



U.S. PRESIDENT'S MALARIA INITIATIVE



2018 PMI AIRS KENYA END OF SPRAY REPORT

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**PMI | AFRICA IRS (AIRS) PROJECT
INDOOR RESIDUAL SPRAYING
(IRS 2)
TASK ORDER SIX**

**2018 PMI AIRS KENYA
END OF SPRAY REPORT**

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BCC	Behavior Change Communication
BMP	Best Management Practice
CHA	Community Health Assistant
CHMT	County Health Management Team
CHV	Community Health Volunteer
CU	Community Unit
DCV	Data Collection Verification
DEC	Data Entry Clerk
DOS	Directly Observed Spraying
DPC	Dump Proof Cover
EC	Environmental Compliance
ECCL	Environmental Combustions and Consultants Limited
ECO	Environmental Compliance Officer
EE	Error Eliminator
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
FEFO	First Expire First Out
GR	Geographical Reconnaissance
IEC	Information Education Communication
IRM	Insecticide Resistance Management
IRS	Indoor Residual Spraying
LLIN	Long Lasting Insecticide Treated Net
M&E	Monitoring and Evaluation
MOH	Ministry of Health
mHealth	Mobile Health
mPesa	Mobile Money
NGO	Non-Governmental Organization
NEMA	National Environmental Management Authority
NMCP	National Malaria Control Programme
NTSA	National Transport and Safety Authority

ODK	Open Data Kit
PCPB	Pest Control Products Board
PMI	U.S. President's Malaria Initiative
PMT	Performance Management Tracker
PPE	Personal Protective Equipment
PTS	Performance Tracking Sheet
PVC	Polyvinyl Chloride
PSDQA	Post Spray Data Quality Audit
PSECA	Pre-Season Environmental Compliance Assessment
RSL	Race to Starting Line
SCCSFP	Sub-County Community Strategy Focal Person
SCH	Sub-County Hospital
SCHRIO	Sub-County Health Records and Information Officer
SCHPO	Sub-County Health Promotion Officer
SCMCC	Sub-County Malaria Control Coordinator
SCPHO	Sub-County Public Health Officer
SEA	Supplemental Environmental Assessment
SOP	Spray Operator
T&C	Terms and Conditions
TL	Team Leader
TOT	Training of Trainers
WHOPES	WHO Pesticide Evaluation Scheme

EXECUTIVE SUMMARY

The objective of the PMI AIRS Project is to limit exposure to malaria vectors and reduce the incidence and prevalence of malaria through indoor residual spraying (IRS). To achieve this objective, AIRS Kenya conducted the 2018 IRS campaign in Homa Bay and Migori County with a long lasting organophosphate (Actellic® 300CS). The 2018 IRS campaign began on February 12, 2018 in Homa Bay County and on February 19, 2018 in Migori County and ended in both counties on March 24, 2018. In total, spray teams recorded 468,656 structures found and 440,969 structures sprayed, resulting in a reported 94.1% IRS coverage rate across both counties to protect 1,833,860 people from the burden of malaria in 2018.

The following are key highlights of AIRS Kenya's spray campaign in 2018:

- IRS was re-introduced as a vector control strategy in Homa Bay County for the first time since 2012, ending a six year gap in IRS coverage. This was the first IRS campaign in Homa Bay County following Kenya's political devolution and the first with organophosphate insecticide.
- A total of 251,741 structures were sprayed in Homa Bay County and 189,228 structures were sprayed in Migori County. The spray coverage was 94.7% in Homa Bay County and 93.3% in Migori County. A total of 440,969 structures were sprayed of 468,656 structures found by spray operators (SOPs), resulting in an overall spray coverage rate of 94.1%.
- AIRS Kenya trained 2,312 people (1,202 people in Homa Bay County and 1,110 in Migori County), 962 (42%) of whom were women, to deliver IRS in the 2018 IRS campaign.
- AIRS Kenya used 162,468 bottles of Actellic® CS 300 with insecticide usage ratios of 2.6 structures per bottle in Homa Bay County and 2.9 structures per bottle in Migori County.
- To assess the quality of the spraying, the project's entomology field technicians conducted wall bioassays between 27 February and 2 March 2018 in four sites: Rongo and Sori Karungu in Migori County, and Ndhiwa and Rachuonyo North in Homa Bay County. The results indicated 100% mortality for all of the structures sampled.
- AIRS Kenya implemented seven mHealth tools: 1) a mobile performance management tracking (PMT) tool to monitor daily operational results; 2) smartphone-based supervisory tools to collect and share real time information; 3) SMS job aides to share information and troubleshoot challenges with seasonal staff; 4) an e-inventory system to monitor daily stock of insecticide and nose masks across operations sites; 5) an IEC summary tool to inform where spray supervisors led spray teams; 6) a financial management tool to monitor and manage payments to thousands of seasonal workers; and 7) an ODK-based incident/accident reporting tool to allow quick reporting to the home office and PMI.
- Both Homa Bay County and Migori County experienced challenges with spray coverage. In Homa Bay County, spray coverage was low in communities on Mfangano Island where village chiefs mobilized against spray teams and the terrain was especially difficult. In Migori County, spray teams in Suna West Sub-County reported many locked structures in gold mining communities as well as refusals due to concerns about IRS and LLINs increasing bedbug biting activity in the community.
- Mobilizers attended village meetings immediately after spray teams finished in communities to identify non-sprayed structures, collect contact and location details of these structures and household heads, and provide this information to inform spray teams' mop up activities.

Table I below shows the main results achieved during AIRS Kenya's 2018 IRS campaign.

TABLE 1: SUMMARY OF 2018 IRS CAMPAIGN RESULTS

Result	Migori County	Homa Bay County	TOTAL
Number of Sub-Counties covered by IRS	6	8	14
Insecticide	Organophosphate	Organophosphate	Organophosphate
Estimated number of structures targeted	217,100	271,223	488,323
Number of structures found	202,830	265,826	468,656
Number of structures sprayed	189,228	251,741	440,969
Spray coverage (<i>number of structures sprayed divided by number of structures found</i>)	93.3%	94.7%	94.1%
Population protected	844,703	989,157	1,833,860
Pregnant women protected	17,315	14,662	31,977
Children under five protected	107,125	121,855	228,980
Number of people trained to deliver IRS ¹	1,110	1,202	2,312

¹ PMI annual indicator for “people trained to deliver IRS” includes team leaders, SOPs and supervisors and excludes clinicians,

I. INTRODUCTION

I.1 BACKGROUND OF IRS IN KENYA

In 2017, the U.S. President’s Malaria Initiative (PMI) supported the restart of IRS in Kenya in six sub-counties of Migori County (Awendo, Nyatike, Rongo, Suna East, Suna West, and Uriri) after a lapse of five years (2012-2017). Results from evaluation of the first round of IRS showed a 95% reduction of indoor resting densities of *An. funestus*. The insecticide remained potent on the sprayed walls, killing over 80% of susceptible *An. gambiae* s.s. up to ten months post spray. The vector population from all sites were fully susceptible to Actellic® 300CS, but showed varying levels of resistance to pyrethroids. The sub-counties of Kuria East and Kuria West in Migori County were not sprayed as the Ministry of Health (MOH) county malaria profiles indicated that malaria prevalence was low in these sub-counties (Figure 1).

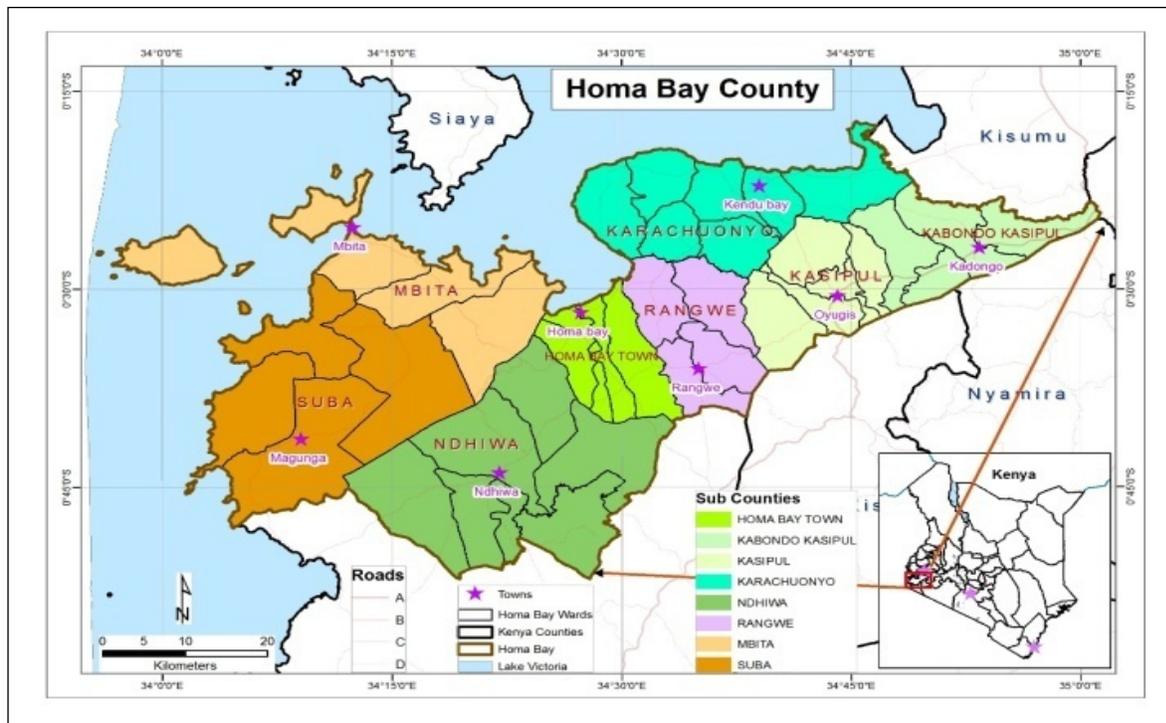
FIGURE 1: LOCATION OF SPRAY AREAS COVERED IN MIGORI COUNTY IN 2018



1.2 INTRODUCTION TO 2018 IRS CAMPAIGN

In 2018, PMI supported the second round of IRS implementation and scale up in Kenya following the successful implementation of IRS in 2017 in the six sub-counties of Migori County. In the scale up, the PMI Africa Indoor Residual Spraying (AIRS) Project targeted 14 sub-counties in two counties: six sub-counties in Migori County (Awendo, Nyatike, Rongo, Suna East, Suna West, and Uriri) and eight sub-counties in Homa Bay County (Homa Bay Township, Kabondo Kasipul, Kasipul, Ndhiwa, Rachuonyo North, Rangwe, Suba, and Mbita) (Figure 2).

FIGURE 2: LOCATION OF SPRAY AREAS COVERED IN HOMA BAY COUNTY IN 2018



Working closely with the Ministry of Health (MOH), the project's overall IRS target was 488,323 structures (217,100 in Migori and 271,223 in Homa Bay). The project based the target in Migori County on the number of structures spray operators (SOPs) found in 2017. For Homa Bay County targets, AIRS Kenya used a summary of ward-level results of population data collected by Homa Bay MOH and Population Services Kenya during the 2017 PMI-funded mass net distribution exercise and used the population ratio of ratio of 4.3:1² to calculate the target number of structures.

Preparations for the 2018 campaign began at the end of the 2017 IRS campaign, when the project held review meetings with staff and stakeholders at different levels to inform planning and decision making for the next campaign. Field preparations started in early July 2017 with a strategic planning meeting to finalize the budget, implementation schedule, and quantification of personnel, equipment, and supplies.

However, when Kenya's Supreme Court annulled the country's presidential election in August 2017, political unrest and violence broke out throughout the country, particularly in Homa Bay and Migori Counties. The unrest also affected neighboring counties where the PMI AIRS Project conducts

² This population ratio was derived from 2017 Migori IRS data and used as a proxy to derive number of structures for Homa Bay for 2018 IRS campaign.

entomological surveillance and collects health facility data to inform vector control. Roads were frequently impassable because of barricades, tear gas, and roadside checkpoints. Businesses and government offices were closed for several weeks sporadically so key local partners and stakeholders were unavailable. These challenges could have led to cancellation of the 2018 IRS campaign and delay IRS expansion for future years, however, the project was able to overcome them.

The 2018 IRS campaign began on February 12, 2018, in Homa Bay County and on February 19, 2018, in Migori County and ended in both counties on March 24, 2018. The 2018 IRS campaign was implemented over 36 and 30 operational days in Homa Bay County and Migori County, respectively.

The main objectives of the 2018 IRS campaign included:

- Achieve spray coverage of at least 85% of the estimated 488,323 targeted structures;
- Ensure compliance with environmental regulations and established best practices for IRS insecticide handling and usage;
- Establish effective monitoring and evaluation of all activities to measure the effect of IRS; and
- Conduct monthly entomological surveillance to inform vector control decision making.

2. PRE-SPRAY ACTIVITIES

2.1 IRS CAMPAIGN PLANNING

The PMI AIRS project held a three-day (July 18 to 20, 2017) strategy planning meeting to prepare for the 2018 IRS campaign. The meeting's main objectives were to discuss the 2018 IRS campaign implementation schedule, develop the Race to Starting Line (RSL) to map out all pre-spray activities, review quantification of IRS commodities and personnel requirements, and draft a budget. The project shared the activity implementation schedule and RSL with the National Malaria Control Program (NMCP) and PMI and, later, shared them with county health management team (CHMT) members in Homa Bay and Migori Counties. The implementation plan detailed all the major activities planned for the 2018 IRS campaign and their timelines, including: micro-planning meetings, sensitization meetings, recruitment, procurement, pre-season environmental assessment of operations sites, medical checkups, various training dates, and IRS launch events. Logistics arrangements, commodity distribution, mobilization dates, and other post-IRS activities were also in the plan.

