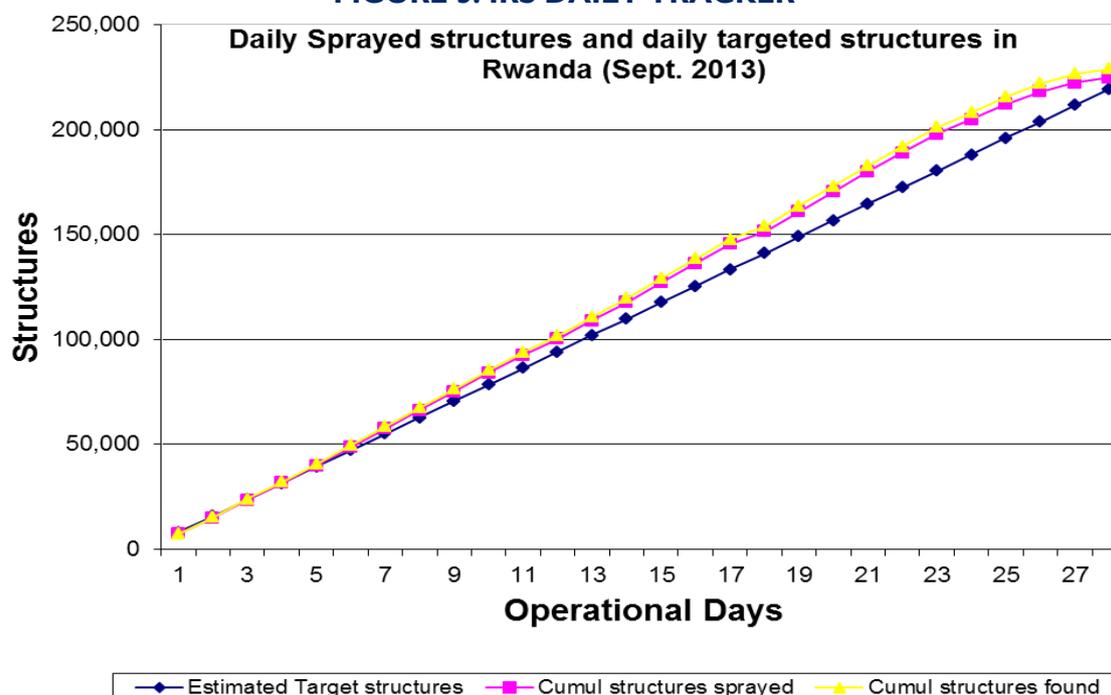
## 6.4 IRS RESULTS

During the spray campaign, 224,708 structures of the 229,039 structures found were sprayed, resulting in 98.1% spray coverage. A total of 957,027 people were protected, including 16,023 pregnant women and 147,531 children under five years old<sup>6</sup> (see Table 19).

**TABLE 19: SUMMARY OF RWANDA IRS RESULTS FOR SEPTEMBER 2013 CAMPAIGN**

District	Total Structures Found	Total Structures Sprayed	Spray Coverage (%)	Total Population Protected			
				Male	Female	Pregnant Women	Children <5 Years
Gisagara	61,231	60,676	99.1	117,886	135,148	3,663	38,602
Bugesera	67,362	65,021	96.5	131,060	140,317	4,494	42,661
Nyagatare	100,446	99,011	98.6	210,669	221,947	7,866	66,268
<b>Total</b>	<b>229,039</b>	<b>224,708</b>	<b>98.1</b>	<b>459,615</b>	<b>497,412</b>	<b>16,023</b>	<b>147,531</b>

**FIGURE 5: IRS DAILY TRACKER**



<sup>6</sup> September 2013 IRS campaign results do not include special team operations.

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

During the September 2013 spray campaign, a total of 230 dormitories were sprayed in 44 schools and three prisons in the three IRS target districts, protecting 16,311 people. Seven hundred and sixty eight (768) insecticide sachets were used (see Table 20).

**TABLE 20: IRS RESULTS FOR SCHOOLS AND PRISONS IN IRS DISTRICTS**

District	Number of Schools	Number of Prisons	Number of Dormitories	Population Protected		Found Rooms	Sprayed Rooms	Spray Coverage (%)	Mosquito Nets Available
				Male	Female				
Bugesera	14	1	70	3,946	2,092	196	193	100	1,689
Gisagara	13	-	69	1,806	2,872	141	139	100	3,216
Nyagatare	17	2	91	2,548	3,047	434	428	100	2,999
<b>Total</b>	<b>44</b>	<b>3</b>	<b>230</b>	<b>8,300</b>	<b>8,011</b>	<b>771</b>	<b>760</b>	<b>100</b>	<b>7,904</b>

### 6.4.2 INSECTICIDE USAGE

The total number of sachets used during the September 2013 campaign was 171,943 (166,324 and 768 sachets for structures and schools in the three target districts, respectively, and 4,851 sachets for the military and police). There were no sachets lost or damaged. On average, one sachet sprayed 1.4 structures (see Table 22). The average number of sachets used by a spray operator per day was 4.8, and each operator, on average, sprayed 6.5 structures per day in the three target districts.

**TABLE 21: INSECTICIDE USAGE<sup>8</sup>**

District	Total Structures Sprayed	Total Sachets Used	Average Number of Sachets per Sprayed Structure	Average Number of Sachets per SOP per Day	Number of Structures sprayed per day per SOP
Gisagara	60,676	52,114	1.16	5.1	6.3
Bugesera	65,021	50,672	1.28	5.0	6.7
Nyagatare	99,011	63,538	1.56	4.2	6.6
<b>Total</b>	<b>224,708</b>	<b>166,324</b>	<b>1.35</b>	<b>4.8</b>	<b>6.5</b>

### 6.4.3 POLICE AND MILITARY CAMPS

In addition to the targeted structures in the three districts of Nyagatare, Gisagara and Bugesera mentioned above, AIRS Rwanda supported spraying activities in prisons, police and military camps located in nine districts. The spray team was comprised of three security teams (Rwanda Defenses Forces, Republican Guard and Police). The three groups sprayed structures within military barracks, police barracks and prisons. Prior to the start of the operations, the spray operators and supervisors (55 males and 2 females) underwent training to equip them with skills in:

- Community mobilization;

<sup>7</sup> Spraying of special structures, such as dormitories, and special team spraying is only reported in the EOSR, not the weekly M&E campaign reports sent to PMI.

<sup>8</sup> In Nyagatare 10 liter spray pumps were used, while in Bugesera and Gisagara 8 liter pumps were used.

- Spraying techniques;
- Stock management;
- Human and environmental safety;
- Data collection and reporting; and
- Management of IRS adverse effects and reporting.

Other preparations included construction of 10 new soak pits within police and military barracks to ensure environmental safety. Spraying for the special teams commenced on September 23, 2013 and ended on October 26, 2013.

All of the 5,865 structures found were sprayed. A total of 33,353 people were protected, including 128 pregnant women and 132 children under five years of age. In total, 4,851 sachets of insecticide were used for the spray campaign, with an average of 1.21 structures sprayed per sachet (see Table 23).

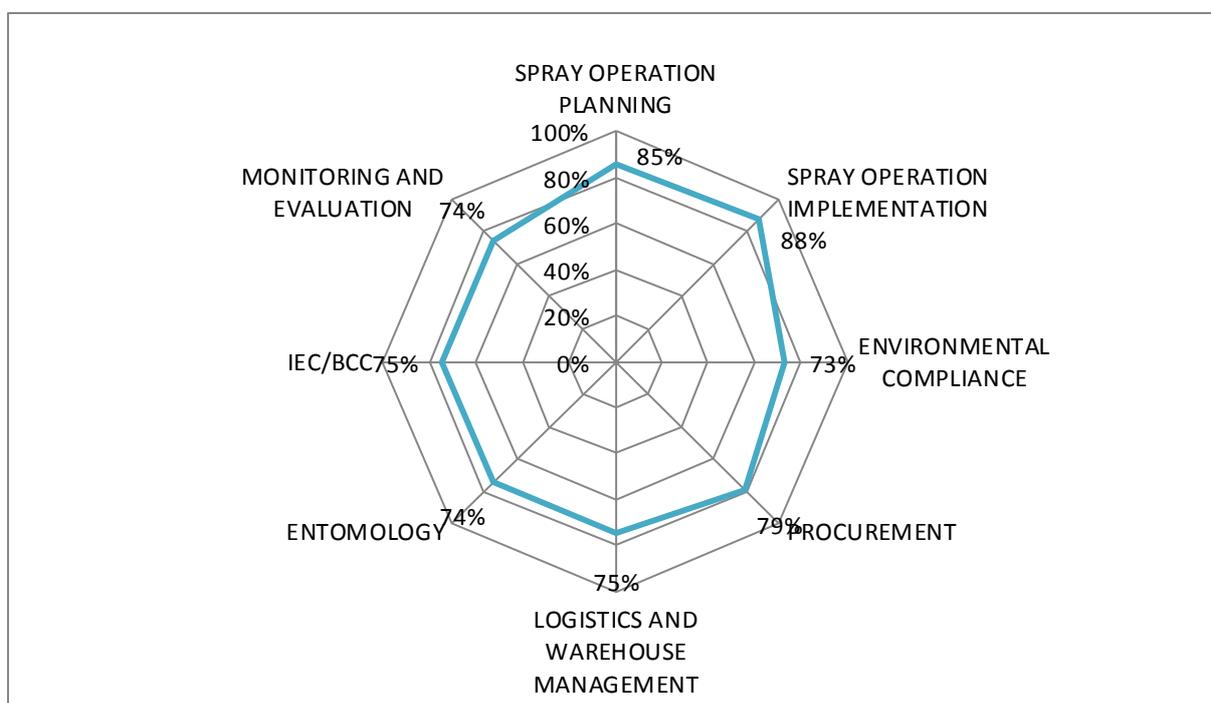
**TABLE 22: RESULTS FOR POLICE AND MILITARY**