The project planned the 2018 IRS campaign for 36 operation days in Homa Bay from February 12 to March 24, 2018, and 30 operation days in Migori County from February 19 to March 24, 2018, utilizing a six-day work week.

2.2 SPRAY AREA AND INSECTICIDE SELECTION

The NMCP's IRS Business Plan and PMI's Malaria Operational Plan guide IRS implementation in Kenya. Kenya's IRS Business Plan identifies Migori County for IRS because it is on the periphery of the lake endemic region. All sub-counties with estimated parasite prevalence greater than 20% were included, leaving out two sub-counties (Kuria East and Kuria West) with estimated prevalence below 20%.³ These two sub-counties are included as controls in the project's entomology activities. According to the NMCP's Business Plan, the next county to implement IRS was Homa Bay County. Based on this, the NMCP and PMI recommended that the IRS campaign in 2018 include the eight sub-counties in Homa Bay, as the entire county has an estimated parasite prevalence >20%.

Given increasing pyrethroid resistance in Western Kenya, the NMCP advocated a shift from the pyrethroid class of insecticides, which are now used solely for long-lasting insecticide-treated nets (LLINs) and not in IRS to mitigate the development of resistance. As in the 2017 IRS campaign, the PMI AIRS Project used an organophosphate—Actellic® 300CS—for IRS in both counties in 2018. It was registered by Pest Control Products Board (PCPB) for IRS in Kenya (PCPB (CR) 1233), and the NMCP's Insecticide Resistance Management (IRM) Strategy permitted use of organophosphates to manage insecticide resistance.

³ Estimated prevalence from the MOH (2016). The epidemiology and control profile of malaria in Kenya: reviewing the evidence to guide the future vector control. National Malaria Control Programme, Ministry of Health. Nairobi, Kenya, April 2016

2.3 GEOGRAPHICAL RECONNAISSANCE (GR)

The PMI AIRS Project in collaboration with county governments conducted GR in both Homa Bay and Migori Counties from July 31 to August 26, 2017, and August 28 to September 1, 2017, respectively. Unlike in the 2016 GR, in 2017 the GR process was digitized through the use of mobile health (mHealth) technology. The mHealth tool resulted in the development of a standard site assessment checklist and availability of archived data after the GR process. More details on this are in Section 8, mHealth.

The main objectives were to:

1. Reassess the existing 28 operations sites in Migori County and document deficiencies for later refurbishment (see Section 6.2.1)
2. Assess the location of the proposed 57 operations sites in Homa Bay County⁴ – soak pits, wash areas, and stores—and ascertain their distances from the sensitive eco-systems (e.g., water bodies, public amenities, schools, farming areas, etc.)
3. Assess the physical state of the existing and proposed stores and document the deficiencies to assist in developing a work plan to address them
4. Identify any sensitive ecosystem that requires special attention during the campaign
5. Establish road distances between operations sites and villages and their accessibility and terrain
6. Check availability of means and cost of transport
7. Assess availability and accessibility of water sources for spraying
8. Assess local availability and cost of soak pit, wash area, and tank stand construction materials

During the GR in Homa Bay County, fifty-seven proposed sites were assessed for suitability as operations site. After the GR, in collaboration with sub-county teams, the PMI AIRS Project selected one operations site per ward based on their accessibility and availability of storage facilities for a total of 40 operations sites in Homa Bay. The project retained all 28 sites in Migori County at the ward level. All 68 operations sites were located in health facilities except three: two located at Chief's camps (Alendo and Ober) and one in the County Headquarters compound.

In addition to meeting its main objectives listed above, during GR, the baseline data for village names and sub-locations in the sub-counties were confirmed. Table 2 below summarizes the target population and estimated number of structures targeted per sub-county.

⁴ Homa Bay County Health Management Team had proposed 57 possible locations to serve as operations sites. All 57 locations were assessed and 40 sites were selected.

TABLE 2: LIST OF SUB COUNTIES TARGETED IN MIGORI AND HOMA BAY COUNTIES

Sub-County	Targeted Population	Estimated Number of Structures Targeted
MIGORI COUNTY		
Awendo	149,953	34,955
Nyatike	195,696	48,720
Rongo	126,578	29,318
Suna East	135,317	32,976
Suna West	117,360	29,271
Uriri	181,484	41,860
Total	906,388	217,100
HOMA BAY COUNTY		
Homa Bay Township	117,147	27,243
Kabondo Kasipul	133,098	30,953
Kasipul	140,490	32,672
Mbita	133,034	30,938
Ndhiwa	205,639	47,823
Rachuonyo North	193,499	45,000
Rangwe	119,109	27,700
Suba	124,244	28,894
Total	1,166,260	271,223

2.4 MICRO-PLANNING

In collaboration with NMCP and county governments, the PMI AIRS Project led micro-planning meetings on October 2 and 3, 2017, for Migori County and on October 5 and 6, 2017, for Homa Bay County. The main objective for these meetings was to discuss and agree on the IRS implementation plan and finalize the quantification of equipment, materials and personnel for each operations site. Participants were from the NMCP, Migori and Homa Bay CHMTs and various sub-counties officials. The sub-county officials included members of Sub-County Medical Officers of Health, Sub-County Public Health Officers (SCPHO), Sub-County Health Promotion Officers (SCHPO), Sub-County Community Strategy Focal Persons (SCCSFPs), Sub-County Malaria Control Coordinators (SCMCCs) and Sub-county Health Records and Information officers (SCHRIOs). The total number of participants in both meetings was 69 (55 male and 14 female) for Migori and 57 (41 male and 16 female) for Homa Bay. Two officers from the NMCP, seven CHMT members, and 12 PMI AIRS Project staff attended the meetings (Table 3).

TABLE 3: MICROPLANNING PARTICIPANTS

Category of Participants	Migori County			Homa Bay County		
	Total	Male	Female	Total	Male	Female
County	7	5	2	7	6	1
Sub-county	48	43	5	36	28	8
AIRS	12	5	7	12	5	7
NMCP	2	2	0	2	2	0
Total	69	55	14	57	41	16

2.5 LOGISTICS NEEDS AND PROCUREMENT

The PMI AIRS Project conducted a needs assessment in October 2017 to establish the quantity of IRS equipment and material available for use and determine the quantity to procure for both Migori and Homa Bay Counties. The project separated procurement of IRS campaign supplies into international and local procurements to guarantee cost efficiency and timely delivery of supplies. Table 4 below shows the items procured internationally.

TABLE 4: INTERNATIONAL PURCHASES

Item	Quantity Required	Stock Balance	Quantities Purchased
Actellic® 300CS	164,185	48,785	115,400
Nozzle Tip	2,369	1,188	1,181
Male fitting for strainer housing	474	208	266
Plunger assembly Complete	33	5	28
Pump shoulder straps	711	36	675
Nitrile Chemical Gloves	9,147	2,811	6,336
Pressure gauge	358	20	338
PVC/Polyester Aprons	192	0	192
Hard Hat	2,742	2,134	608
Head gear connector	2,690	378	2,312
Face shield Bracket	2,740	378	2,362
Particulate Respirator (Dust Mask) w/valve 10 per box	118,880	17,480	101,400
Face shield / Visor	2,669	19	2,650
Control flow valves (CFVs)	2,369	996	1,373
Seals for Control Flow valve (CFV)	2,558	528	2,030
USAID Stickers A4	3,300	480	2,820
USAID Stickers A5	4,400	550	3,850
USAID Stickers A6	4,950	200	4,750

2.6 WAREHOUSES AND INSECTICIDE STOCK MANAGEMENT

The PMI AIRS Project secured three warehouse facilities: one central warehouse in Kisumu and county warehouses in Homa Bay and Migori Counties. In addition, the project secured five insecticide distribution centers, three in Homa Bay County (the Homa Bay warehouse, Rachuonyo Sub-County Hospital and Ogongo Sub-County Hospital) and two in Migori County (Kochola Dispensary and Arombe Health Center). The project received all insecticide and the majority of locally purchased materials in the Kisumu central warehouse and later distributed them to the county warehouses based on the quantification and distribution plan. The project delivered insecticides directly to the distribution centers and then distributed them to the operations sites. In Migori County, Kochola Dispensary is located in Rongo Sub-County and served Rongo, Awendo, and Uriri sub-counties. The Arombe Dispensary in Suna West Sub-County served Suna West, Suna East, and Nyatike Sub-Counties. In Homa Bay County, Rachuonyo Sub-County Hospital served Kabondo, Kasipul, and Rachuonyo North Sub-Counties. Homa Bay warehouse served Homa Bay Township and Rangwe Sub-Counties. Ogongo Sub-County Hospital served Mbita, Suba, and Ndhiwa Sub-Counties. During and after the campaign, these insecticide distribution centers also served as a temporary storage for empty insecticide bottles and other plastic wastes in transit to the project's Kisumu central warehouse.

The PMI AIRS Project carefully tracked insecticide, equipment, and other materials from the central warehouse in Kisumu to the county warehouses and subsequently to the operations sites' storage facilities. When insecticide was dispatched from the central warehouse in Kisumu, it was counted and recorded in the delivery notes which accompany insecticide in transit to the county warehouse. The stock cards and ledger books were then updated accordingly at the central warehouse and county warehouse after dispatch and receipt, respectively. From the county warehouse, insecticide is dispatched to the distribution centers. On arrival at the distribution centers, the storekeeper verifies the quantity received before signing the delivery note and completing the Goods Received Note (GRN). A copy of the delivery note and original copy of the GRN are returned back to the county warehouse. The same procedure is applied when delivering to the operation sites from the distribution centers. The team tracked empty insecticide bottles daily at the operations sites and insecticide distribution centers using a digitized e-inventory system. Storekeepers accounted for insecticide by recording how many insecticide bottles each team leader received and tracked to the respective spray operators (SOPs) at the start of the day and reconciled the same at the end of the day. They documented stock on goods-issued notes, stock cards, insecticide-distribution tracking sheets, and commodity ledger books.

2.7 HUMAN RESOURCE REQUIREMENTS

In preparation for the 2018 IRS campaign, the PMI AIRS Project categorized human resource requirements into two groups: permanent and seasonal staff.

2.7.1 RECRUITMENT OF PERMANENT STAFF

Due to expansion to Homa Bay County and the purchase of a second vehicle, the project needed to fill the positions of Homa Bay county coordinator, Homa Bay warehouse manager, and driver. The project advertised the positions, shortlisted and interviewed candidates, and hired new staff before 2017 Christmas break.

2.7.2 HIRING OF SEASONAL STAFF

During micro-planning, the project and stakeholders agreed on quantifications of personnel and subsequently advertised on websites and county and sub-county forums. Seasonal professional staff positions advertised including finance assistants, information, education, and communications (IEC) assistants, logistics assistants, monitoring and evaluation (M&E) assistants, data entry clerks (DECs), site coordinators, and storekeepers. The PMI AIRS Project vetted applications, shortlisted qualified

candidates for interviews, and selected final candidates after interviews. In close collaboration with the MOH, the project selected seasonal casual laborers (SOPs and mobilizers) from existing networks of community health volunteers (CHVs).

The members of the sub county health management team⁵ played a key role in selecting active CHVs as SOPs and mobilizers. After quantification, preset criteria were used to select the CHVs for SOPs and mobilizers' positions in each sub-county with SCPHOs, SCMCCs, SCHPO and SCCSFP playing a key role in identifying those who met the requirements. Those who worked previously and were available in Migori County received priority. In general, the number of different categories of personnel is determined by the number of targeted structures. Quantification was done up to the operations site level. In some villages the number of available mobilizers was greater than the number needed hence not all of them were selected. The project recruited and assigned them to villages they normally work and reside in. Annex C shows the distribution of seasonal workers hired for each position, broken down by gender and targeted sub-county.

2.8 PAYMENT OF SEASONAL WORKERS

Based on the 2017 IRS campaign lessons learned, the PMI AIRS Project hired seasonal sub-county finance assistants in addition to the seasonal county finance assistants to fill the gaps identified and ease the payment process. As described below, these additional staff helped ensure that the finance team facilitated the payment process and met payment deadlines before and throughout the 2018 IRS campaign, helping ensure its success. Finance staff received a three-day training to acquaint them with their roles and responsibilities to ensure an efficient payment process.

Their responsibilities included:

- Distribution and collection of signed contracts from all the seasonal staff: SOPs, team leaders (TLs), pump technicians, washers, security guards and mobilizers
- Preparation and collection of all timesheets for seasonal staff before preparing payrolls
- Preparation and submission of payroll based on the schedule of payments the finance manager created at the start of the IRS campaign
- Collection of invoices from both food and vehicle vendors and delivery to the AIRS Kenya finance office for payment
- Collection and reconciliation of IRS vehicle logs sheets

The PMI AIRS Project paid seasonal workers, including SOPs, TLs, supervisors, mobilizers, washers, pump technicians, and security guards through Safaricom's mobile money platform – *mPesa*. *MPesa* was the preferred money platform because of its wide coverage and consistent use in Kenya, which enabled efficient bulk payments to a large number of personnel.

The advantages of *mPesa* payments as opposed to cash payments were:

- Time saving: Seasonal workers did not have to travel to collect their money. The project sent money directly to their phones. As a result, seasonal workers could receive pay even while at work
- Reduction of cash loss: Mobile money reduces the inherent risk of transportation of large amounts of cash to different sites to pay workers

⁵ SCHMT is made up of sub county public health officers, sub county malaria control coordinator, sub county community strategy focal person, Sub County Health Promotion Officers and Sub County Health Records and Information Officers

- Gender Impact: Women who participated in the IRS campaign had full control over their use of the money to improve their household standard of living since they received money directly on their phones

For personnel and commodity transportation, the PMI AIRS Project contracted 205 vehicles for IRS operations: 98 vehicles in Migori County and 107 in Homa Bay County. The project sourced these vehicles from local vendors who formed a consortium in each sub-county for SOP transportation and one consortium for each county for supervisory vehicles. The 17 consortia included seven in Migori, nine in Homa Bay, and one consortium for logistics covering both counties. The project hired all SOP vehicles and supervision vehicles for 30 days in Migori and 36 days in Homa Bay. The project contracted logistics vehicles before the campaign, during the closeout period and as needed during the campaign. Table 5 shows the number of vehicles assigned to each county.

TABLE 5: DISTRIBUTION OF VEHICLES IN THE SUB-COUNTY

County/ Sub-counties	No. of SOPs and TLs	36 Days of Operations				Total
		County Logistics Vehicles	Sub-County Supervision Vehicles	Vehicles for Spray Operators	Vehicles for Supervision- County	
Migori County		3			7	10
Awendo	151		2	12		14
Nyatike	216		3	18		21
Rongo	141		2	10		12
Suna East	142		2	11		13
Suna West	126		2	10		12
Uriri	183		2	14		16
Sub Total Migori	959	3	13	75	7	98
Homa Bay County		4			9	13
Homa Bay Township	98		2	7		9
Kabondo	112		2	8		10
Kasipul	118		2	9		11
Mbita	138		3	11		14
Ndhiwa	173		2	13		15
Rachuonyo North	162		2	13		15
Rangwe	99		2	8		10
Suba	104		2	8		10
Sub Total Homa Bay	1,004	4	17	77	9	107
Overall	1,963	7	30	152	16	205

3. IEC AND COMMUNITY MOBILIZATION

3.1 MOBILIZATION METHODOLOGY

The PMI AIRS Project worked closely with the MOH teams in Homa Bay and Migori Counties and Sub-Counties to employ various mobilization methodologies to prepare the community for IRS. These activities began in November 2017 and continued until the spray exercise ended on March 24, 2018. Mobilizers were drawn from CHVs. Mobilizers were paid for 10 working days per their seasonal employment contracts. The strategy employed this year was targeted mobilization. Guided by the spray and mobilization calendars, mobilization activities occurred only in villages scheduled for spraying the following week. Assuming that the day before a specific spray date for a village is Day 0, from Day -5 to day -1, mobilizers visited all the households in their villages and gave the key messages. They then would go back on Day 0 to remind households that SOPs will be arriving the following day. The mobilizer would go around the village using a megaphone to remind household owners that the SOPs would be around the following day and that homeowners needed to prepare themselves. On Days 1 and 2, the mobilizers would accompany the spray operators but slightly ahead of them to ensure households were prepared. This limited the time wasted when SOPs arrive and houses are not ready. Mobilizers took note of structures that were missed on the actual spray date for progressive mop up. For the last remaining two days (Day 3 and Day 4), mobilizers were to attend public meetings in villages where the spray exercise was complete to get feedback from those whose structures were sprayed and those who were not and to discuss any IRS issue or concern that needed clarity. These public meetings included chiefs' barazas, women and youth group meetings, and churches. Once the mobilizers documented those who were not sprayed, they handed this information over to the IEC supervisor to guide mop-up activities in collaboration with the site coordinators. This strategy, however, needs revision to include days when mobilizers are called in to assist during mop-up days.

During mobilization, once mobilizers reached a household, they introduced themselves and gave an overview of IRS, including demystifying myths and sharing key messages. Afterward, mobilizers would complete the serialized IRS card and leave the card behind with the household owner after signing their details. The mobilizer would mark the household door on the outside to indicate whether the house was sensitized or not. The structure of the door marking format is shown in Section 7.2.2.

In two operation sites, Nyatoto in Suba County in Homa Bay and Alendo in Nyatike Sub-County, the use of IRS stickers was piloted instead of IRS cards. During the 2017 post IRS review meetings, it was evident that the stickers would last longer on the structures compared to door marking, as door markings either were rubbed off or faded away due to weather conditions such as rainfall. IRS cards, on the other hand, were often misplaced, as seen during Data Collection Verification in the field. These observations, coupled with the PSDQA findings of poor IRS card retention within a short time period after the campaign, supports the use of stickers as opposed to cards.

3.1.1 SENSITIZATION MEETINGS

The PMI AIRS Project and county and sub-county teams in Homa Bay and Migori Counties organized pre-spray sensitization meetings and held them concurrently between November 9 and 24, 2017. The project held two county, 14 sub-county, and 68 ward meetings. The meetings reached 2,960 stakeholders, who were to disseminate key IRS messages back to their communities and prepare them

for the exercise. The stakeholders targeted included: MOH officials; key representatives from the Ministry of Education, Ministry of Environment, and National Environmental Management Authority (NEMA); religious leaders; politicians; women and youth leaders; NGOs; and provincial administration officials, including ward representatives, deputy county commissioners, chiefs, assistant chiefs, and police representatives.

In Migori County, which was sprayed last year, most of the concerns raised in the meetings included after effects of the chemical and about possible remedies for such things as the strong smell and the white color on the walls. Though Homa Bay County was last sprayed in 2012, a good number of the participants were still able to recall their experience at that time. In a number of meetings, they claimed that SOPs in 2012 sprayed water instead of the insecticide (i.e., perhaps because of pyrethroid resistance) and conveyed the misconception that bedbugs increased after the spray exercise. The CHVs, chief's barazas and community meetings continued to demystify these misconceptions and myths and explained that in the 2018 IRS campaign, rigorous supervision will prevent spray teams from spraying water. Similarly, the project noted that the strong smell of the insecticide makes it easy to distinguish from water. Mobilizers also clarified that in most eligible structures, SOPs should mix insecticide in the presence of the household owners unless the SOP is coming from spraying another structure and did not use all the insecticide in the tank.

During the campaign, some spray teams experienced resistance from community members. The teams resolved the issues through sensitization meetings with help of the chiefs, village elders, and MOH teams. This yielded positive results as most of the communities in these areas later accepted their houses to be sprayed. In every sub-county, the project held at least two such meetings during pre-spray sensitization and during the spray period, mostly through chiefs' barazas.

3.1.2 IEC MATERIALS

In the 2018 IRS campaign, the project used IEC materials developed in 2017 with the NMCP and updated them with Homa Bay County information. In 2018, the project procured 6,974 T-shirts, 689,155 IRS cards, 13,329 IRS stickers, 2,919 mobilizer pocket guides, 2,998 mobilizer bags, 75 banners, and 3,740 posters. For each operations site, the project provided a banner and 50 posters for display in public areas and branded SOP vehicles. Every mobilizer received a mobilizer pocket guide, which contained brief guidelines on the key messages to emphasize during household visits and frequently asked questions and possible responses. Mobilizers received a branded bag to carry the mobilizer forms and IRS cards, which the project issued to every mobilized structure. The project distributed branded T-shirts to all the seasonal staff, supervisors, and all attendants in the IRS 2018 launch events in counties. Chiefs, assistant chiefs, and village elders who helped with mobilization in areas that encountered refusals also received T-shirts. People who participated in sensitization sessions held during market days received T-shirts. People were given an opportunity to answer questions, and the first four who answered correctly got a T-shirt.

3.1.3 RADIO PRESENTATIONS

This year the PMI AIRS Project engaged four radio stations to sensitize the community on IRS. Radio Mayienga, the second most popular Luo radio station in the country after radio Ramogi, ran advertisements for three weeks and conducted two call-in talk shows. For the talk shows, both MOH representatives (county health promotion officers) from Homa Bay and Migori Counties were at the studios at the same time for the one-hour call-in show. The duration of call-in sessions proved to be too short for the public in both counties to engage their representatives. The county health representatives suggested that in future a separate call-in show should be done for each county, so that as many people as possible can call in and air their concerns. Participants from Awendo Sub-County in Migori County complained that the reception of radio Mayienga is not clear and the majority preferred radio Ramogi. In Migori, we also engaged two local radio stations: radio Anyuola and radio Milambo. For radio Anyuola,

there were two call-in talk shows, while radio Milambo had one talk show. For both Homa Bay and Migori, radio Nam Lolwe conducted one call-in talk show.

The radio shows proved to be very important and made the work of mobilizers easy in some areas because household owners would tell them they had heard all the necessary information on radio and that all they needed an IRS card and to have their structures sprayed. The radio advertisements began two weeks before the IRS spray campaign began and continued one week into the spray campaign. The talk shows continued weekly until the end of the spray exercise. The post spray review meetings found that all the radio advertisements and talk shows were in Dholuo languages and thus locked out other ethnic groups that reside in Homa Bay and Migori Counties. The preferred language apart from Dholuo is Swahili, which is a national language. In Mfangano Island, only one radio station was accessible: radio Ekialo Kiona. To give sub-counties more opportunity to go to the studio and interact with their community members who call in, additional cadres of MOH staff beyond the CHPOs will be involved in the radio talk shows in future.

3.1.4 MOBILIZERS TRAINING

The project trained 1,076 mobilizers in Migori and 1,577 mobilizers in Homa Bay for three days between January 30 and February 1, 2018. The training took place concurrently across the 40 operations sites in Homa Bay and 28 operations sites in Migori. IEC supervisors and public health officers from the sub-counties who received training during the TOT facilitated the training. For the three days, mobilizers received training on: how to mobilize households, mobilization strategies, how to promote acceptance of IRS, key messages (Annex H); door-marking protocol, and filling of data-collection tools. The training included practical sessions. Trainers expected the mobilizers to conduct role plays and group work to ensure that they understood the sessions. M&E assistants and DECAs from the M&E department supported the training on data-collection tools. Some mobilizers were relatively illiterate and hence found it difficult to comprehend the training, especially the data tools. In every operations site, the project had one IEC supervisor to supervise the mobilizers. The number of mobilizers supervised varied per operation site. The lowest was 23, and the highest was 66 mobilizers working at separate times. The number of mobilizers recruited depended on the number of households that an operation site covered. Some IEC supervisors covering large areas shared that it was difficult to supervise all their mobilizers. Supervisors proposed that in the future, a single IEC supervisor should not supervise an operation site with more than four sub-locations.

3.1.5 DOOR-TO-DOOR MOBILIZATION

The project conducted door-to-door mobilization by mobilizers who are CHVs recruited from their home community and have been working under the MOH community health strategy. The mobilization strategy adopted this year was staggered targeted mobilization for 10 days broken down into 5 – 1 – 2 – 2 day segments. The initial five-day took place only in villages scheduled for spraying the following week based on the spray and mobilization calendars. This meant that every mobilizer was to mobilize all the allocated households within five days, issue them IRS cards, and mark their doors or mount the sticker. Mobilizers had targets of approximately 30 to 40 households a day, depending on population density. In urban areas with high population density with households very close to each other, mobilizers could have up to 40 households a day to mobilize. On average, during the spray campaign mobilizers actually reached an average of 29 HHs per mobilizer per day. The next day, the day before the SOPs arrived, the mobilizers went around the village again using megaphone to alert the community of the SOPs' arrival on the following day. The key messages emphasized during this one-day activity included the need to: have an adult home, have at least 7.5 liters of water ready for the SOPs, and move foodstuff, utensils, and movable household items outside the house the next day. For the next two days, the mobilizers accompanied the SOPs, walking ahead to ensure that all structures were well prepared and household goods were removed. For villages that the SOPs had already visited, in the final two days, the mobilizer was to attend public gatherings such as the chiefs' barazas, women's and youth group meetings, and

churches to capture details of those who were missed during the spray. The information was captured on Form I B. The spray team used this information for mop up. During the public gatherings, mobilizers addressed any refusals and reactions to the insecticide and made appropriate referrals.

When the spray and mobilization calendars did not align during implementation, most often the SOPs caught up with mobilizers. When spray teams encountered such situations, IEC Supervisors were advised to call to work additional mobilizers from two sub-locations to start mobilization immediately to avoid SOPs arriving at villages not yet mobilized.

In areas where mass refusals were encountered, mostly because community members protested that none of their kin was recruited to work in the IRS campaign, the project engaged local leaders, mostly chiefs, assistant chiefs, and elders. They were able to intervene and in most areas the refusals turned to acceptance.

One challenge that came up with the mobilization strategy was that the project did not allocate time for mobilizers to support mop-up activities. It was difficult for spray teams to physically locate the unsprayed structures even though mobilizers had provided household contact information and landmarks to locate the structures. Despite the contact information, some phone numbers were unreachable and some gave contacts of relatives because they had no phones. When SOPs did locate unsprayed structures, they had to prepare households and remove items, which used up their valuable spray time during mop up.

3.1.6 USE OF MEGAPHONES

Every operation site was issued three megaphones. Mobilizers used megaphones to alert villagers that the spray teams had arrived and that they needed to prepare their households. This was done a day before the SOPs arrived and on the spray day. Mobilizers used megaphones during market sessions to draw attention when the IEC supervisors arranged for a sensitization activity at the market center on a busy market day. This worked well in some markets except where other promoters had bigger sound systems.