District	Found	Sprayed	Spray Coverage (%)	Population Protected				Sachets Used	Average Structure /Sachet	Mosquito Nets Available
				Male	Female	Pregnant Women	Children under 5			
Bugesera	196	196	100	1,216	44	0	0	195	1.01	1,156
Gasabo	3,044	3,044	100	10,376	2,742	35	0	2,061	1.48	8,474
Gatsibo	178	178	100	1,157	196	0	1	173	1.03	1,055
Kicukiro	1,218	1,218	100	6,282	1,315	56	128	1,184	1.03	5,518
Kirehe	144	144	100	757	171	0	0	150	0.96	742
Musanze	238	238	100	1,657	360	0	0	238	1.0	859
Nyagatare	76	76	100	417	58	2	3	75	1.01	405
Nyarugenge	566	566	100	3,869	886	35	0	570	0.99	1,830
Rwamagana	205	205	100	1,592	258	0	0	205	1.0	755
<b>Total</b>	<b>5,865</b>	<b>5,865</b>	<b>100</b>	<b>27,323</b>	<b>6,030</b>	<b>128</b>	<b>132</b>	<b>4,851</b>	<b>1.21</b>	<b>20,794</b>

# 7. CAPACITY BUILDING OF THE MINISTRY OF HEALTH

AIRS Rwanda initiated the IRS country capacity assessment framework analysis and engaged in the review and formalization process a majority of key in-country stakeholders including MOPDD, PMI Advisors, District Health Directors, WHO, REMA, Rwanda Health Communication Center (RHCC), Urunana, MOH-Maternal and Child Health Division, MOH-Medical Procurement and Distribution Division (MPDD), and district hospitals. In the joint review and discussions, the two technical components rated highest were Spray Operations Planning and Spray Operations Implementation (see Figure 6). Strong capabilities in these areas are likely a result of the MOH/MOPDD conducting its own spray campaigns and working closely with IRS implementing partners over the past several years. The technical components rated lowest were Environmental Compliance (EC), M&E, and entomology. Overall, Rwanda needs to put effort into completing, updating, and disseminating its overall malaria control and IRS strategic documents and specific policies for IRS components including EC, IEC/BCC, logistics, procurement, and M&E. Subsequent to the capacity assessment, a capacity building plan with specific deliverables, timelines and budget is in the process of being developed in consultation with the MOPDD and other stakeholders as blueprint for enhancing district and national capacities for efficient implementation of IRS independent of PMI support. The national capacity-building plan will identify all of the priority areas that the Rwanda MOH will target to strengthen its capacity to implement IRS and it will also identify areas where AIRS Rwanda can support the MOH in 2014.

**FIGURE 6: RESULTS OF RWANDA COUNTRY IRS CAPACITY ASSESSMENT**



In terms of capacity building during spray operations, the implementation of IRS was conducted in close collaboration with the MOH and district staff to promote sustainability. The MOPDD staff participated 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 district/sector staff (Vice Mayor-Social Affairs, District Health Director, District Environmental Health Officer, and Sector Social Affairs Officers). These staff were all given orientations on IRS supervisory activities.

In addition, AIRS Rwanda, in collaboration with MOPDD, conducted a two-day joint MOH and Abt IRS training on July 20-21, 2013. The training targeted MOPDD staff, Abt staff, and district stakeholders. The participants trained were: nine MOPDD staff, 16 Abt AIRS staff, three district health directors, two district environmental officers and three district malaria officers from Gisagara, Bugesera and Nyagatare districts. The training was attended by 33 participants including 25 males and 8 females.

The main objective of the training was to strengthen the capacity of MOPDD staff, AIRS staff and district stakeholders on key IRS components including IRS planning and implementation, logistics and procurement, environmental compliance, advocacy and community mobilization, monitoring and evaluation, entomological monitoring and spray techniques.

The AIRS Project further provided support to the MOPDD in finalizing and printing a number of strategy documents including:

- Integrated Vector Management Strategic Plan
- Insecticide Resistance Management Strategic Plan
- Vector Control Needs Assessment
- Integrated Vector Management Training Curriculum

## 8. ENTOMOLOGY

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Entomological monitoring is essential in any insecticide-based vector control intervention such as IRS. It ensures 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 aimed at:

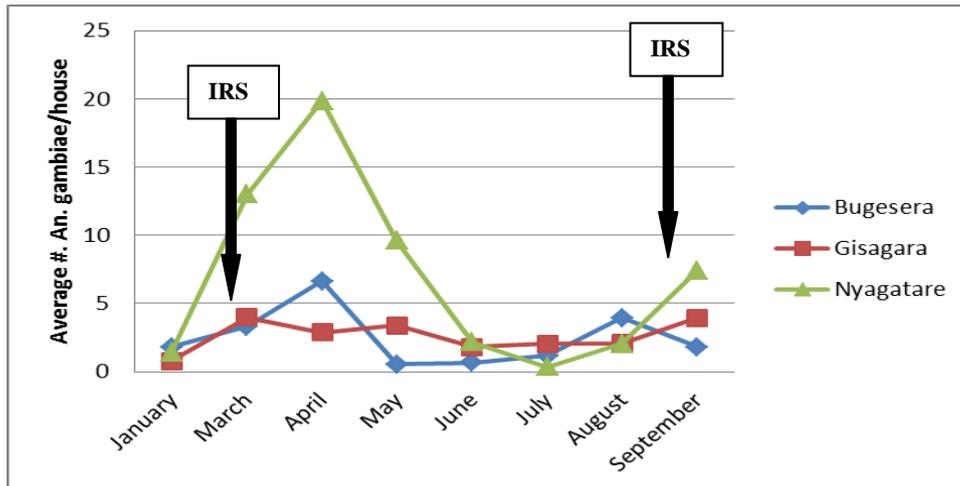
- Assessing malaria vector density and species composition in intervention areas;
- Establishing vector feeding time and location;
- Monitoring the quality of insecticide application and insecticide decay rates; and
- Assessing vector susceptibility to insecticides approved for IRS and mechanism of resistance.

### 8.1 VECTOR SPECIES COMPOSITION, DENSITIES, FEEDING TIME AND LOCATION

Monthly vector collections were done to assess the vector species composition, density and behavior in the three IRS districts using human landing collections (HLC) and pyrethrum spray catches (PSC). Vector density was calculated as the average number of *An. gambiae s.l.* collected per house per day from PSC data. The anopheles densities were highest during the months of March, April and May (see Figure 7 and Annex 10). This population build-up could be attributed to the proliferation of breeding sites following the onset of the rainy season. Of all of the anophelines collected during this period, *Anopheles gambiae s.l.* was the predominant (96.7%) vector species. Vector samples from two of the IRS districts (Mimuli site in Nyagatare district and Mareba site in Bugesera district) in which polymerase chain reaction (PCR) identification was conducted showed that *Anopheles arabiensis* was the dominant species (76%) while the rest were *An. gambiae s.s.*

Human biting rates were estimated using data from human landing catches. The data varied across the study sites with outdoor biting being comparatively higher than indoor biting in Gisagara and Bugesera but almost equal in Nyagatare (see Annex 8). Ovary dissection of the Anophelines collected by HLC was performed to determine the parity rates. Results did not show any definite trend across the study sites during the study period (see Annex 9).