Table 6 below is an outline of the results following the strategies mentioned above:

TABLE 6: MOBILIZATION RESULTS

Sub County	Households		Eligible Structures Identified	Population Reached (12 years and above)			IRS		IRS cards Distributed
	Sensitized	Not Sensitized		Total	Male	Female	Accepted	Not Accepted	
MIGORI COUNTY									
Awendo	27,078	25	37,367	70,616	31,574	39,042	27,034	65	37,314
Nyatike	33,287	339	45,727	73,532	31,474	42,058	33,244	97	45,552
Rongo	25,934	202	32,937	76,981	35,693	41,288	25,893	91	32,913
Suna East	30,888	157	37,338	81,299	37,350	43,949	30,840	66	37,351
Suna West	24,056	154	31,393	55,759	24,398	31,361	24,009	65	31,379
Uriri	28,526	143	42,901	73,400	32,146	41,254	28,451	117	42,823
Total	169,769	1,020	227,663	431,587	192,635	238,952	169,471	501	227,332
HOMA BAY COUNTY									
Homa Bay Township	20,752	594	25,644	56,929	25,742	31,187	20,600	239	25,633
Kabondo Kasipul	28,204	493	38,835	65,384	29,596	35,788	28,054	259	38,804
Kasipul	28,130	510	38,269	59,015	25,138	33,877	28,034	606	38,216
Mbita	19,611	234	24,961	53,759	24,983	28,776	19,490	217	24,918
Ndhiwa	38,363	260	50,512	98,458	45,165	53,293	38,180	355	50,449
Rachuonyo North	38,279	617	52,837	87,442	39,010	48,432	38,050	540	52,768
Rangwe	24,248	204	31,792	55,684	24,070	31,614	24,129	267	31,773
Suba	24,889	210	32,349	67,354	31,732	35,622	24,768	313	32,341
Total	222,476	3,122	295,199	544,025	245,436	298,589	221,305	2,796	294,902
Overall	392,245	4,142	522,862	975,612	438,071	537,541	390,776	3,297	522,234

3.2 SPRAY LAUNCH

In 2018, the PMI AIRS Project worked closely with the MOH in both Homa Bay and Migori Counties to prepare for launch activities. On February 9, 2018, a few days before the start of the spray campaign, the Homa Bay governor released a press statement to the media to inform the county and the nation about the upcoming IRS activities and his support for it. In Homa Bay, the spray launch was on February 12, 2018, the first day of the spray campaign in the county. The Homa Bay Governor Hon. Cyprian Awiti Onyango presided over the event and reiterated his support for health initiatives in the county. He highlighted malaria treatment and prevention initiatives since malaria is the leading cause of morbidity and mortality in Homa Bay County. He flagged off a team of SOPs from the Homa Bay Township operations site. The event received coverage from local and national TV, radio, and print media.

In Migori County, the launch took place on February 15, 2018, three days before the spray campaign began in the county. The launch was held in Nyatike Sub-County at a public ground called Sori Karungu sports ground. The well-attended event was graced by the County Executive of Health Dr. Isca Oluoch, County Executive of Lands Elijah Odhiambo, who represented the Migori governor, County Executive of Finance Scholastica Gumo, the County Chief of Health Dr. Dalmas Oyugi. County Director of Health

Dr. Elizabeth Mgamb, County Malaria Coordinator Mrs. Florence Ngere, Nyatike Sub-County Administrator Mr. Benard Apolo, and Nyatike Deputy County Commissioner Mr. Omar Dima. Twelve Members of the County Assembly, twelve chiefs and twenty six assistant chiefs from the host sub-county, MOH officials from the six sub-counties, community members, women and youth representatives, and other like-minded non-governmental organizations (NGOs) in the county were in attendance. PMI AIRS Chief of Party Bradley Longman spoke of the project's continued support in the county to reduce malaria prevalence through IRS and carry out entomological studies on the malaria-causing mosquito. SOPs and mobilizers from the nearest operational site, Sori Karungu, held a walk from the site to the venue through the market center and the town, sensitizing the community to the campaign and key messages that they need to adhere to. PMI AIRS Project and MOH supervisors accompanied them.

As part of the Migori launch, the project used an eligible structure for the spray demonstration exercise. Guests observed the spraying after the spray team mobilized and prepared the structure for the spray activity. The demonstration was aired on national television channels, including KTN and NTV and local radio stations.

4. IRS IMPLEMENTATION

IRS training began in November for the support staff, including the logistics team, data clerks, M&E assistants, finance assistants, IEC assistants, and environmental compliance assistants. ToT training began on January 8, 2018, while the SOPs' trainings ended on February 10, 2018. Team leader (TL) training took place on February 11, 2018. The project implemented the spray campaign starting February 12 in Homa Bay and on February 19, 2018, in Migori. The campaign ended on March 24 in both counties. Annex B shows the implementation plan and the timelines for activity implementation.

4.1 ORGANIZATION OF THE IRS CAMPAIGN

The project used the national-level community strategy for recruitment of spray teams and mobilizers. Each sub-location comprises a community unit (CU) of CHVs and 13-member community health committees. Local leaders and other community members select the health committee members from the community. A trained community health assistant (CHA) leads each CU. In Migori County, the project gave first priority to those who worked in 2017 and were available while the project replaced those not available using CHVs where possible. Since Homa Bay County had not had IRS since 2012, the project recruited new personnel from the existing pool of CHVs.

After recruitment, the project held a meeting in every sub-county and used the micro-planning figures to agree on the numbers to select for each ward. CHAs from every ward and the Sub-County Health Management Team members attended the meeting. They selected TLs during training based on their performance and supervisors from the MOH team based on their familiarity with the ward. The project ensured they followed all the required recruitment processes and the correct number of seasonal workers per ward.

It was initially planned that the NMCP would lead supervision and technical advice for campaign operations. Unfortunately, the NMCP did not participate in 2018 IRS campaign due to ongoing suspension of use of US government funds to Kenya's Ministry of Health announced on May 9, 2017.⁶ Instead, the project developed a master supervision plan to guide supervision teams. The project organized the general supervision structure into steering committees at the county and sub-county levels. Each seven-member county steering committee provided support supervision and oversaw IRS activities at the county level. Each of the county members had a sub-county to focus on. The project team rotated in the two counties weekly. Each sub-county had a six-member steering committee, which the project asked to coordinate, supervise, and address any mobilization and spray issues within their sub-county.

The name, location and number of spray personnel by sub-county are presented in Table 7.

⁶ <https://ke.usembassy.gov/statement-regarding-suspension-assistance-ministry-health/>

TABLE 7: NUMBER OF SPRAY TEAMS AND OPERATIONS SITES PER SUB-COUNTY

Sub-County	Number of Spray Teams	Number of SOPs	Number of Operations Sites
MIGORI COUNTY			
Awendo	22	129	4
Nyatike	31	185	7
Rongo	20	121	4
Suna East	20	122	4
Suna West	18	108	4
Uriri	26	157	5
Total	137	822	28
HOMA BAY COUNTY			
Homa Bay Township	14	84	4
Kabondo Kasipul	16	96	4
Kasipul	17	101	5
Mbita	20	118	5
Ndhiwa	25	148	7
Rachuonyo North	23	139	6
Rangwe	14	85	4
Suba	15	89	5
Total	144	860	40
Overall	281	1682	68

Every morning before departure to the field, the project provided breakfast to the SOPs, TLs, supervisors, washers, pump technicians, and store personnel. After breakfast, spray personnel would receive personal protective equipment (PPE), insecticides, and other commodities and hold a morning mobilization meeting with supervisors and TLs. After morning mobilization, SOPs would collect four liters of rinse water from barrels 1, 3, 5, and 7 and proceed to board a vehicle. Supervisors and SOP vehicles the project hired would then drop spray teams in the areas they would spray. At the household level, the SOP would follow the protocols and skills gained during training to spray the eligible structures and give post spray key messages.

4.2 IRS CAMPAIGN SUPERVISION AND MONITORING

The project assigned every operations site and sub-county a spray target to achieve by the end of the spray campaign. Targets were further broken down to the sub-location level. Site supervisors instructed spray teams to conduct their operations based on daily monitoring of performance in achieving the targets. This informed the site coordinator's plans for personnel and movement of the spray team. To ensure compliance, both the project and MOH personnel jointly supervised operations.

During spray personnel training, trainers grouped SOPs into teams of six, each led by one TL. One site supervisor supervised three TLs. Where there were more than three teams, the project deployed two supervisors. In regions where there was more than one supervisor, the other would double up as the ward coordinator. The project also trained site coordinators as trainers which made it possible for them to assist with SOPs training and spray supervision.

During the campaign the project held debrief meetings at the county level every Monday, Wednesday, and Friday between project staff and county supervisors. Every Saturday, the project held sub-county meetings at central locations within the sub-counties for all the operation sites. This enabled site supervisors to discuss issues arising from supervision and agree on a way forward. At the site level, site coordinators and site supervisors held morning mobilization meetings every day to update the teams, discuss issues, and direct teams to where they were going to spray that day. One storekeeper managed each site store, and one site coordinator who was a seasonal project support staff managed each site with a main role of coordinating and providing oversight on all the logistics, site requirements, and team operations at the site.

4.3 SERIALIZED INSECTICIDE BOTTLE TRACKER

Serialization of the insecticide bottles was one of the key innovations in the 2018 IRS campaign. This ensured accurate tracking of each insecticide bottle throughout the IRS supply chain. Store records existed to capture bottle issuance from the storekeeper to the TL. However, there was no tool to record bottle issuance from the TL to SOPs. To solve this problem and strengthen the project's IRS supply chain, the PMI AIRS Kenya Project team designed a team leader insecticide tracking tool to enable tracking of insecticide issuance from the TL to the SOPs in the morning at departure to the field and on return in the evening. PMI AIRS had printed serialized stickers which were used to label each bottle issued. The project printed a register where the number of bottles issued to TL, the serial numbers of each of those bottles and to which SOP a specific serialized bottle was issued was recorded. SOP signed off receipt of those specific bottles. At the end of the day, the SOP has to account for those specific bottles. Both the TL and SOP sign off reconciliation at the end of the day. The tool turned out to be very valuable, with 100% uptake. The operations site stores also used the tool to validate their records. Due to the detailed tracking, there was no single report of missing insecticide bottle at the close of the 2018 IRS campaign. One bottle was briefly reported as missing and was recovered within a short time and authenticated as an IRS issued bottle as a result of the tool's clear documentation and accountability.

4.4 POLITICAL EVENTS AND THE RAINS

Earlier in the year, the project had a clear implementation plan and timeline leading up to the 2018 spray campaign. 2017 was an election year and Kenya elections turned out to be contentious with protests and violence. The elections were scheduled for August 8, 2017 with the results overturned by the Supreme Court of Kenya on September 1, 2017. A re-run was ordered to be held within 60 days. Homa Bay and Migori were political hotspots. The US Embassy and Abt Associates took measures to ensure the safety and security of its staff in certain areas of the country including Kisumu, Homa Bay and Migori. Abt staff was advised to minimize movement into the field and/or work from home. The security situation affected all the activities that were set to take place immediately after the initial election date, through the end of December. Consequently, activities planned during this time were either postponed or cancelled due to the state of unrest. Any activity like community sensitization meetings which required community member gatherings were highly discouraged. Full implementation resumed in January 2018.

The rainy season was expected to begin around late April to early June. However, this year, the rains began in late February and early March. The project encountered refusals because household owners were unwilling to remove items from their homes. Some roads become impassable which forced spray teams to walk long distances to reach households thereby affecting daily spray output.

5. POST-SPRAY ACTIVITIES

5.1 IRS MATERIALS AND EQUIPMENT

Throughout the IRS 2018 campaign, the project issued all IRS personnel required commodities, including insecticides, spray pumps, PPE, and a bag containing assorted items. The personnel received the commodities every morning and returned them to the operations site store in the evening. Storekeepers tracked all the issued items daily in stores records. On the last day of the IRS campaign, SOPs, team leaders, mobilizers, drivers, site supervisors, and sub-county and county supervisors returned all spray equipment, PPEs and other IRS materials to the stores. Each seasonal worker signed a clearance form upon returning the assigned items. Any losses recorded clearly indicated the total surcharge. Site coordinators sent clearance forms to the finance department for final payment.

Immediately after the campaign was over, the close-out process began at all operation sites with thorough cleaning of PPE and other commodities commencing on March 26-28, 2018. After that, the project logistics team returned all the items to the central warehouse. This followed a pre-determined close-out plan. The logistics team collected all solid wastes and returned it to the field distribution centers at Rabondo, Kochola, and Arombe for Migori County and to the central warehouse for Homa Bay County. The centers temporarily stored the waste as it awaited collection and distribution to respective disposal facilities. The project transported plastic wastes to the Kisumu central warehouse, from where a vendor collected it for disposal in Nairobi.

5.2 POST-SPRAY INVENTORY

A total of 48,785 insecticide bottles remained after the 2017 IRS campaign, largely thanks to NMCP's insecticide donation received after the project purchased insecticide. The project warehouse team labelled these cartons with red x's to ensure the logistics team distributed them first, using the first-to-expire, first-out (FEFO) stock management principle. In 2018, the project procured initially procured 113,990 bottles and received an additional 10 bottles for free for a total of 114,000. In the final two weeks of the campaign, the project determined that it would run out of insecticide and was able to obtain PMI approval to purchase an additional 1,400 bottles in stock with Arysta in Kenya. Consequently, the project had a total of 115,400 new bottles and therefore 164,185 bottles available during the spray campaign. The project used 66,182 insecticide bottles in Migori and 96,286 in Homa Bay, a total of 162,468 insecticide bottles and had 6 lost/ damaged bottles. This leaves 1,711 bottles available for IRS in 2019, which the project is storing in the Kisumu central warehouse (Table 8). This closing stock in the Kisumu warehouse is in three batches--BSN7J1982, BSN7J1782, and BSN7J1580--manufactured in October 2017, each with a shelf life of two years.

TABLE 8: POST SPRAY INVENTORY RECONCILIATION

2018 Opening Balance	Purchased Stock	Bottles Used	Damaged/ Loss	Stock on Hand
48,785	115,400	162,468	6	1,711

On further review and investigation, we can account for the six “lost” bottles as follows:

- (a) One empty bottle at Rariw accounted for by Incident Report IR 2018 003.
- (b) After the end of the 2017 campaign, we reported a closing balance of 48,786 bottles. However, one bottle was mistakenly used to get rid of termite infestation. Consequently, the opening balance for insecticide revised from 48,786 to 48,785.
- (c) One bottle with half its contents was rejected at Nyamrisra site on delivery. It was labelled Osingo and is from 2017 stock. Tracing it back to Osingo (2017), the former Storekeeper reports that a spray operator broke the seal so that he could mix the insecticide, and when he realized that it was half full, he immediately reported the matter to one of the supervisors who was out with spray team in the field. Neither the supervisor nor the SOP could explain how the bottle ended up being half empty which implies that this could have been a packaging issue by the manufacturer. Unfortunately, the half empty bottle was returned into stock and not appropriately recorded and set aside and was issued out in the 2018 campaign.
- (d) Two missing bottles in two cartons delivered at Kitare site were reported on delivery. Each carton had 11 rather than 12 bottles and were part of batches BSN6K 2480 MANUF: 11/16 and BSN6L 0181 MANUF: 12/16 from the 2017 spray campaign.
- (e) One missing bottle in a carton was delivered to Pala site which was flagged during receipt verification at the site.

Following the above review, a gap has been identified in issuance and receipt of insecticide at Kisumu and county warehouses. Due to the volume involved at these locations, the warehouse managers conducted spot checks rather than full physical count (i.e. open each box and verify its contents) before receipt and dispatch. The “lost bottles” were identified in boxes containing insecticide delivered in 2017 which means that during reverse logistics, incomplete boxes were not flagged and logged in appropriately.

5.3 POST-SPRAY REVIEW MEETINGS

The project held post-spray review meetings to discuss the preliminary spray results, best practices, lessons learned, challenges, and recommendations for the next spray campaign.

Post-spray meetings with the spray personnel and supervisors occurred on March 24, 2018 at each operation site. PMI AIRS and county and sub-county supervisors attended these meetings to collect feedback from the teams before their departure. The project also held meetings with IEC supervisors in both counties to get their feedback on mobilization strategies on March 27 and 28, 2018, in Migori and Homa Bay, respectively. M&E assistants and DECAs held their meeting on April 3 and 4, 2018, for Homa Bay and Migori, respectively. The logistics team held its meetings on April 5 and 6, 2018, in Migori and Homa Bay, respectively.

The project hosted the final post-spray review meetings in Kisumu with PMI, AIRS, county and NMCP officials on April 16 and 17, 2018, for Homa Bay County and on April 18 and 19, 2018, for Migori County. Ninety-two participants from Migori and Homa Bay Counties, the NMCP, PMI, and AIRS project staff attended.

6. ENVIRONMENTAL COMPLIANCE

6.1 ENVIRONMENTAL COMPLIANCE DOCUMENTATION

In December 2016 USAID approved a nationwide Supplemental Environmental Assessment (SEA) for the period 2017-2021 authorizing the use of four classes of pesticides; pyrethroids, organophosphates, carbamates, and, when pre-qualified by the World Health Organization, chlorfenapyr.

In December 2017, USAID also approved the PMI AIRS Project Letter Report for IRS in the two counties. The report fulfilled the requirement in the SEA for an annual write up justifying the continued use and choice of insecticides for IRS and reporting on the preparations and readiness for the February/March 2018 IRS campaign.

The Kenya Environmental Management and Coordination Act (CAP 387 Rev 2012, Part VI Section 58) make Environmental Impact Assessments (EIA) mandatory for all projects specified in the Act. The Act requires an EIA to be conducted by environmental impact assessment experts legally registered with NEMA and documented by a report written in accordance with EIA & Audit Regulations, 2003. As required by law, the PMI AIRS Project engaged Safe Global Consultancy Limited to carry out two distinct EIAs for the IRS exercise in Migori and Homa Bay in accordance with the EIA & Audit Regulations, 2003.

The EIA project reports for Migori and Homa Bay were submitted to NEMA in December 2016 and December 2017, respectively. After review, NEMA issued a formal license on 12 April 2017 authorizing IRS in Migori and on 24 January 2018 in Homa Bay. Annex I contains copies of the license.

6.2 PRE-SPRAY ENVIRONMENTAL COMPLIANCE ASSESSMENTS AND INSPECTIONS

6.2.1 ENVIRONMENTAL ASSESSMENTS DURING GEOGRAPHICAL RECONNAISSANCE (GR)

The PMI AIRS technical team carried out a GR and needs assessment in Homa Bay and Migori Counties from August 28 to September 15, 2017. The visit aimed at identifying potentially compliant storage facilities for IRS pesticides, PPE, and other commodities; determining the best available routes for transportation of pesticides and SOPs; determining the suitability of soak pits/wash areas used in the previous IRS rounds; and locations for new soak pits, wash areas, and water collection points, especially from roof catchments. GPS locations for all 68 PMI AIRS operations sites are in Annex A.

Information and data collected from the GR guided the PMI AIRS technical team in setting up 40 new operation sites in Homa Bay County and refurbishing 28 operations sites in Migori County (those used in the February/March 2017 IRS campaign) (Annex J) . The team performed the work between September 13 and November 24, 2017.

A well refurbished IRS operations site (Figure 3) meets the PMI BMPs requirements provided below:

- Has a fenced-off wash area with a soak pit installed to facilitate safe disposal of effluent resulting from IRS cleanup activities
- Has a reliable water source for supply of clean water that is required for bathing, cleaning of PPE, and other equipment

- Has separate storerooms for the insecticide and other IRS commodities, both being leak free, well-equipped with first aid and firefighting equipment, emergency response procedures, warning and signs. They are well lit with adequate ventilation
- Have separate and private washrooms for male and female spray teams

FIGURE 3: TYPICAL PMI AIRS KENYA PROJECT OPERATION SITE



(1)



(2)



(3)

- 1 – Storeroom and water point/roof catchment
 2 – Fenced-off wash area with warning sign and an adjacent soak pit
 3 – Separate temporary bathing structures (blue structures) for male/female spray team members

6.2.2 INITIAL, SECOND, AND FINAL PRE-SEASON ENVIRONMENTAL COMPLIANCE ASSESSMENTS (PSECAs)

To ensure that all operations sites in Homa Bay and Migori Counties meet the requirements provided for by the PMI BMPs, the PMI AIRS environmental compliance officer (ECO) accompanied by officials from NEMA and MOH conducted an initial smartphone-based PSECA in all selected 68 operations sites from November 14 to December 1, 2017. This PSECA identified a number of issues for both the storerooms and wash areas/soak pits as follows:

- Lack of PPE, soap, and wash tubs at the site stores. The project would deliver these items before delivery of insecticide and commencement of IRS operations.

- Provision of insecticide health and safety sheets and spill and emergency response procedures for site storerooms and for vehicles transporting the insecticide.
- Lack of fire extinguishers, thermometers, first aid and spill response kits for the site stores. The items needed to be available before delivery of the insecticide.
- Need for the delivery of labelled containers for storage of contaminated wastes at the site stores as well as rinse barrels.
- Need for training of storekeepers on environmental compliance for IRS operations at the site storerooms prior to commencement of spraying.
- Need for the delivery of antidotes (atropine) ampoules to health facilities nearest to the operations sites.
- Need for medical examination and pregnancy testing for seasonal workers.
- Lack of adequate water supply at the operation sites. Installed roof catchment systems were not sufficient and needed to be complemented.
- Lack of drying lines in the wash areas for hanging overalls and other PPE after cleaning.
- Lack of hazardous warning signage on the stores and wash areas. There was need for delivery and installation of all the required site warning signs.

The ECO developed a site refurbishment work plan to address the deficiencies at all sites. The project proposed several action points in the work plan to prepare the operations sites for the February/March 2018 IRS campaign. The procurement office promptly made available fire extinguishers, first aid kits, and safety and warning signage required at the operations sites. By mid-January 2018, PMI AIRS had made tremendous progress in addressing many of the issues identified during the initial PSECA. This paved the way for carrying out the second and final PSECA between January 23 and February 9, 2018, in both counties. All pending non-compliance issues identified in the second PSECA were addressed within the same period and PMI AIRS received a green light to conduct IRS in all 14 sub-counties in Homa Bay and Migori on February 7 and 14, 2018, respectively. The green lighting process was facilitated by the AIRS Home Office in Bethesda, MD.

6.2.3 IRS SUPERVISION, SOPs, AND TRANSPORT VEHICLES INSPECTION

The PMI AIRS ECO and the environmental compliance (EC) assistants conducted a pre-contract transport vehicle inspection for IRS supervision, logistics, and SOP transportation vehicles between January 8 and 19, 2018. The inspection was a general assessment of the condition of vehicles to ensure they were road worthy, had valid insurance and technical inspection documents from the National Transport and Safety Authority (NTSA), and the drivers had valid licenses. Vehicle vendors whose vehicles were found not to meet all the provisions of the PMI BMP for IRS transportation were given two weeks to comply either by repairing the vehicles or providing the required documentation.

The project re-inspected the vehicles between February 1 and 7, 2018, to ensure that the vendors had fixed vehicles recommended for repair work and that all the vehicles met the safety and transportation requirements for IRS operations. The ECO inspected and certified 205 vehicles to support IRS operations in Migori and Homa Bay.

6.2.4 MEDICAL EXAMINATION AND PREGNANCY TESTING FOR SPRAY TEAMS

To ensure a healthy work force during the IRS campaign, the project carried out medical examinations for all IRS seasonal workers who would work directly with the insecticide and, for female workers, a pregnancy test. The exams took place in both counties between January 29 and February 8, 2018. This group of workers comprised SOPs, washers, pump technicians, and storekeepers. Medical officers

examined the cadres at selected health centers. The employees gave a declaration of their medical and occupational histories and underwent checkups on their general health, visual acuity, allergic reactions, and cardiovascular and respiratory conditions. The physicians submitted their recommendations based on the fitness levels of each individual. This information guided PMI AIRS in the allocation of duties to the spray teams. Pregnancy testing for the females was repeated 30 days after the first checkup at each operation site to ensure that the group was still fit to continue with IRS operations. All those found unfit to carry out roles that required direct interaction with the insecticide were re-assigned to mobilization roles.

6.3 TRAINING AND CAPACITY BUILDING

PMI AIRS incorporated environmental compliance procedures and best practices for IRS operations in the training of all cadres recruited to support the campaign. The TOT workshop was the first training. The goal was to enable supervisors who received that training to transfer the knowledge gained and cascade it down with training materials during training of TLs, pump technicians, mobilizers, and SOPs.

PMI AIRS staff trained security guards, health workers, and drivers who were to transport SOPs and the insecticide. Details of the training for IRS seasonal workers are in Annex D.

6.4 ENVIRONMENTAL COMPLIANCE ACTIVITIES DURING THE CAMPAIGN

The project structured IRS field inspections and support supervision in Migori and Homa Bay in a way that the PMI AIRS team, NEMA, and MOH supervisors from the county and sub-county would carry out smartphone-based activities. They include morning mobilizations and transport vehicle inspections, home owner inspections, SOP performance checks, end-of-day clean up inspection, and daily storekeeper performance checks. Each spray day, a team of these supervisors would head to different sub-counties and carry out supervision in different sites. Thrice a week, the supervision team met centrally, both in Migori and Homa Bay, to give feedback on best practices and challenges and recommend corrective actions to resolve non-compliance observed in the field (Annex K).

PMI AIRS provided the spray teams with a breakfast and plenty of water each morning to drink to prevent the SOPs from carrying or asking for food items in the field while working with the insecticide. When conducting morning mobilizations, the supervisory team regularly visited the SOPs at their food stations to ensure each had had the meal and drank plenty of water to hydrate. The supervisors would then accompany the SOPs to the sites to ensure they donned their PPE correctly and team leaders completed the SOPs' daily health checklists. The supervisors also ensured that the SOPs collected all the previous day's leftover insecticide in barrels 1, 3, and 5 prior to boarding an IRS transport vehicle.

Every morning, each SOP transportation vehicle underwent an inspection to ensure that the driver was in possession of a valid license and mobile cell phone and that the vehicle was equipped with firm benches, a spill response kit, first aid kit, fire extinguisher, emergency response procedure sheet, and other IRS health and safety procedure sheets, including the material safety data sheet for Actellic 300 CS. Vehicle carrying capacity was also inspected to ensure that the SOPs were not overcrowded and sat comfortably with sprayer pumps held between their legs.