**FIGURE 7: ANOPHELES DENSITY**

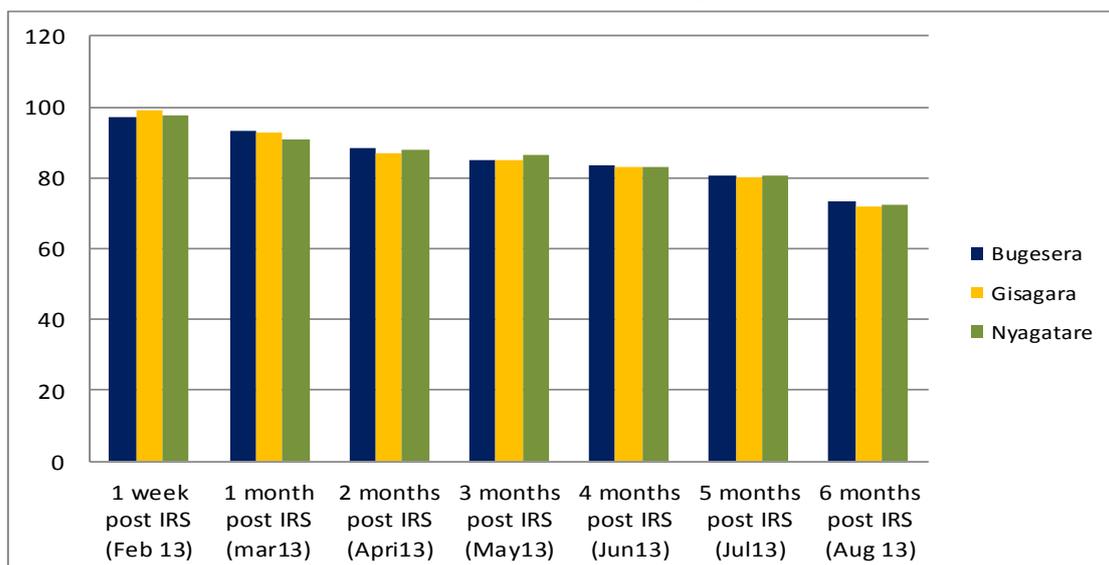


## 8.2 WALL BIOASSAYS

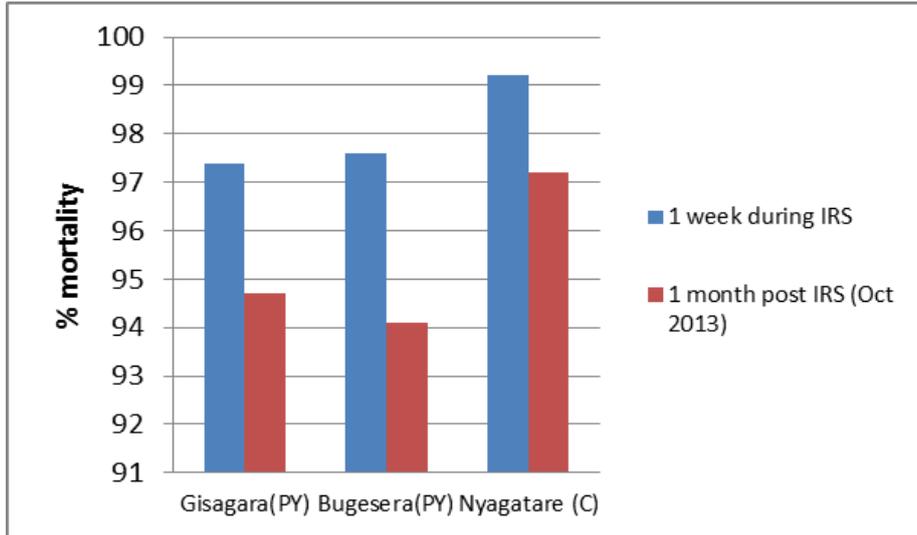
Cone bioassays were conducted in 36 sprayed structures in the three districts: within one week of spraying to assess the quality of spraying, and monthly to determine the insecticide decay rate. In each district, two different sectors were sampled and in each sector, six structures were sampled. The structures sampled were of three different wall surfaces, namely: plastered and painted, plastered and not painted, and mud. For each of the three different wall surfaces, two structures were used for the tests.

Monthly WHO cone bioassay tests which were conducted following the February 2013 IRS campaign showed average mortality rates of 72.5% of susceptible *Anopheles gambiae s.l.* at six months post-spray (see Figure 8). During the September 2013 IRS campaign, the cone bioassays conducted for quality assurance showed mortality rates of 97-100% using susceptible *An. gambiae s.l.*, indicating a good spray quality for both pyrethroids and carbamates. One month post-spray (October) the cone bioassay assessments conducted in the three districts showed average percentage mortalities of 94.7, 94.1 and 97.2 for Gisagara, Bugesera and Nyagatare respectively (see Figure 9).

**FIGURE 8 : WALL BIOASSAY TESTS RESULTS (FEBRUARY – AUGUST 2013)**



**FIGURE 9: WALL BIOASSAYS (SEPTEMBER 2013 IRS)**





# 9. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

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## 9.1 CHALLENGES

The main challenges experienced during the IRS campaign included:

- Loss of IRS cards (approximately 20.5%) by households and village mobilizers, which led the AIRS project to incur extra costs in reprinting replacement cards.
- Non-adherence to selection criteria for SOPs, leading to interruption of training due to changes of SOPs invited for training. This affected the quality of training and increased the cost of medical examinations for the replacements.
- Parliamentary election campaigns during the first two weeks of IRS operations where communities and local leaders were required to be engaged in campaigns led to the disruption of IRS activities.
- Lack of commitment and sufficient time for mobilization by community leaders due to multiplicity of functions including the involvement in parliamentary campaigns during the first few weeks of the spray campaign led to insufficient mobilization in some communities.
- Absence of some households (1.9%) during time of spraying because of farming, market days, work days, funerals and some refusals.
- Conflict of other MOH activities with IRS at the sector level requiring SOPs (CHWs) to attend to other functions led to interruption of spraying campaign in some instances.

## 9.2 LESSONS LEARNED AND RECOMMENDATIONS

- A few female SOPs tested positive for pregnancy before and during the spray campaign. Since the IEC positions were already filled, they could not be re-assigned to those positions. However, in the future, AIRS will find other positions for women who test positive for pregnancy so they can be used during the campaign but not come into contact with insecticide.
- Enhanced supervision in this spray round by the AIRS staff, district and sector staff and regular feedback meetings were instrumental to the high spray coverage recorded.
- The IRS Sector team and Sector Social Affairs should meet weekly to share challenges encountered and report to the district/sector authorities. They should give a copy of this report to the IRS District Coordinator for further action.
- The list of SOPs should be prepared by the person in charge of CHW at the Health Center, verified and signed by the Head of Health Center and a copy sent to the Sector Social affairs for verification with final approval by the Sector Executive Officer.
- CHWs with previous IRS experience should be recruited so as to enhance spraying quality and reduce training cost.

- Women and youth councils, community-based organizations (CBOs), and churches at the district and sector level should be included in IRS district micro-planning and evaluation meetings to strengthen their involvement in community mobilization.
- Community radio ambassadors should be engaged during IRS mobilization to take advantage of their influential positions in the community.
- Conduct training of IRS focal persons at district and sector levels in order to strengthen their knowledge in IRS operations, supervision and reporting.
- The number of IEC mobilizers recruited at village level should be done depending on the number of structures and the spatial distribution of structures in the village.
- Due to current gender disparity (88% males), increase the involvement of women in IRS mobilization activities by assigning these functions to women within the cell/village development committees.

# ANNEXES

## ANNEX I: SUMMARY OF 2012 INSECTICIDE SUSCEPTIBILITY TEST RESULTS (24 HOURS POST-EXPOSURE % MORTALITY)

Sites	Organo-chlorine	Carbamates	Organo-phosphates	Pyrethroids	
	DDT 4%	Bendiocarb 0.1%	Fenitrothion 1.0%	Deltamethrin 0.5%	Lamdacyhalothrin 0.75%
Mimuli (Nyagatare)	84	84	100	22.50	19.50
Kivumu (Rutsiro)	100	98.70	100	100	97.20
Rwaza (Musanze)	98.80	100	100	99	97.70
Mubuga (Karongi)	97	98	100	97	89.70
Mareba (Bugesera)	97	100	100	90	85.80

## ANNEX 2: MOH LETTER ON INSECTICIDE SELECTION 2013/2014

REPUBLIC OF RWANDA

Kigali, on 22<sup>nd</sup> March 2013  
N° 20/1227/RBC/IHDPC/2013



MINISTRY OF HEALTH  
PO BOX.84 KIGALI  
www.moh.gov.rw

Mr Peter MALNAK  
USAID Country Mission Director  
**KIGALI-RWANDA.**

**Re: Choice of insecticide for Indoor Residual Spraying 2013 to 2014 in Rwanda.**

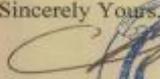
Dear Mission Director,

I am pleased to take this opportunity to thank the USAID/PMI team for their active involvement in the large consultation in the process of selection of insecticide to be used for the next IRS rounds for malaria prevention throughout respectively the stakeholders technical workshop on Rwanda insecticide resistance strategy held on February 27<sup>th</sup>, 2013, and the stakeholders meeting on approval of technical specifications for malaria commodities held on March 21<sup>th</sup>, 2013.

Considering the strategies proposed in the insecticide resistance strategy document for mitigation of occurrence of insecticide resistance, I am pleased to inform you that Rwanda is planning to change the class of the current insecticide to the Carbamates for the period of 2013 to 2014. The active ingredient on insecticide recommended for the above period is *Bendiocarb*.

We would appreciate again your support under the lead of the Malaria and Other Parasitic Diseases Division-RBC for the implementation of this strategy with particular attention to ensure environmental compliance and strengthen appropriate IEC/BCC as recommended by the stakeholders meeting.