Supervisors also assessed the use of PPE by the SOPs when they were spraying and during wash-up activities. An inspection of site storerooms was carried out with frequent checks on the general arrangement, inventory records, and physical verification of items, including insecticides, empty bottles, new and used nose masks, etc., to ensure that the physical count matched figures documented in store records. The project carried out regular checks to confirm correct posting of and adherence to warning signs at the sites; proper maintenance of fire extinguishers, first aid kits, and hand wash barrels; and the appropriate level of preparedness to respond to emergency cases related to potential incidents, accidents, and exposures. Storekeepers were interviewed to ensure they were trained on the symptoms of insecticide exposures and measures to take in case of such incidents. Correct handling, segregation,

and storage of wastes at the site stores were also key supervision elements and deliverables for storekeepers.

In the field, supervisors supported household preparation to ensure removal of items from eligible structures and that immovable ones were covered with polythene sheeting before spraying. TLs and supervisors monitored SOP performance to ensure correct swathing and application of the insecticide on desired surfaces. Beneficiaries were also interviewed to ensure that they had been given the correct instructions on what to do before, during, and after spraying. At the end of the day, when the SOPs returned to their sites, TLs and site supervisors would ensure that the SOPs continued to use their PPE in the wash areas, correctly performed the progressive rinsing of the sprayer pumps, and at the very least, washed their hands and faces with soap and water. Separate temporary bathing units covered with canvas sheets were provided for male and female SOPs so they could shower and change clothes.

6.5 PMI AIRS PROJECT INCIDENTS MANAGEMENT

Spray operations in Migori and Homa Bay Counties for the 2018 campaign generally ran smoothly. However, eight sub-counties reported addressable incidents. Annex L presents a summary of the incidents that were reported during the February/March 2018 spray campaign in both Counties.

6.6 POST-SEASON ENVIRONMENTAL COMPLIANCE ACTIVITIES

Immediately after spray operations, PMI AIRS rolled out the close-out phase for all IRS operation sites. The activities carried out in this phase included:

- Proper and thorough cleaning of PPE and other IRS items before storage during the off-season
- Emptying all site stores of materials and equipment used during spraying. All these items went to the main county warehouses for storage
- Cleaning and decontaminating such stores
- Separately collecting all IRS wastes at the site stores as either contaminated or non-contaminated wastes and temporarily storing them at the main warehouses before final disposal
- Covering of all 68 soak pits in both counties with soil placed over a heavy gauge polythene sheet lining. This will prevent the growth of vegetation over the filter material during the off-season and allow for effective biodegradation of the insecticide content adsorbed by the charcoal in the soak pit (Figure 4).
- Ensuring that all wash areas were properly secured with gates locked to restrict access by humans or animals during the IRS off-season period

FIGURE 4: COVERING OF SOAK PITS AND SECURING THE WASH AREA



At all operation sites, PMI AIRS used storerooms provided by facility management either at health centers or chiefs' camps. Before handing over storerooms to the management of such facilities in Migori and Homa Bay, PMI AIRS cleaned and decontaminated them by washing the floors with soap and water. The project repaired and painted storerooms whose walls had been damaged after the installation and removal of wooden pump hangers. PMI AIRS made a formal request to the facility in-charges to provide adequate security for the locked-up wash areas and soak pits to prevent vandalism during the non-spraying period.

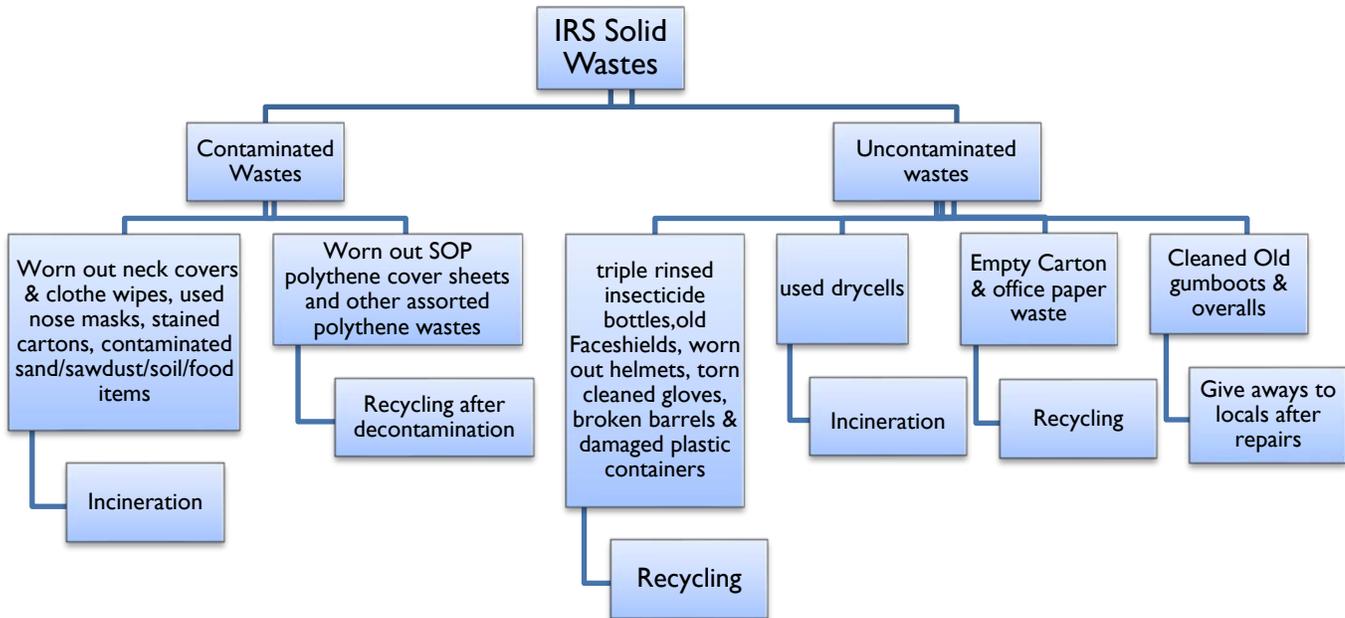
Led by the ECO, PMI AIRS carried out a post-IRS environmental compliance inspection of all the 68 operation sites between April 10 and 27, 2018.

6.7 IRS CAMPAIGN WASTE COLLECTION AND DISPOSAL

Spray teams handled liquid waste in the wash areas, with the contents draining into the soak pits for filtration.

The project emphasized source segregation of IRS solid wastes at the operation sites, with the storekeeper in charge of the task. Storekeeper categorized solid wastes generated at the sites as contaminated and uncontaminated (Figure 5). Contaminated wastes comprise primarily used paper nose masks, soil/sand/sawdust used to clean spillages, and food items contaminated by the insecticide at beneficiaries' homes. The project stored all used dry cells with the contaminated wastes. The project separated uncontaminated waste and stored it in labelled gunny bags either as polythene/plastic wastes or ordinary paper/carton wastes. After being triple-rinsed by SOPs in the field, all empty Actellic 300 CS bottles were thoroughly cleaned by washers and then punctured and stored as uncontaminated plastic wastes in their cartons.

FIGURE 5: PMI AIRS PROJECT SOLID WASTE SEGREGATION



At the end of spray operations, the Program and Logistics coordinator organized transportation of all uncontaminated wastes collected from the sites to the Kisumu main warehouse for temporary storage before final disposal. The Migori and Homa Bay warehouse managers oversaw the transportation of all contaminated wastes to the Kochola Operation site for temporary storage in a shipping container before final disposal. Annex M presents a summary of the disposal mechanism for wastes streams generated during the 2018 campaign. The PMI AIRS ECO witnessed both plastic and paper/carton recycling process from April 7-9, 2018. Certificates of disposal are in Annex I.

7. MONITORING & EVALUATION

7.1 INTRODUCTION

Based on the challenges experienced and lessons learned in the 2017 IRS campaign, PMI AIRS applied improved M&E systems for the 2018 IRS campaign. The key areas of change, improvement, or expansion included:

- Review of mobilization reporting and data capture – both the database and the reporting tools
- Expanded scope and use of mHealth in the program for quick decision making
- Active and early involvement of the M&E personnel in training key data collectors (SOPs and mobilizers)
- Production of customized tools and materials to enhance data collection processes at different levels and across departments

The M&E Manager, working closely with the Home Office M&E Specialist, steered the implementation of the above activities. Working through the Kenya county government structures, the County and Sub County HRIOs were involved in supervision and data quality checks both during the PSDQA and during the campaign. For PSDQA, only those HRIOs who did not take part in the campaign were involved. The HRIOs upload the IRS data to the KHIS (Kenya Health Information System). Monitoring and Reporting

PMI AIRS continued monitoring performance and reporting through the use of customized data collection tools. Under the leadership of the M&E manager, the project refined the tools following the IRS 2017 campaign review meetings with stakeholders. The key changes and improvements in the M&E data collection systems included capturing village data in the system, revising the door-marking protocol, introduction of a special code for non-sprayed structures, and improving data flow.

7.1.1 CAPTURING VILLAGE DATA IN THE SYSTEM

For the 2017 IRS campaign in Migori county, data was only captured down to the sub-location level despite the village being the lowest geographical unit. Village-level data proved to be important during the 2017 PSDQA period and during the entomology spray quality assessment. As a result, in 2018 the data collection forms for mobilization and spray captured the more granular village level data. Due to limitations with number of geographical levels that could be entered into the legacy AIRS Access database, the village level detail was not incorporated into the standard M&E database. As a result, this data was entered and managed via a simple excel database. Once data entry was completed, the village dataset was reconciled against the primary Access database to ensure validity. Moving forward, under the PMI VectorLink project, the Kenya program will switch to the new DHIS2 database, where geographical limitations will not exist and village level details will be captured.

7.1.2 REVIEW OF THE DOOR-MARKING PROTOCOL

During the 2017 review meetings, stakeholders provided feedback that the length of the door-marking protocol used was too long. As a result, for 2018 PMI AIRS made modifications to have the door-marking protocol written as below:

For Mobilization:

Date/MOB Code/IRS Card Number / M

Date/MOB Code/NM

M stands for mobilized and **NM** stands for Not Mobilized. The project removed the IRS number from the non-mobilized household markings because no card was left. For such households, consent was not provided by household head, so mobilizers were instructed not to leave an IRS card behind.

For Spraying:

- Structures sprayed were marked by the SOP as:
Date / Spray Operator Code / S
- Structures found, but yet to be sprayed, e.g., the home owners were away, but spray teams were still active in the respective community, were marked as:
Date / Spray Operator Code / X
- Structures (FINALLY) NOT sprayed were marked as:
Date / Spray Operator Code / NS

When SOPs came across non-mobilized structures, they would contact the TL (who had extra mobilization forms and IRS cards) to mobilize the households, issue the IRS card, and document the household data in the mobilization form (Form IA). Thereafter, the SOP sprayed the structure and collected spray data. During mop up, spray teams focused on the structures with the *Date / Spray Operator Code / "X"* marking. Structures marked as *Date / Spray Operator Code / "NS"* were sprayed if house owners changed their mind or requested IRS after initial refusal.

7.1.3 INTRODUCTION OF CODE 999999

Based on the above guidance in door marking and recording structures, the M&E team introduced the '999999' code as a unique way to identify and record non-mobilized structures. Both the database and the data collection forms were edited to account for a multitude of reasons for non-mobilization. Upon reaching a household that could not be mobilized e.g. a locked structure, the mobilizer was instructed to schedule up to 2 additional re-visits before the household was declared 'non-mobilized'. After the third unsuccessful attempt, the door was marked as not mobilized and included the IRS number as '999999'. Similarly, mobilizers recorded the '999999' in the IRS number column on the daily mobilizer form to ensure all households found were documented, irrespective of mobilization status. All supervisors, M&E assistants and DEC's were trained on this approach.

7.1.4 REVIEW OF THE MOBILIZATION DATA COLLECTION TOOLS

In 2017 mobilization was identified as a key area for improvement in 2018. The M&E Manager and the IEC/behavior change communication (BCC) coordinator worked together to review the M&E systems in place to support mobilization in order to identify opportunities for strengthening as follows:

- Mobilization form IA. Two new indicators were added to the mobilization data collection form:
 - Number of households reached
 - Number of households sensitized
 - Revision of the minimum age for the population reached under mobilization to 12 years and above. There was an expectation that mobilized population would both comprehend and then pass along the messages provided by the mobilizer.

- IEC supervisor form 1B (new): The IEC supervisor used this tool at the ward level. The tool summarized daily mobilization data captured by mobilizers during the household door-to-door activities and the community meetings attended by each mobilizer.
- Mobilizer Community Meeting Form 1C (new): After the spray exercise concluded in a given village, the mobilizer would identify and attend community meetings. Each mobilizer had a target to attend three meetings during the last two days (Day 3 and Day 4) of the 10-day contract. During these meetings, mobilizers were to identify non-sprayed structures, collect contact and location details of these structures including key landmarks, and provide this information to inform spray team mop up activities.

7.2 DATA FLOW

The TL for spray activities and the IEC supervisor for mobilization activities collected all data from the field spray and mobilization activities. The TL and IEC supervisor verified the data. They completed the relevant summary forms, including the use of the Error Eliminator (EE). The TL then handed over the reports to the site supervisor or the site coordinator (whoever is present). The site coordinator and the M&E assistant ensured all relevant sections of the tools were filled out correctly and proper authentication was given in the form of a signature. The IEC supervisor handed over the mobilization data forms to the M&E Assistant. At this level, all arithmetic must match. M&E assistants ensured that all the forms reached the data centers through the PMI AIRS supervisors.