Sincerely Yours,

  
**Dr Agnes BINAGWAHO**  
Minister of Health

**Cc:** - Acting DG of RBC  
- The Head of Malaria and Other Parasitic Diseases Division-RBC  
**KIGALI.**

## ANNEX 3: LOCAL PROCUREMENT

Description	Quantity / Number
<b>IRS Transportation</b>	
Rented vehicles used in micro-planning and logistic assessments	3
Rented Vehicles used in IRS implementation	101
Special Team Vehicles	7
IRS Supervision vehicles(Country Office)	3
Rented vehicles that facilitated the Post IRS activities	36
<b>Printed materials</b>	
SOP Forms	43,715
Team Leader Forms	12,676
IRS Cards	200,250
Brochures	221,611
IEC Mobilizer Forms	3,415
IEC Implementer Form	31,640
Stock Cards	500
Delivery Note Books	0
Request Books	0
Goods Issued Note Books	20
<b>Food Vendors</b>	
Gisagara District	6
Nyagatare District	9
Bugesera District	7

## ANNEX 4: SOP TRAINING PROGRAM

TIME	SUBJECT	FACILITOR
<b>Day 1</b>		
08.00 - 09.00	Arrival and Registration	<b>Supervisor</b>
09.00 - 09.15	Opening remarks	<b>Sector Executive/Social Affairs</b>
09.15 - 09.30	Objective of the training	<b>Sector Coordinator</b>
09.30 - 10.00	Introduction to malaria control and indoor residual spraying	<b>Trainer</b>
<b>10.00 - 10.15</b>	<b>BREAK</b>	<b>Sector Supervisor</b>
10.15 - 11.15	Parts of compression pumps handling and pump maintenance	<b>Trainer</b>
11.15 - 11.45	Pump calibration	<b>Trainer</b>
11.45 - 12.15	Introduction to the spraying surface	<b>Trainer</b>
12.15 - 01.00	Safety of population and environment	<b>Trainer</b>
<b>01.00 - 02.00</b>	<b>LUNCH</b>	<b>Sector Supervisor</b>
02.00 - 03.00	Personal protection	<b>Trainer</b>
03.00 - 04.30	Filling daily data collection forms	<b>Trainer</b>
04.30	End of Day 1	
<b>Day 2</b>	<b>Safety of IRS</b>	
08.00 - 10.00	Filling of daily collection data forms	<b>Trainers</b>
10.00 - 10.15	<b>BREAK</b>	<b>Sector Supervisor</b>
10.15 - 11.00	Preparing structures for IRS, community mobilization	<b>Trainers</b>
11.00 - 12.00	Management of adverse effects	<b>Trainers</b>
12.00 - 01.00	Supervision and reporting of all IRS activities (use of supervision checklists)	<b>Trainers</b>
01.00 - 02.00	<b>LUNCH</b>	<b>Sector Supervisor</b>
02.00 – 04.00	Introduction to Spraying Wall Practice	<b>Trainers</b>
04.00	End of Day 2	
<b>Day 3 - 5</b>	<b>Quality Control</b>	
08.00 - 01.00	<b>Spraying Walls Practice</b> Maintaining 45 cm distance from walls Maintaining 75 cm swath and 5 cm overlap Spray rhythm (speed top – down)	<b>Trainers</b>
<b>01.00 - 02.00</b>	<b>LUNCH</b>	<b>Sector Supervisor</b>
02.00 - 04.00	<b>Spraying Walls Practice</b> Maintaining 45 cm distance from walls Maintaining 75 cm swath and 5 cm overlap Spray rhythm (speed top – down)	<b>Trainers</b>

## ANNEX 5: SUMMARY OF M&E SUPERVISION CHECKLISTS COMPLETED BY AIRS STAFF

Type of Form	AIRS Staff	No. forms/ structures to be verified	No. forms/ structures verified									
			Week 1	% Week 1	Week 2	% Week 2	Week 3	% Week 3	Week 4	% Week 4	Week 5	% Week 5
		<b>Forms</b>										
<b>EE for Spray Data</b>	Team Leaders	7314	6,473	88.5	6913	94.5	6820	93.2	6842	93.5	3698	50.6
	Sector Supervisors	3060	2455	80.2	3184	104.1	2702	88.3	2637	86.2	1483	48.5
	Sector Coordinators	1170	937	80.1	959	82.0	1001	85.6	950	81.2	223	19.1
	District IEC Assistants	60	54	90.0	72	120.0	75	125.0	61	101.7	24	40.0
	District Coordinator	60	45	75.0	47	78.3	73	121.7	49	81.7		
	M&E Assistants	180	86	47.8	82	45.6	76	42.2	17	9.4	70	38.9
	Abt Staff	80	23	28.8	33	41.3	40	50.0	32	40.0		
<b>EE for Mobilizer Data</b>	Cell IEC Supervisors	1032	612	59.3	660	64.0	552	53.5	626	60.7	217	21.0
	Sector IEC Assistants	936	790	84.4	723	77.2	632	67.5	628	67.1	228	24.4
	District IEC Assistants	60	52	86.7	74	123.3	74	123.3	60	100.0	16	26.7
	M&E Assistants	180	89	49.4	78	43.3	22	12.2	17	9.4	60	33.3
	Abt Staff	80	15	18.8	17	21.3	41	51.3	20	25.0		0.0
<b>DEV</b>	M&E Assistants	180	85	47.2	133	73.9	137	76.1	213	118.3	145	80.6
	District Coordinators	60	29	48.3	10	16.7			8	13.3		
	District IEC Assistants	60	36	60.0	30	50.0			24	40.0		
	Abt Staff	80	7	8.8	116	145.0	53	66.3	56	70.0	83	103.8
			<b>Structures</b>									
<b>DCV Form</b>	Sector Coordinators	1404	900	64.1	1128	80.3	1071	76.3	1044	74.4	358	25.5
	District IEC Assistants	60	39	65.0	71	118.3	76	126.7	61	101.7	20	33.3
	District Coordinators	60	39	65.0	49	81.7	71	118.3	50	83.3		
	M&E Assistants	180	85	47.2	73	40.6	70	38.9	50	27.8		
	Abt Staff	80	24	30.0	22	27.5	75	93.8	67	83.8	20	25.0

## ANNEX 6: STOCK UPDATE

Category	Item	Initial Stock	New Procurement	Used	Equipment Damaged/ Needing Repair)	Usable Stock Remaining
<b>PPE</b>						
	Coveralls	5,035	500	3,808	439	5,485
	Boots	2,052	0	1,904	72	1,980
	Helmets	2,176	912	1,669	16	3,072
	Gloves	4,216	3,168	3,809	0	3,575
	Dust masks	19,781	50,640	49,637	0	20,784
<b>Spray pumps</b>						
	Spray pumps	1772	0	1,485	0	1772
	Repair kits	23	0	10	0	13
	Nozzle gaskets	0	800	499	0	301
	Nozzle tips	685	0	572	0	113
	Strainers	0	400	239	0	161
	Extension Assembly	82	0	29	0	53
	Pressure Gauge	28	0	21	0	7
	Pump Hose	100	0	30	0	70
	Measuring cylinder	25	0	23	0	25
<b>Insecticides</b>						
Pyrethroid	Deltamethrin	102,881	500 (MOPDD)	103,381	0	0
	Carbamate	85,449	0	68,563	0	16,886
<b>Empty Sachets</b>						
	Pyrethroid	0		103,381		
	Carmabate	0		68,563		

## ANNEX 7: MAN BITING RATES (BITES/PERSON/NIGHT)

Month	Bugesera		Nyagatare		Gisagara	
	indoor	outdoor	indoor	outdoor	indoor	outdoor
March	32	39	42.83	38	3.63	14.67
April	46.83	81.17	92.67	93.67	8.77	20.33
May	9.83	14	83.67	84.5	1.97	7
June	1.5	6	15.5	10.83	0.33	3.33
July	0.67	4.17	3.33	0.83	0.4	1.33
August	4	8.17	13.17	12.17	6.33	9.5
September	2.9	3.58	35.8	23.3	21.08	20.08

## ANNEX 8: PARITY RATES (PERCENTAGE)

District	Sector		Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13			Sep-13	Oct-13
Bugesera	Mareba	SPRAYING	23.5 (119)	39.3 (224)	30.5 (59)	26.2 (42)	53.8 (26)	38.6 (57)	Nyaruge nge	SPRAYING	29.2 (65)	27.3 (11)
	Musenyi		22.2 (18)	48 (25)	22.2 (9)	0 (1)	0 (3)	50 (16)	Musenyi		7.7 (13)	18.2 (11)
Nyagatare	Rukomo		20 (10)	30.5 (95)	32.8 (192)	48.2 (56)	16.7 (12)	46.8 (79)	Rukomo		25 (120)	28.8 (66)
	Mimuli		22.4 (134)	34 (160)	24.2 (128)	45.2 (62)	30.8 (13)	48.1 (52)	Nyagatare		27.5 (120)	35.9 (39)
Gisagara	Muganza		32.2 (59)	27.9 (111)	15 (40)	51.7 (29)	30 (20)	0 (83)	Muganza		23.6 (144)	21.4 (70)
	Nyanza		0 (4)	50 (8)	100 (1)	0 (1)	0 (0)	0 (12)	Gishubi		18.8 (16)	35.9 (39)

## ANNEX 9: PYRETHRUM SPRAY CATCH RESULTS

Month	District	Sector	UNFED	FED	HALF GRAVID	GRAVID	Total	Density ( <i>An. gambiae s.l./house</i> )
March 2013	Gisagara	Muganza	44	32	28	11	115	19.17
		Mamba	2	1	2	0	5	0.83
	Nyagatare	Mimuli	221	73	76	15	385	64.17
		Rukomo	1	4	0	0	5	0.83
	Bugesera	Mareba	37	34	6	6	83	13.83
		Musenyi	5	5	3	3	16	2.67
April 2013	Nyagatare	Mimuli	205	148	23	29	405	67.50
		Rukomo	112	76	14	7	209	34.83
	Gisagara	Muganza	34	41	3	5	83	13.83
		Mamba	1	2	0	0	3	0.50
	Bugesera	Mareba	80	42	11	7	140	23.33
		Musenyi	20	10	13	9	52	8.67
May 2013	Gisagara	Muganza	42	34	15	0	91	15.17
		Mamba	6	3	2	0	11	1.83
	Nyagatare	Mimuli	97	60	18	18	193	32.17
		Rukomo	51	32	7	5	95	15.83
	Bugesera	Mareba	4	3	0	0	7	1.17
		Musenyi	6	2	0	0	8	1.33
June 2013	Gisagara	Muganza	22	19	4	9	54	9.00
		Mamba	0	0	0	0	0	0.00
	Bugesera	Mareba	5	5	0	1	11	1.83
		Musenyi	8	1	0	0	9	1.50
	Nyagatare	Mimuli	25	18	6	5	54	9.00
		Rukomo	3	4	1	0	8	1.33
July 2013	Gisagara	Muganza	17	29	6	9	61	10.17
		Mamba	0	0	0	0	0	0.00
	Nyagatare	Mimuli	6	4	1	0	11	1.83
		Rukomo	0	0	0	0	0	0.00
	Bugesera	Mareba	19	12	2	3	36	6.00
		Musenyi	0	0	0	0	0	0.00
August 2013	Gisagara	Muganza	30	16	5	1	52	8.67
		Mamba	4	5	2	0	11	1.83
	Nyagatare	Mimuli	33	15	5	8	61	10.17
		Rukomo	0	1	0	0	1	0.17
	Bugesera	Mareba	30	14	9	4	57	9.50
		Musenyi	12	5	2	3	22	3.67
September 2013	Gisagara	Muganza	49	32	8	23	112	18.67
		Mamba	8	8	0	1	17	2.83
	Nyagatare	Mimuli	78	38	15	16	147	24.50
		Rukomo	34	26	6	9	75	12.50
	Bugesera	Mareba	13	14	4	4	35	5.83
		Musenyi	4	8	2	0	14	2.33