In IRS 2018, all M&E assistants were decentralized to operate from within the sub-counties instead of the main office and used motorbikes to move around. When it rained, M&E assistants had to delay their daily movements and activities based on driving conditions, which would reduce the M&E assistants' time in the field and supervision targets for the day. Occasionally, the delay in daily movements also resulted in a delay for data collection forms reaching the data centers. To mitigate this, the project intends to start operations early in future campaigns to enable completion before the rains begin. Otherwise, the decentralized model worked very well during the campaign and the Kenya team will continue to deploy M&A assistants in this manner in future campaigns.

PMI AIRS supervisors had a supervision schedule that required each of them to be at a sub-county for an entire week. Based on this, the M&E manager designed a data flow plan and circulated it to the teams each week. This plan showed central data collection points and the contacts of the field M&E assistants and AIRS supervisors. AIRS Supervisors and M&E assistants sometimes faced challenges in coordinating the best way to meet each evening for data form transfers to the data centers. Similarly, on the first few days, some M&E assistants felt they did not have sufficient time to verify the data due to the large volume captured from both mobilization and spray activities. Additionally, some supervisors did not make it to sites due to competing duties, thereby delaying the data flow to the data center. As a result, the M&E manager convened a meeting to review ways to make the system work better. It was decided that supervisors agree on systematic approach for timely communication and coordination between themselves and the M&E assistants and M&E manager to ensure a seamless data flow to the central points. Additional manpower was assigned during times when AIRS supervisors were very busy and were not able to make it to specific site. Table 9 below gives a summary of these tools and the data flow.

TABLE 9: DATA FLOW AND DATA COLLECTION TOOLS

	Spray and Mobilization Data Flow	Data Collection and Verification Tools
1	CHV sensitizes the community through door-to-door visits	Mobilization form/IRS card
2	SOP visits a mobilized structure for spraying	Daily SOP Form/IRS Card
3	CHVs attend community meetings as quality checks for non-sprayed structures to ensure follow up at household level and eventual spraying	Mobilizer Community Meeting Form
4	TL directly observes SOP during spray	Directly Observed Spray (DOS) Form
5	M&E assistants move with the spray team to verify data at structure and site level	Data Collection Verification (DCV) Form (Digitized)/ Error Eliminator (EE)
6	Team leader reviews the SOP form daily after end-of-day activity and submits forms to site supervisor	Team Leader Summary form and Error Eliminator (EE)
7	IEC supervisor reviews the mobilization form, updates in mHealth daily, and submits forms to M&E assistant	IEC supervisor summary
8	Site supervisor verifies form and hands over to site coordinator	EE
9	Site coordinator summarizes data on the Performance Management Tracker (PMT) and sends the report via CommCare	PMT
10	M&E assistant collects, verifies, and submits data forms to data center (both spray and mobilization)	EE
11	Data received at the data center, verified, and entered into the database	EE/data center tracking form

7.3 DATA QUALITY ASSURANCE AND VERIFICATION

The project used the AIRS standardized approach to data collection and reporting through provision of standard tools and required training for all data collectors and supervisors at each level. Trained SOPs and mobilizers received unique numbers to track data they submit to the data center. The protocol for seasonal worker replacement required the site coordinators to notify the M&E team of the changes on the ground. The M&E department allocated the codes and shared the details with the finance and operations team.

The data center Access database, used to collate spray and mobilization data. It had a special reporting mechanism that checked for any data errors post-entry and gave summary reports. The database had built-in validation to control quality of data during entry, such as allowing for only unique IRS numbers, SOP codes, and mobilizer codes, to be entered. As a result, the M&E team could detect duplicate cases and communicate them to the field teams.

PMI AIRS used the following tools to monitor data quality at different levels of reporting:

- **EE:** This tool suggests logic checks for the SOP form that are linked to common errors. The team leader, M&E assistants, and data entry clerks (DECs) applied the tool during data error checks each day.
- **TL Summary:** This tool summarized the key daily indicators from the SOP form, namely the eligible structures found and sprayed and the insecticide bottles issued, used, returned, or damaged at the end of each day.

- **Directly Observed Spray (DOS) Form:** This form covers a set of spray quality indicators spanning from the mixing of the insecticide to the actual spraying activity. The TL uses it during daily SOP supervision. It also provides a guide on what to check for during direct observation of spraying.
- **Data Collection Verification (DCV) Form:** This tool focused on verifying the details of a household one to two days after it had been sprayed. M&E Assistants and field supervisors completed the form during field visits. This form was digitized and reported via CommCare.
- **IEC Supervisor Form (new):** The IEC supervisor used this form at the operations site level. The tool summarized mobilization data at the household- and community-meetings level.
- **Mobilizer Community Meeting Form (new):** The mobilizer used this tool in community meetings to track non-sprayed structures and their locator details and to document any IRS concerns and possible solutions for further action by the sites.

All project supervisors and M&E teams received training on the use of these tools at different levels. The project developed a supervision schedule for use of all supervisory tools, including the M&E tools, and used it to guide supervision and hold supervisors accountable for supervision targets.

In 2018, data quality was greatly improved especially in the first week of IRS operations. The first week of the campaign was a critical time for data quality in IRS operations, because any forms with errors must be returned to the field for corrections, which could result in a backlog in data entry. One reason for improvement was the structured training, in which M&E representatives were present both as trainees and as trainers-of-trainers during all trainings held (ToTs, SOPs, TL, and MOB). Additionally, during the ToT, all site coordinators and MOH SCHRIOs received training on data collection and quality assurance procedures. This resulted in an increased awareness of the importance of data quality across cadres. Site coordinators and MOH SCHRIOs routinely checked SOP forms before data reaching the data center. SOPs and mobilizers received a handout on data collection and key areas to focus on for reference as they started their work. The outcome of these initiatives was a low bounce-back rate of 3% for SOP forms with incomplete data returned to the field. The low bounce-back rate represents a great improvement from Week 1 in 2017, when 70% of data forms were returned to the field for review, verification, and resubmission.

Despite having been taken through training sessions that emphasized the need to document both sprayed and non-sprayed eligible structures, some SOPs failed to adequately document all eligible structures that were found but not sprayed across program coverage areas. During supervision, AIRS supervisors noted that SOPs would document only the sprayed structures and leave out the non-sprayed structures. When investigated further, SOPs reported a key reason for failure to record non-sprayed structures was a concern that SOPs would fill up their SOP form quickly, and then would not have space to document the sprayed structures. Furthermore, the spray supervisors communicated the importance of SOPs meeting their daily spray targets, thus SOPs would focus on documenting the sprayed structures, and would fail to record non-spray events. To combat this issue, a decision was made to ensure SOPs received more than one SOP form as they left for field in the morning. Additionally, the SOP form was revised to have space for fifteen structures as opposed to the initial ten structures per form.

7.4 DATA MANAGEMENT AND PROCESSING

PMI AIRS Kenya managed and processed data through the Microsoft Access database, which had built-in validation processes to ensure clean data. Data were stored on SQL server and saved through daily synchronizations via Dropbox. The database generated reports on a daily basis which were shared with the broader M&E and Operations teams to show progress in the data entry process.

7.4.1 DATA ENTRY

PMI AIRS identified and set up two centers for data entry and management. The project recruited and trained 62 DECAs (52 working and 10 alternates). The centers were located in Migori (25 DECAs) and Homa Bay (27 DECAs). Each DEC had an assigned computer with the AIRS 2018 database and Dropbox installed. Each DEC entered the mobilization and spray data according to the AIRS protocol, by totals first and then by details. By the end of each day, every DEC synchronized the data to the cloud server. Data cleaning took place on a weekly basis (every Monday) for spray data for the previous week during the campaign. Post spray completion, mobilization and village data were cleaned for a number of weeks to troubleshoot quality issues and ensure data accuracy.

7.4.2 DATA STORAGE AND SECURITY

PMI AIRS stored data both electronically (in the SQL server and each DEC computer) and conventionally (in box files). After the spray campaign, the project moved the paper data forms in the files to the Kisumu office in a lockable archival room with limited access. The project arranged the forms by wards in each sub-county and by the different spray teams for every date of spray. The AIRS IT specialist cleaned the DEC computers once data were finalized. The data will continue to be accessible to the AIRS team through the AIRS Kenya servers or stored paper-based forms if needed.

During the campaign, the project collected the names of respondents above 18 years of age during spraying and the name of the household heads during mobilization. No other identification details were collected during the campaign. The data forms were handled by project-trained and authorized personnel only. Through working with the local administrations, the communities were made aware in advance that this level of detail would be collected. These data were entered into the AIRS database, which was password protected where only limited persons were allowed to access the information. AIRS Kenya data analysis did not include identification details, rather the final reports focused on key aggregated project indicators.

7.5 KEY RESULTS

The key indicators tracked throughout the campaign included structures targeted, structures found, and the proportion of targeted and found sprayed over targeted and found to reflect progress and coverage. During spraying, the project collected population details to establish the populations protected. This included the total population disaggregated by gender and special groups such as pregnant women and children under five. PMI AIRS also closely tracked insecticide usage using the automated e-inventory and the PMI AIRS database.

According to Table 10, based on the number of structures recorded as found, the project achieved overall coverage of 94.1% (93.3% in Migori County and 94.7% in Homa Bay County). The highest coverages were in Suna East (98.2%) and Kabondo Kasipul (98%) in Migori and Homa Bay Counties, respectively. The lowest spray coverages were in Suna West sub-county (80.7%) and Mbita sub-county (89.9%) in Migori and Homa Bay Counties, respectively. In Suna West, the team reported many locked structures in gold mining communities. The highest numbers of refusals were in the Suna West sub-county.

For Mbita Sub-County, the low progress on Mfangano Island compared with the mainland lowered the overall performance (Table 11). This was as a result of poor terrain that hindered movement of the SOPs, especially in rainy weather that resulted in vehicles getting stuck. SOPs also had to walk long distances between one structure and the next due to the sparse population. The island had many ineligible structures; those made of corrugated iron sheet walls. Additionally, local administrative officials demobilized the community because the project had not hired the officials' friends and relatives.

TABLE 10: 2018 SPRAY COVERAGE BROKEN DOWN BY SUB-COUNTY AND COUNTY

County	Structures Targeted	Structure Found	Structures Sprayed	Spray Coverage	Targeted Overall Population	Population Protected				
						Male	Female	Total Population protected	# Pregnant Women	# Children <5 Years
MIGORI COUNTY										
Awendo	34,955	30,086	28,598	95.1%	149,953	60,743	66,277	127,020	1,763	13,282
Nyatike	48,720	42,859	39,690	92.6%	195,696	92,709	93,771	186,480	5,360	25,499
Rongo	29,318	30,651	28,975	94.5%	126,578	66,048	63,686	129,734	1,973	14,691
Suna East	32,976	31,862	31,304	98.2%	135,317	66,416	69,066	135,482	2,572	16,803
Suna West	29,271	27,393	22,095	80.7%	117,360	46,872	47,976	94,848	2,112	14,028
Uriri	41,860	39,979	38,566	96.5%	181,484	86,499	84,640	171,139	3,535	22,822
Total	217,100	202,830	189,228	93.3%	906,388	419,287	425,416	844,703	17,315	107,125
HOMA BAY COUNTY										
Homa Bay Township	27,243	24,489	22,515	91.9%	117,147	46,825	48,658	95,483	1,542	11,283
Kabondo Kasipul	30,953	31,362	30,732	98.0%	133,098	61,281	59,642	120,923	1,214	12,982
Kasipul	32,672	34,840	33,631	96.5%	140,490	64,097	62,373	126,470	2,117	15,021
Mbita	30,938	25,002	22,476	89.9%	133,034	44,319	45,498	89,817	1,304	11,018
Ndhiwa	47,823	46,946	42,893	91.4%	205,639	84,242	86,669	170,911	3,500	24,517
Rachuonyo North	45,000	45,004	44,032	97.8%	193,499	83,901	85,837	169,738	2,017	19,765
Rangwe	27,700	27,819	26,520	95.3%	119,109	50,226	50,965	101,191	1,235	12,709
Suba	28,894	30,364	28,942	95.3%	124,244	56,928	57,696	114,624	1,733	14,560
Total	271,223	265,826	251,741	94.7%	1,166,260	491,819	497,338	989,157	14,662	121,855
Overall	488,323	468,656	440,969	94.1%	2,072,648	911,106	922,754	1,833,860	31,977	228,980

TABLE 11: MBITA SUB COUNTY PERFORMANCE

Area	Structures Found	Structures Sprayed	Coverage
Mainland	22,208	20,433	92%
Island	2,794	2,043	73%

7.5.1 INSECTICIDE USAGE AND SOP PERFORMANCE

SOPs received daily targets of nine structures at the start of the campaign. Spraying activities started with far-off structures, progressing closer to the operations sites in the field. Toward the last days of the campaign, many of the SOPs were spraying urban regions, which had bigger structures with many rooms. Institutions were targeted for the last days of the campaign. The project used 162,468 insecticide bottles to spray 440,939 structures (Table 12).