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

Operation Site	Date Inspection Performed	Are the store keepers, SOs and wash persons wearing appropriate PPE?	Do spray teams have clean PPE at the start of each work day?	Are overalls washed daily, and dried over the soak pit?	During transport, are all spray operator comfortably seated with pumps well placed between their legs in the transport vehicle?	Are spray operators fed before start of spray? (before wearing of PPE	Is the store well arranged? (height of arranged items, allowing for free movement, proper stacking of items, allowing for ventilation)	Are warning signs correctly displayed? (danger sign, insecticide safety notice)	Is there firefighting equipment (not expired)?	Are the surroundings of the store and soak pit clear of IRS solid wastes (empty sachets, masks, gloves)?	Are the contents of drums 1, 3, 5 and 7 emptied into spray pumps before spray operators depart for field?
Musenyi	9/11/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Rweru</b>	9/26/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Rilima</b>	9/3/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Gashora</b>	9/26/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
<b>Mayange</b>	10/9/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Nyamata</b>	9/25/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Ngeruka</b>	9/26/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shyara	9/4/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nyarugenge	9/4/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kamabuye	9/4/2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ruhuha	9/4/12	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mareba	9/25/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mamba	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gikonko	9/17/13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Musha	18/9/13	Yes									
Muganza	8/18/13	Yes									
Save	9/17/13	Yes									
Ndora	9/17/13	Yes									
Kibirizi	9/11/13	Yes									
Mugombwa	9/18/13	Yes									
Kansi	9/14/13	Yes									
Gishubi	9/14/13	Yes									
Kigembe	9/17/13	Yes									
Karama	9/16/13	Yes									
Mukama	9/16/13	Yes									
Karangazi Site 1	9/9/13	Yes									
Karangazi site 2	9/9/13	Yes									
Mimuli	9/19/13	Yes									
Rwimiyaha 1	9/16/13	Yes									
Rwimiyaga 2	9/16/13	Yes									
Rwempasha	9/23/13	Yes									
Gatunda	9/23/13	Yes									
Nyagatare	9/9/13	Yes									
Katabagemu	9/19/13	Yes									
Musheri	10/3/13	Yes									
Kiyombe	10/7/13	Yes									
Matimba	9/16/13	Yes									
Tabagwe	9/3/13	Yes									
Rukomo	9/26/13	Yes									

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

<b>Operation Site</b>	<b>Have all personal belongings, animals, and sick persons been removed from the house?</b>	<b>Have all immovable items been moved to center of the house and properly covered with polythene sheet?</b>	<b>Are the residents instructed on what to do during and after spraying?</b>
Musenyi	Yes	Yes	Yes
Rweru	Yes	Yes	Yes
Rilima	Yes	Yes	Yes
Gashora	Yes	Yes	Yes
Mayange	Yes	Yes	Yes
Nyamata	Yes	Yes	Yes
Ngeruka	Yes	Yes	Yes
Shyara	Yes	Yes	Yes
Nyarugenge	Yes	Yes	Yes
Kamabuye	Yes	Yes	Yes
Ruhuha	Yes	Yes	Yes
Mareba	Yes	Yes	Yes
Mamba	Yes	Yes	Yes
Gikonko	Yes	Yes	Yes
Musha	Yes	Yes	Yes
Muganza	Yes	Yes	Yes
Save	Yes	Yes	Yes
Kibirizi	Yes	Yes	Yes
Mugombwa	Yes	Yes	Yes
Kansi	Yes	Yes	Yes
Gishubi	Yes	Yes	Yes
Kigembe	Yes	Yes	Yes

Karama	Yes	Yes	Yes
Mukama	Yes	Yes	Yes
Karangazi 1	Yes	Yes	Yes
Karangazi 2	Yes	Yes	Yes
Mimuri	Yes	Yes	Yes
Rwimiyaga 1	Yes	Yes	Yes
Rwimiyaga 2	Yes	Yes	Yes
Rwempasha	Yes	Yes	Yes
Gatunda	Yes	Yes	Yes
Nyagatare	Yes	Yes	Yes
Katabagemu	Yes	Yes	Yes
Musheri	Yes	Yes	Yes
Kiyombe	Yes	Yes	Yes
Matimba	Yes	Yes	Yes
Tabagwe	Yes	Yes	Yes

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

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

Kansi	Yes	Yes	Yes	Yes	No	Yes
Gishubi	Yes	Yes	Yes	Yes	No	Yes
Kigembe	Yes	Yes	Yes	Yes	no	Yes
Karama	Yes	Yes	Yes	Yes	No	Yes
Mukama	Yes	Yes	Yes	Yes	No	Yes
Karangazi Site 1	Yes	Yes	Yes	Yes	No	Yes
Karangazi site 2	Yes	Yes	Yes	Yes	No	Yes
Mimuri	Yes	Yes	Yes	Yes	No	Yes
Rwimiyaga site 1	Yes	Yes	Yes	Yes	No	Yes
Rwimiyaga site 2	Yes	Yes	Yes	Yes	No	Yes
Rwempasha Gatunda	Yes	Yes	Yes	Yes	No	Yes
Nyagatare	Yes	Yes	Yes	Yes	No	Yes
Musheri	Yes	Yes	Yes	Yes	No	Yes
Kiyombe	Yes	Yes	Yes	Yes	No	Yes
Matimba	Yes	Yes	Yes	Yes	No	Yes
Tabagwe	Yes	Yes	Yes	Yes	No	Yes
Rukomo	Yes	Yes	Yes	Yes	No	Yes

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

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

Musha	Yes									
Muganza	Yes									
Save	Yes									
Ndora	Yes									
Kibirizi	Yes									
Mugombwa	Yes									
Kansi	Yes									
Gishubi	Yes									
Kigembe	Yes									
Karama	Yes									
Mukama	Yes									
Karanganzi site 1	Yes									
Karangazi site 2	Yes									
Mimuri	Yes									
Rwimiyaga site 1	Yes									
Rwimiyaga 2	Yes									
Rwempasha	Yes									
Gatunda	Yes									
Nyagatare	Yes									
Katabagemu	Yes									
Museri	Yes									
Kiyombe	Yes									
Matimba	Yes									
Tabagwe	Yes									
Rukomo	Yes									

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

Operation Site	Date Inspection Conducted	Are all the IRS items, insecticides and wastes taken back to the district store?	Does the addition of used insecticides and unused insecticides equal the beginning inventory?	Is the store cleaned before being handed over to the owners?	Is the soak pit covered and the gate closed and locked?	Are the soak pit and its surroundings left clean?	Was the working relationship between the IRS team and owners of the store good?
Musenyi	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Rweru	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Rilima	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Gashora	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Mayange	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Nyamata	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Ngeruka	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Shyara	10/15/13	Yes	Yes	Yes	yes	Yes	Yes
Nyarugenge	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Kamabuye	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Ruhuha	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Mareba	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Mamba	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Gikonko	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Musha	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Muganza	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Save	10/15/13	Yes	Yes	Yes	Yes	Yes	Yes
Ndora	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes

Kibirizi	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Mugombwa	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Kansi	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Gishubi	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Kigembe	10/16/13	Yes	Yes	Yes	Yes	Yes	Yes
Karama	10/23/13	Yes	Yes	Yes	Yes	Yes	Yes
Mukama	10/23/13	Yes	Yes	Yes	Yes	Yes	Yes
Karangazi site 1	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Karangazi site 2	10/25/13	Yes	Yes	Yes	Yes	Yes	Yes
Mimuri	10/24/13	Yes	Yes	Yes	Yes	Yes	Yes
Rwimiyaga site1	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Rwimiyaga site2	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Rwempasha	10/25/13	Yes	Yes	Yes	Yes	Yes	Yes
Gatunda	10/23/13	Yes	Yes	Yes	Yes	Yes	Yes
Nyagatare	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Katabagemu	10/24/13	Yes	Yes	Yes	Yes	Yes	Yes
Musheri	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Kiyombe	10/23/13	Yes	Yes	Yes	Yes	Yes	Yes
Matimba	10/22/13	Yes	Yes	Yes	Yes	Yes	Yes
Tabagwe	10/25/13	Yes	Yes	Yes	Yes	Yes	Yes
Rukomo	10/24/13	Yes	Yes	Yes	Yes	Yes	Yes

## ANNEX 15. SUCCESS STORY

### Women in Rwanda Breaking Barriers By Leading The Fight Against Malaria Through Indoor Residual Spraying

Rwandan women are breaking barriers by leading the fight against malaria through the implementation of Indoor Residual Spraying traditionally dominated by males in most countries. Pelagie Niyongira, 28 years old and Therese Muhorakeye, 39 years old, both from Gisagara District are among the 764 and 729 women spray operators who worked in the February and September 2013 IRS campaigns, respectively. The promotion of women involvement in community health programs by the government of Rwanda has led to active participation of women in a series of what was perceived as traditionally male reserved activities. This is why more women like Pelagie and Therese find it normal and fulfilling to engage actively in IRS and play a major role in the fight against malaria in their communities.

Pelagie Niyongira, a community health worker from Kibilizi Sector, Gisagara District explained that she likes participating in IRS as a spray operator not only for its significance as a source of income for her family, but most importantly for the fact that she is directly involved in the control of malaria in her community. She further explains that, “If we had kept on thinking that women are weak and should stay at home and be catered for without their contribution in community activities, we would not have made the gains we have achieved as a community in the fight against malaria”. She adds that as a spray operator she gets a lot of satisfaction in realizing that her contribution usually goes a long



way in helping to prevent at least a new malaria episode among children in her community, and importantly that her effort saves a fellow woman the agony and pain of nursing a sick child notwithstanding the many roles a woman has to play in the family. She further notes that if the current spirit of involving women in community activities such as IRS continues then Rwanda will be free from malaria in a few years.

Pelagie further adds that, “When I participated in IRS for the first time as a spray operator in 2009, people made fun of me and the few other women who worked as spray operators because IRS was

deemed as a man’s job. We have proved them wrong as the numbers of women spray operators continue to rise”. Today, the malaria control benefits reaped from IRS remain our biggest motivation and more women are eager to participate in IRS. “Using the money I am paid during the IRS campaign I am able to pay school fees, medical insurance and also buy food for my family,” said Therese Muhorakeye, a woman spray operator in Kibilizi Sector, Gisagara District. She further points out that as a woman and a mother she is readily accepted and allowed to freely enter people’s houses to conduct the spraying.

With support from the US President’s Malaria Initiative (PMI) Rwanda through the Malaria & Other Parasitic Diseases Division is implementing IRS as one of the key strategies for malaria control. In the February and September 2013 spray rounds some 522,315 and 957,027 residents were protected against malaria in the three IRS target Districts, respectively. Out of the total 1,417 spray operators who participated in the IRS campaign in February 2013, 764 (53.9%) were women. In the September 2013 spray campaign women accounted for 54.1% (864) of 1,597 spray operators.

This complies with the Rwandan government gender policy to have at least 30% of women in leadership positions. “I am happy with the good job women are doing and their exemplary commitment to IRS,” said Naboth Ashimwe, Gisagara District IRS Operations Coordinator. Nadine Mukeshimana, Kibilizi Sector Social affairs Officer added that although IRS was traditionally seen as a man’s job, women and men are currently working together during spray operations in Gisagara District. This is very encouraging as Rwanda is aiming to achieve malaria pre-elimination by 2017.

## ANNEX 16: MONITORING AND EVALUATION PLAN MATRIX – SEPTEMBER 2013 CAMPAIGN RESULTS

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

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

1.1 Procurement											
1.1.1 Number and percentage of international insecticide procurement orders delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<p><i>[Numerator:</i> Number of international insecticide procurement orders delivered in country, at port of entry, at least 30 days prior to the start of spray operations]</p> <p><i>[Denominator:</i> Total number of international insecticide procurement orders]</p> <p><i>Calculation:</i> [Numerator ÷ Denominator] x 100</p>	Y1, Y2, Y3	<p><i>Data source:</i> Logistics and Procurement Inventory Reports</p> <p><i>Reporting frequency:</i> Each spray season</p>	By Spray Campaign	AIRS	N.A.; 80%	I; 100%	Round 1 <sup>9</sup> : I; 100%	Round 1: N.A. <sup>10</sup>	I; 100%	
1.1.2 Number and percentage of international procurement orders for equipment, including PPE, received at port of entry, 30 days prior to start of spray operations.	<p><i>[Numerator:</i> Number of international procurements for equipment, including PPE, received at port of entry, 30 days prior to start of spray operations]</p> <p><i>[Denominator:</i> Total number of international procurements for equipment, including PPE.]</p>	Y1, Y2, Y3	<p><i>Data source:</i> Logistics and Procurement Inventory Reports</p> <p><i>Reporting frequency:</i> Each spray season</p>	By Spray Campaign	AIRS	N.A.; 85%	I; 100%	Round 1: I; 100%	Round 1: I; 100%	I; 100%	

<sup>9</sup> Round 1 occurs in February; round 2 in August/September.

<sup>10</sup> No international insecticide was ordered /procured for Round 1 in Year 2.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
	<i>Calculation: [Numerator ÷ Denominator] x 100</i>										
1.1.3 Number and percentage of local PPE procurement orders that are delivered to the main warehouse, 14 days before the start of spray operations	<p><i>[Numerator: Number of local PPE procurement orders delivered to the main warehouse 14 days before the start of spray operations]</i></p> <p><i>[Denominator: Total number of local PPE procurement orders]</i></p> <p><i>Calculation: [Numerator ÷ Denominator] x 100</i></p>	Y1, Y2, Y3	<p><i>Data source: Logistics and Procurement Inventory Reports</i></p> <p><i>Reporting frequency: Each spray season</i></p>	By Spray Campaign	AIRS	N.A.; 80%	I; 100%	Round 1: I; 100%	Round 1: I; 100%	NA	
1.1.4 Successfully completed spray operations without an insecticide stock-out	Milestone: (Achieved/Not achieved)	Y1, Y2, Y3	<p><i>Data source: Logistics Inventory Report</i></p> <p><i>Reporting frequency: Each spray season</i></p>	By Spray Campaign	AIRS	Achieved	Achieved	Round 1: Achieved	Round 1: Achieved	Achieved	
<b>1.2 In-country Logistics, Warehousing, and Training</b>											
1.2.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<p><i>[Numerator: Total number of logistics and warehouse managers trained in IRS supply chain management using AIRS Project resources.]</i></p> <p><i>[Denominator: Total number of AIRS logistics and warehouse managers.]</i></p>	Y1, Y2, Y3	<p><i>Data source: Routine training records</i></p> <p><i>Reporting frequency: Each spray season</i></p>	By Spray Campaign By Gender	AIRS	8; 100% 3 males, 5 females	8; 100% 3 males, 5 females	Round 1: 8; 100% 3 males, 5 females	Round 1: 7; 100% <sup>11</sup> 3 males, 4 females	8; 100% 7 males, 1 female	

<sup>11</sup> After submitting targets for Year 2, we reduced the number of logistics and warehouse managers needed for the campaign. Nonetheless, we trained all seven staffed logistics and warehouse managers.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
	<i>Calculation: [Numerator ÷ Denominator] x 100</i>							5 females	1 female		
1.2.2 Number and percentage of base stores where physical inventories are verified with up-to-date stock records	<p><i>[Numerator: Number of base stores where physical inventories are verified by up-to-date stock records]</i></p> <p><i>[Denominator: Total number of base stores audited.]</i></p> <p><i>Calculation: [Numerator ÷ Denominator] x 100</i></p> <p><i>(See PIRS for details on sample size for operational audits)</i></p>	Y2, Y3	<p><i>Data source: Logistics and Environmental compliance reports</i></p> <p><i>Reporting frequency: Each spray season</i></p>	By Spray Campaign	AIRS	N.A.	N.A.	Round 1: 4; 100%	Round 1: 4; 100%	4; 100%	
1.2.3 Submit up-to-date inventory records to AIRS Home Office 30 days after the end of each spray campaign	Milestone: (Completed/Not Completed)	Y2, Y3	<p><i>Data source: Post-Spray Logistics Inventory Report</i></p> <p><i>Reporting frequency: Each spray season</i></p>	By Spray Campaign	AIRS	N.A.	N.A.	Round 1: Completed	Round 1; Completed	Completed	

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

2.1 Planning and Design of IRS Programs											
2.1.1 Annual IRS country work plan developed and submitted on time	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	<p><i>Data source: Project records</i></p> <p><i>Reporting frequency: Annually</i></p>		AIRS	Completed	Completed	Round 1: Completed	Round 1: Completed	Completed	
								Round 2: Completed	Round 2: Completed		
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations											

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
2.2.1 SEA/letter report submitted on time <sup>12</sup>	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	<i>Data source:</i> Project records – submitted SEAs/ letter reports  <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	AIRS	Completed	Completed	Round 1: Completed  Round 2: Completed	Round 1: Completed  Round 2: Completed	Completed	
2.2.2 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	[Numerator: Number and percentage of soak pits and warehouses/storerrooms inspected and certified by an environmental officer/AIRS Environmental Compliance Officer prior to each spray campaign supported by the AIRS Project]  [Denominator: Total number of project soak pits and/or storehouses]  Calculation: $[Numerator \div Denominator] \times 100$	Y1, Y2, Y3	<i>Data source:</i> Pre, Mid and Post Inspection Reports submitted by environmental officers  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By Soak Pit  By Warehouse/ Storerroom	AIRS	N.A.; 100%	84; 100%	Round 1: 46; 100%  Round 2: 78; 100% 39 soak pits 39 storerrooms	Round 1: 46; 100% 23 soak pits, 23 storerrooms  Round 2: 78; 100% 39 soak pits 39 storerrooms	40; 100% 20 soak pits, 20 storerrooms	
2.2.3 Number of government environmental and health officers trained in IRS environmental compliance	Total number of government environmental and health officers trained in IRS environmental compliance using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Training reports from Environmental Compliance Officer	By Spray Campaign  By Gender	AIRS	3	0	Round 1: 3; 3 males  Round 2: 9; 100%	Round 1: 3 2 males; 1 female  Round 2: 8; 88.9%, 5 males,	9; 6 males, 3 females	

<sup>12</sup> In Year 1, SEAs were due 30 days prior to the commencement of spraying and letter reports were to be submitted 14 days prior to the commencement of spraying. In Year 2 and Year 3, due dates agreed upon with Washington-PMI will be noted in each country-specific Monitoring and Evaluation Plan to assess indicator 2.2.1.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
			<i>Reporting frequency:</i> Semi-annually					6 males, 3 females	3 females		
2.2.4 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation	Total number of spray personnel who attend a training in environmental compliance and personal safety standards in IRS implementation using AIRS Project resources, includes all staff who received environmental compliance training - spray operators, team leaders, washpersons, storekeepers, etc.	Y1, Y2, Y3	<i>Data source:</i> Project records – Training reports  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By Gender	AIRS	N.A.	2,305; 1,227 males, 1,078 females	Round 1: 1,659; 834 males, 825 females  Round 2: 1,867; 939 males, 928 females	Round 1: 1,854; 946 males, 908 females  Round 2: 5,744; 4,187 males; 1,557 females	3,852; 2,808 males, 1,044 females	
2.2.5 Number of health workers receiving insecticide poisoning case management training	Total number of clinical personnel trained in insecticide poisoning case management using AIRS Project resources	Y2, Y3	<i>Data source:</i> Project records – Training reports  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By Gender	AIRS	N.A.	98; 60 males, 38 females	Round 1: 52; 32 males, 20 females  Round 2: 99; 67 males, 32 females	Round 1: 70; 49 males, 21 females  Round 2: 107; 72 males, 35 females	47; 32 males, 15 females	
2.2.6 Number of adverse reactions to pesticide exposure reported that resulted in a referral for medical care documented	Total number of incidents of pesticide exposure reported that resulted in a referral for medical care	Y1, Y2, Y3	<i>Data source:</i> Incident report forms that are required for each incidence of pesticide exposure  <i>Reporting frequency:</i> Each spray season	By Spray Campaign  By residential/occupational exposure	AIRS	0	24	Round 1: 0  Round 2: 0	Round 1: 18  Round 2: 14	0	
2.2.7. Number of	Total number of vehicular accidents	Y1, Y2,	<i>Data source:</i>	By Spray	AIRS	0	0	Round 1: 0	Round 1: 1	0	

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
vehicular accidents reported	reported	Y3	Vehicular incident report forms that are required for each accident  <i>Reporting frequency:</i> Each spray season	Campaign				Round 2: 0	Round 2: 0		
<b>2.3 Support Entomological Monitoring Activities and Insecticide Resistance Strategies</b>											
2.3.1 Number of sentinel sites supported by the AIRS project	Total number of entomological sentinel sites supported by the AIRS project	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By Spray Campaign	AIRS	6	6 (partial support)	Round 1: 6 (partial support)  Round 2: 6 (partial support)	Round 1: 6  Round 2: 6 (partial support)	6 (partial support)	
2.3.2 Number and percentage of entomological monitoring sentinel sites measuring all five primary PMI indicators	<i>[Numerator:</i> Number of entomological monitoring sites measuring all five primary PMI entomological indicators]  <i>[Denominator:</i> Number of entomological monitoring sentinel sites]  <i>Calculation:</i> [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By Spray Campaign	AIRS	6; 100%	6; 100%	Round 1: 6; 100%  Round 2: 6; 100%	Round 1: 6; 100%  Round 2: 6; 100%	6; 100%	
2.3.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	<i>[Numerator:</i> Number of entomological monitoring sites measuring at least one secondary PMI indicator]  <i>[Denominator:</i> Number of entomological monitoring sites]	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Annually	By Spray Campaign	AIRS	6; 100%	6; 100%	Round 1: 6; 100%  Round 2: 6; 100%	Round 1: 6; 100%  Round 2: 6; 100%	6; 100%	

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
	<i>Calculation: [Numerator ÷ Denominator] × 100</i>										
2.3.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	<p><i>[Numerator: Number of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control.]</i></p> <p><i>[Denominator: Number of insecticide resistance testing sites]</i></p> <p><i>Calculation: [Numerator ÷ Denominator] × 100</i></p>	Y1, Y2, Y3	<p><i>Data source: Entomological reports</i></p> <p><i>Reporting frequency: Annually</i></p>	<p>By Spray Campaign</p> <p>By Type of Insecticide</p>	AIRS	12; 100%	<p>12; 100%</p> <p>All four classes of insecticide are being tested at each of the 12 sites</p>	<p>Round 1: 12; 100% All four classes of insecticide to be tested at each of the 12 sites</p> <p>Round 2: 12; 100% All four classes of insecticide to be tested at each of the 12 sites</p>	<p>Round 1: Ongoing</p> <p>Round 2: 5; 41.7% All four classes of insecticide were tested in 5 sites only.</p>	12; 100% All four classes of insecticide to be tested at each of the 12 sites	
2.3.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Total number of wall bioassay studies conducted in established sentinel sites to evaluate quality of IRS spraying activities	Y1, Y2, Y3	<p><i>Data source: Entomological reports</i></p> <p><i>Reporting frequency: Per spray campaign</i></p>	By Spray Campaign	PMI	1 (36 houses)	1 (36 houses)	<p>Round 1: 1 (36 houses)</p> <p>Round 2: 1 (36 houses)</p>	<p>Round 1: 1 48 houses</p> <p>Round 2: 1 (36 houses)</p>	1 (36 houses)	
2.3.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Total number of wall bioassay studies conducted at monthly intervals in established sentinel sites to evaluate the rate of insecticide decay on sprayed surfaces	Y1, Y2, Y3	<p><i>Data source: Entomological reports</i></p> <p><i>Reporting frequency:</i></p>	By Spray Campaign	PMI	5 (36 houses)	5 (36 houses)	<p>Round 1: 5 (36 houses)</p> <p>Round 2: 5 (36 houses)</p>	<p>Round 1: 36 houses</p> <p>Round 2: 5 (36 houses)</p>	5 (36 houses)	

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
			Per spray campaign								
2.3.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Total number of vector susceptibility tests conducted to gauge the effectiveness of individual insecticides proposed for use in spray operations	Y1, Y2, Y3	<i>Data source:</i> Entomological reports  <i>Reporting frequency:</i> Per spray campaign	By Spray Campaign  By Type of Insecticide	PMI	4 replicates per 6 insecticides <sup>13</sup>	4 replicates per 6 insecticides <sup>14</sup>	Round 1: 4 replicates per 6 insecticides  Round 2: 4 replicates per 6 insecticides	Round 1: Ongoing  Round 2: Ongoing	4 replicates per 6 insecticides	
2.4 Conduct Communications Activities and Community Mobilization											
2.4.1 Number of radio spots and talk shows aired	Total number of radio spots and talk shows aired in target spray districts to stress the safety and benefits of IRS, ensure successful spray coverage, timely vacating of premises and adherence to IRS safety precautions by community members	Y1, Y2, Y3	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign	AIRS	N.A.	134	Round 1: 134  Round 2: 134	Round 1: 42 <sup>15</sup>  Round 2: 150	150	
2.4.2 Number of IRS print materials disseminated	Total number of IRS educational materials developed, printed and distributed to community members in target spray districts using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Project records  <i>Reporting frequency:</i> Semi-annually	By Spray Campaign  By Type of printed material and message(s)	AIRS	270,000	227,767	Round 1: 139,167  Round 2: 241,408	Round 1: 117,518 brochures  Round 2: 219,810	136,413	

<sup>13</sup> DDT, Fenitrothion, Bendiocarb, Deltamethrin, Lambdacyhalothrin, Etofenprox

<sup>14</sup> DDT, Fenitrothion, Bendiocarb, Deltamethrin, Lambdacyhalothrin, Etofenprox

<sup>15</sup> The February 2013 spray round followed shortly after the fall 2012 campaign. As a result, fewer radio spots were needed since communities were still aware of and knowledgeable about IRS activity and sensitization messages.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
2.4.3 Number of people reached with IRS messages via door-to-door mobilization	Total number of adults reached with IRS message during pre-spray community, door-to-door mobilization	Y1, Y2, Y3	<i>Data source:</i> Mobilization Data Collection Forms  <i>Reporting frequency:</i> Daily per mobilization conducted	By Spray Campaign  By Gender	AIRS	N.A.	1,063,869; 508,345 males, 555,524 females	Round 1: 554,098; 264,763 males, 289,335 females  Round 2: 511,463; 230,123 males; 281,340 females	Round 1: 496,315; 237,533 males, 258,782 females  Round 2: 511,463; 230,123 males; 281,340 females	276,467; 124,391 males, 152,076	
2.5 Spray Targeted Structures According to Technical Specifications											
2.5.1 Number of structures targeted for spraying <sup>16</sup>	Total number of structures found in targeted spray districts by Spray Operators	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray campaign	By Spray Campaign	PMI	240,000	242,589	Round 1: 125,000  Round 2: 219,462	Round 1: 121,697  Round 2: 229,039	124,012	
2.5.2 Number of structures sprayed with IRS <sup>17</sup>	Total number of structures sprayed in targeted districts	Y1, Y2, Y3	<i>Data source:</i> Daily Spray Operator Forms  <i>Reporting frequency:</i> Daily per spray	By Spray Campaign	PMI	204,000	236,610	Round 1: 106,250  Round 2: 186,543	Round 1: 121,154  Round 2: 224,708	105,410	

<sup>16</sup> The yearly targets for this indicator are from the applicable work plan. The annual results are the number of structures found by Spray Operators during the campaign.

<sup>17</sup> The target per year for this indicator is based on 85% of the number of structures to be targeted as noted in the applicable work plan.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
			campaign								
2.5.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	[Numerator: Total number of structures sprayed in targeted districts ]  [Denominator: Total number of structures in targeted areas found by spray operators]  Calculation: [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	Data source: Daily Spray Operator Forms  Reporting frequency: Daily per spray campaign	By Spray Campaign	PMI	85%	97.5%	Round 1: 85%  Round 2: 85%	Round 1: 99.6%  Round 2: 98.1%	85%	
2.5.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Total number of people residing in structures sprayed (Actual numbers are collected during spray operations; population estimates are not used.)	Y1, Y2, Y3	Data source: Daily Spray Operator Forms  Reporting frequency: Daily per spray campaign	By Spray Campaign  By Number of pregnant women  By Number of children <5 years old	PMI	N.A.	1,025,181; 17,157, pregnant women; 160,399, children <5 years	Round 1: 533,948; 8,936 pregnant women; 83,541 children <5 years  Round 2: 948,542; 16,203 pregnant women; 148,185 children <5 years	Round 1: 522,315; 8,935 pregnant women; 81,433 children <5 years  Round 2: 957,027; 16,023 pregnant women; 147,531 children <5 years	517,312; 8,661 pregnant women; 79,746 children <5 years	

**Component 3: Provide ongoing monitoring and evaluation and quality control measures**

3.1 Submit Monitoring and Evaluation Plan (MEP) to PMI-Rwanda	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: Project records  Reporting frequency: Semi-		AIRS	Completed	Completed	Round 1: Completed  Round 2: Completed	Round 1: Completed  Round 2: Completed	Completed	
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Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
			annual								
3.2 Submit a post-spray data quality audit report to the M&E Specialist in the AIRS Home Office within 60-180 days of completion of spray operations	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: PSDQA Summary Report  Reporting frequency: Per spray campaign	By Spray Campaign	AIRS	N.A.	N.A.	Round 1: N.A.  Round 2: Completed	Round 1: N.A.  Round 2: In process	NA	
3.3 Submit a country-specific Eligible Structure Definition Document to local PMI and MOPDD	Milestone: (Completed/Not Completed)	Y1	Data source: Project records  Reporting frequency: Semi-annually		AIRS	Completed	Completed	N.A.	N.A.	NA	
3.4 Supply chain review conducted by RTT	Milestone: (Completed/Not Completed)	Y1, Y2	Data source: RTT supply chain review reports  Reporting frequency: Semi-annually	By Spray Campaign	AIRS	Completed	Completed	N.A.	N.A.	NA	

**Component 4:**

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

4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Total number of implementation guidelines, process checklists and program tools related to IRS operations developed or refined using the technical and/or financial resources of the AIRS Project	Y1, Y2, Y3	Data source: Project records – Activity reports  Reporting frequency: Semi-annually	By Guideline/checklist/tool	AIRS	8	8	Both spray rounds: 27  Type: 20 supervisory checklists, 7 training manuals	Both spray rounds: 27;  20 supervisory checklists, 7 training manuals (IEC, M&E, operations,	NA	
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Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
									database, environment, finance, logistics)		
4.2 Number of articles/best practices documents published	Total number of articles or other best-practice documents that have been published in relevant journals or through PMI/USAID communications vehicles	Y2, Y3	Data source: EOSR  Reporting frequency: Semi-annually	By Spray Campaign  By IRS Technical Area	AIRS	N.A.	N.A	Round 1: N.A.  Round 2: I (Mobile M&E: Africa IRS Environmental compliance)	Round 1: N.A.  Round 2: I (Mobile M&E: Africa IRS Environmental compliance)	NA	
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Total number of project-related oral and poster presentations delivered in national, regional and/or international meetings related to IRS.	Y2, Y3	Data source: Project records – Activity reports  Reporting frequency: Semi-annually	By IRS Technical Area	AIRS	N.A.	I  Technical area: IRS mobilization /implementation	Both spray rounds: I  Technical area: IRS mobilization /implementation	Both spray rounds: I <sup>18</sup>  Technical area: IRS mobilization /implementation	I  Technical area: IRS mobilization /implementation	

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

5.1 Capacity Building <sup>19</sup> (Gender Inclusion)											
5.1.1 Number of people trained in IRS implementation	Total number of personnel trained in IRS implementation using AIRS Project resources. This figure only spray personnel (i.e.	Y1, Y2, Y3	Data source: Project records – Training reports	By Spray Campaign  By Gender	PMI	N.A.	1,986; 998 males, 988 females 49.7%	Round 1: 1,659; 834 males, 825 females	Round 1: 1,605; 762 males, 843 females	1,215; 577 males, 638 females, 52.5 % of	

<sup>18</sup> Presented at the National IRS Evaluation Meeting.

<sup>19</sup> See Appendix B for the disaggregation of trained AIRS staff for indicators under section 5.1 Capacity Building.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
	spray operators, team leaders, supervisors, clinicians.)		Reporting frequency: Semi-annually	Percentage of Women Trained			women	49.7% women	52.5% women trained	women trained	
							Round 2: 1,847; 877 males, 970 females, 52.5% of women	Round 2: 1,875; 890 males, 985 females, 52.5% women trained			
5.1.2 Number of people trained to deliver or support IRS in target districts	Total number of people trained using AIRS Project resources to implement/support elements of IRS in target districts.  This figure includes all cadre that serve a role in IRS.	Y1, Y2, Y3	Data source: Project records – Training reports  Reporting frequency: Semi-annually	By Spray Campaign  By Gender  By Role (e.g., spray operator, storekeeper)  Percentage of women trained	AIRS	N.A.	6,065; 4,509 males, 1556 females 25.6% women	Round 1: 3,700; 2,751 males, 949 females 25.6% women  Round 2: 6,065; 4,509 males, 1,556 females 25.6% women	Round 1: 3,793; 2,624 males, 1,169 females; 30.8% women trained  Round 2: 5,765; 4,196 males, 1,569 females, 27.2% women trained	3,867; 2,814 males, 1,053 females; 27.2% women trained	
5.1.3 Number of personnel trained as IRS implementation trainers	Total number of personnel trained in Training of Trainers (TOT) for IRS delivery	Y1, Y2, Y3	Data source: Project records – Training reports  Reporting frequency: Semi-annually	By Spray Campaign  By Gender  Percentage of women	AIRS	178	178; 77 males, 101 females  56.7% women	Round 1: 120; 52 males, 68 females 56.7% women	Round 1: 118; 60 males, 58 females 49.1% women trained	96; 48 males, 48 females; 50.0% women trained	

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals						
						Year 1		Year 2		Year 3		
						Targets	Results	Targets	Results	Targets	Results	
				trained				Round 2: 166; 72 males, 94 females 56.6% women	Round 2: 171; 85 males, 86 females, 50.3% women trained			
5.1.4 Number of government environmental and/or health officials trained in IRS oversight	Total number of national and sub-national/district government environmental and/or health officials who are trained in oversight of IRS implementation using AIRS Project resources	Y1, Y2, Y3	Data source: Project records – Training reports  Reporting frequency: Semi-annually	By Spray Campaign  By Gender  Percentage of Women Trained  Type of government official (e.g. environmental /health)	AIRS	N.A.	3; 3 males  0% women  Type: Environmental health officers	Round 1: 3; 3 males 0% women  Type: Environmental health officers  Round 2: 9; 100% 6 males, 3 females Type: Environmental health officers	Round 1: 3; 2 males; 1 female 33.3% women trained  Type: Environmental health officers  Round 2: 8; 88.9%, 5 males, 3 females, 37.5% women trained  Type: Environmental health officers	9; 6 males, 3 females 33.0% women trained  Type: Environmental health officers		
5.1.5 AIRS conducted a capacity assessment	AIRS Rwanda program conducted an assessment of IRS capacity among national and sub-national/district government health officials	Y1, Y2	Data source: Project records – Capacity assessment		AIRS	Completed	In process	Completed	Completed	NA		

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Actuals					
						Year 1		Year 2		Year 3	
						Targets	Results	Targets	Results	Targets	Results
			reports Reporting frequency: Semi-annually								
5.1.6 Number of capacity-building MOUs signed by AIRS, MOPDD and partners/ institutions	Total number of Memoranda of Understanding (MOU) on provision of local capacity building finalized and signed between AIRS, the Malaria and Other Parasitic Diseases Division (MOPDD), and other local partners and institutions	Y1, Y2, Y3	Data source: Project records – MOUs Reporting frequency: Semi-annually	By Spray Campaign	AIRS	I	I	N/A	N/A	NA	