TABLE 12: USE OF INSECTICIDE AND PERFORMANCE OF SPRAY OPERATORS

Sub County	Structures Sprayed	Insecticide Used*	Average Number of Structures Sprayed by SOP per Day	Average Number of Structures Sprayed per Bottle
Awendo	28,598	9,079	7.7	3.1
Nyatike	39,690	17,892	7.4	2.2
Rongo	28,975	8,784	8.2	3.3
Suna East	31,304	8,817	8.8	3.6
Suna West	22,095	8,392	7.0	2.6
Uriri	38,566	13,218	8.5	2.9
Total	189,228	66,182	7.9	2.9
Homa Bay Township	22,515	8346	8.0	2.7
Kabondo Kasipul	30,732	12247	9.2	2.5
Kasipul	33,631	18573	9.5	1.8
Mbita	22,476	12590	7.4	1.8
Ndhiwa	42,893	10318	8.5	4.2
Rachuonyo North	44,032	13975	9.4	3.2
Rangwe	26,520	10560	8.8	2.5
Suba	28,942	9677	9.4	3.0
Total	251,741	96,286	8.8	2.6
Overall	440,969	162,468	8.4	2.7

Insecticide data reported from the warehouse and satellite reports

7.5.2 REASONS FOR NON-SPRAY, 2018

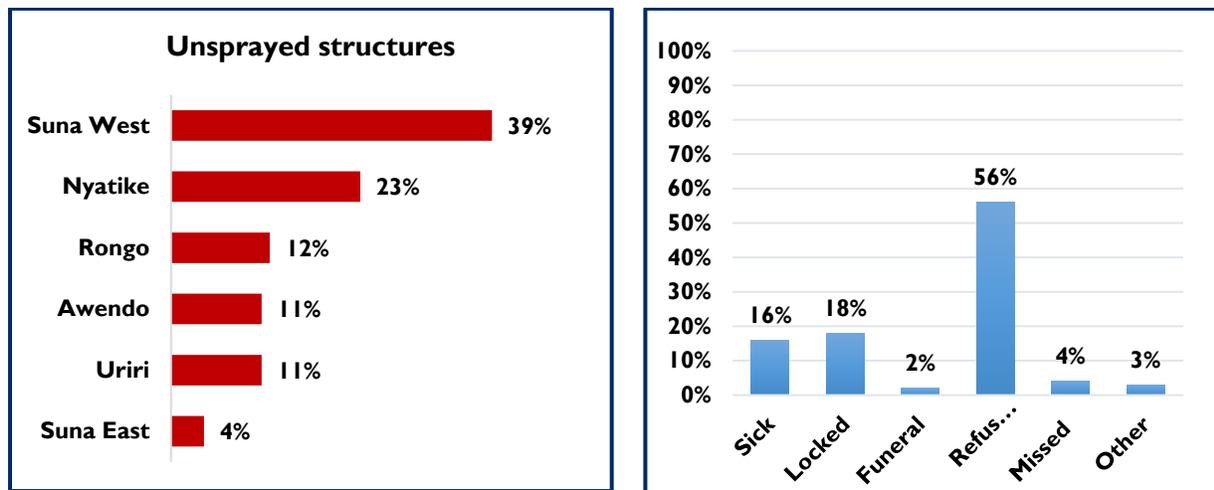
The SOP form documented a number of reasons for failure to spray certain structures. This has been profiled against the sub-counties in each county below, with details provided in sections below:

7.5.2.1 MIGORI COUNTY

The project did not spray 13,602 eligible structures found (7.2% of all eligible structures found) in Migori County with a reported population of 46,313 people (972 pregnant women, 6,896 children under five).

The highest number of reported unsprayed structures was in Suna West, with refusals as the key contributing factor (Figure 6). One of the leading causes of refusals was demobilization in the community by some of the administrative leaders, who cited recruitment issues as the reason for speaking out against IRS. They expected their community members to be part of the spraying team despite a failure to meet the recruitment criteria and requirements. Also in Suna West, some of the SOPs and mobilizers selected for both mobilization and spray were assigned to work outside their native village, leading to refusals in certain areas. In some wards such as Wiga being absent to work in local gold mines resulted in missed appointments during spray days. Apart from refusals, the other reasons that contributed to non-spray included locked structures and presence of sick people who could not move out of the structures.

FIGURE 6: DISTRIBUTION OF UNSPRAYED STRUCTURES IN MIGORI COUNTY (N=13,602)



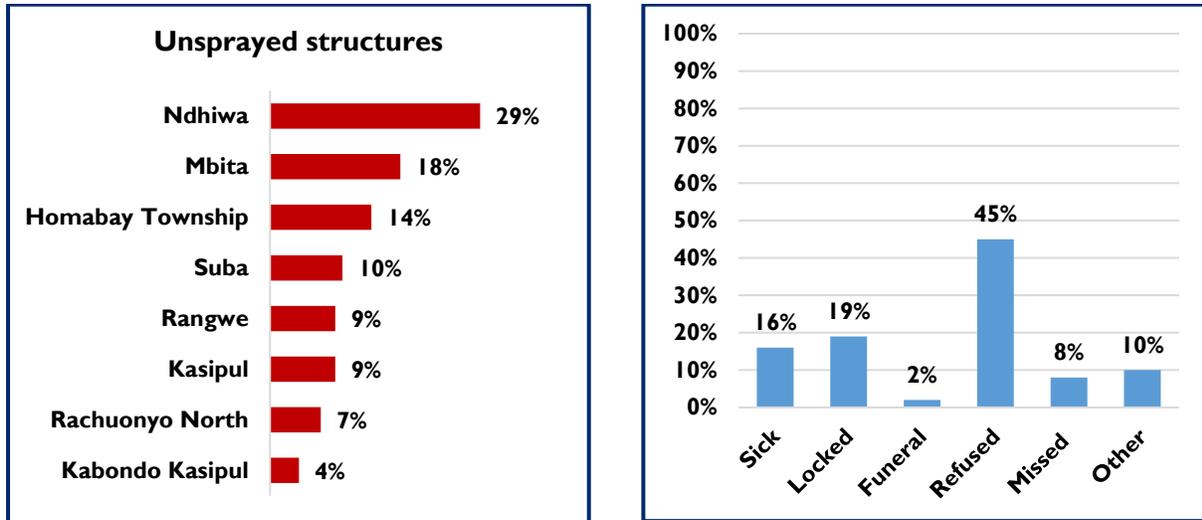
7.5.2.2 HOMA BAY COUNTY

In Homa Bay County, 14,085 eligible structures were not sprayed (5.6% of all eligible structures found). The total population in these structures was 46,387 people. Among these, 681 were pregnant women, and 6,562 were children under five. Most of the non-sprayed structures were recorded in Ndihiwa and Mbita Sub-Counties (Figure 7). The key reason for non-spraying was refusals. In Ndihiwa Sub-County in the early days of the campaign, many people refused, citing the bedbug myth and demobilization of the communities by CHVs and community leaders who had not been recruited for the spray campaign. The earlier than predicted onset of rainy weather, in late February-early March, resulted in impassable roads and difficulty getting items out of the structures for spraying. Some community members, after witnessing their neighbors being sprayed, later requested for IRS. In some situations it was impossible to get back to the village due to impassable roads. In Mbita Sub-County, demobilization of the community by a chief reportedly resulted in mass refusals. The MOH Supervisors reported the chief and the authorities disciplined him. In other areas, gated communities were inaccessible. For wealthier communities with access to alternative malaria control methods, accepting spray was difficult.

Despite these challenges, the project continued to pass the key messages through the mobilizers to the community. Radio talk shows tried to dispel the bedbug myths. To advocate for IRS and minimize refusals, PMI AIRS met with chiefs and community leaders to discuss benefits of IRS and issue T-shirts to participants. In the market centers, the project held “market interrupt sessions” to share with the public the benefits of IRS, distribute IEC materials, and dispel myths and misconceptions. With this effort, most of the residents refusing IRS then demanded for their structures to be sprayed. Some structures were

revisited during mop-up, but others could not be revisited due to impassable roads and the logistical challenge when spray teams were in regions far from those seeking spraying.

FIGURE 7: DISTRIBUTION OF UNSPRAYED STRUCTURES IN HOMA BAY COUNTY (N=14,085)



8. MHEALTH

8.1 INTRODUCTION

In 2018, PMI AIRS expanded the scope and use of mHealth applications to support quick decision making across different components of the program. This expansion complemented the CommCare tools used in IRS 2017 campaign. The new tools were designed in ODK and Kobo Collect platforms; both of which are open source. The 2018 mHealth component covered the following technical arms of the project: data performance monitoring, seasonal workers attendance tracking, insecticide inventory tracking, incident and accident reporting, and mobilization data reporting. The M&E department designed and developed these capabilities under the leadership of the M&E manager. The project mainly used the Open Data Kit (ODK) application in the design of these tools, which were very valuable in decision making throughout the campaign.

8.2 COMM CARE APPLICATIONS

With Dimagi and Home Office offering remote support, the program continued to use the CommCare applications. CommCare is an easily customizable, open-source mobile platform that supports frontline workers in low-resource communities. CommCare consists of two components:

- **CommCare Mobile** is the mobile-based portion of CommCare used for data collection and service delivery
- **CommCare HQ** is the cloud based website (www.commcarehq.org) used for application management, data storage, and reporting. Through the CommCare HQ website, users can design applications, access data, and manage mobile workers. CommCare HQ is the ultimate repository for data submitted by frontline workers using CommCare Mobile

PMI AIRS employed both CommCare mobile and CommCare HQ with Telerivet in the 2018 campaign. The project managed three components in these platforms: supervisory tools, performance management tracking, and job aide messages. The M&E manager was able to set up two gateways. One was dedicated purely to data reports and the other to job aide messages. The decision to use two gateways was arrived at following challenges experienced during IRS 2017 campaign. The use of a single gateway for both data and job aide messages resulted in delays in sending out the job aide messages and the PMT data reports.

PMI AIRS will continue to use two gateways as they have proved to be sufficient for managing both data and job aides.

8.2.1 SUPERVISORY TOOLS AND REPORTS

Digitized supervision checklists were used during field visits by AIRS and MOH supervisors and any visitors to the program. The forms included: SOP morning mobilization and transport vehicle inspection, homeowner preparation and SOP performance, storekeeper performance, end-of-day clean up, and DCV. Supervisors submitted these forms daily to the CommCare HQ platform and later shared with different stakeholders to highlight key red flags identified which required follow up action. Before the start of the campaign, the PMI AIRS M&E manager reviewed most of the supervisory tools and gave design advice to both Home Office and Dimagi. Dimagi implemented the suggestions and improved the reports. A challenge with the application included the over-reporting of red flags in the first few weeks of the campaign. The M&E manager and ECO followed up the cases for further investigation and in most

cases determined they were false alarms. To address the issues, the project provided on-the-job training to the teams, which improved as the campaign progressed.

A total of 13,700 forms were submitted by both AIRS and MOH supervisors between February 12, 2018, and April 6, 2018. We included the two-week period after the campaign to capture the DCV reports that M&E assistants submitted for the last weeks of the campaign. Out of the 13,700 mHealth forms submitted by supervisors, 36% were homeowner preparation and SOP performance, 19% were morning mobilization and transport vehicle inspection, 18% were end-of-day clean up, 17% were DCVs, and 10% were storekeeper performance. The forms show that many supervisors concentrated their efforts in DOS and offering support in this area. As the campaign progressed, homeowner preparation was noted as one of the key areas that required strengthening in the program and in future campaigns.

8.2.2 PERFORMANCE MANAGEMENT TRACKER (PMT)

Daily submission of key operations data via PMT SMS provided key indicators on campaign progress and performance through automated email reports. Each of the 68 site coordinators received a mobile phone to submit the daily reports to CommCare HQ via Telerivet. After data verification with the SOPs, TLs, and site supervisors, the site coordinators submitted the data as summarized on the TL forms to the CommCare HQ platform. The same data was updated on the performance tracking sheet posted that was posted at every site. The report format used via SMS was:

A.X.Y.W.Z, where A is a constant, X is the number of SOPs that worked for the day, Y is the number of structures found, W is the number of structures sprayed, and Z is the number of insecticide bottles used during the campaign.

In the initial phases of the campaign, the M&E manager noted that the reports gave data for both counties (Homa Bay and Migori), yet only Homa Bay was spraying at the time. After troubleshooting, the M&E team discovered that there was a mix up on the phones distributed to Homa Bay teams. The data submitted was mapped to Migori sites in the Televerit system. PMI AIRS corrected the issue by having the right contact details and the associated International Mobile Equipment Identity (IMEI) numbers for mobile devices re-mapped. However, there was a delay with the Dimagi team to clear out the discrepant data. Once rectified, site coordinators then re-submitted their data from the start of the campaign to the end. Even after re-submissions, many were still unable to view their data by week three of the campaign. In the interim, the Kenya team had developed a back-up PMT system, with data captured each day by the M&E Assistants through a mobile application (see below section 8.3). The PMT back system became a resource for the Kenyan team as key stakeholders were still able to track daily progress and coverage figures while the Dimagi PMT system was corrected. In the future, Dimagi and the Kenya team will try to test and troubleshoot the PMT system before the campaign.

8.2.3 JOB AIDE MESSAGES

The M&E manager and the technical team designed corrective IRS 2018 messages that went out as job alert aides to the different cadres of staff in the program. These messages spanned different components of the project, including finance and administration, IEC BCC, operations, M&E, environmental compliance, and gender. This was an expansion from the messages sent out in the IRS 2017 campaign, which mostly focused on EC, operations and gender. The main objective was to enhance compliance across all program technical areas. In 2017, job aide messages went out only in English and Swahili, alternating between the two languages. Following feedback from the recipients on the languages used, many preferred messages sent out in local vernacular as well as English since the Swahili used in 2017 was too deep to be comprehended. Therefore in 2018, messages were translated to dholuo. The translations still created challenges since dholuo is not a standardized language, especially when it comes to pronunciation and the written language, as one travels across the Nyanza region. Additionally, during implementation Home Office M&E Specialist, Kenya M&E manager and Dimagi team noted that the IRS 2017 job aide plan supported only 11,000 messages daily. With the expansion plan, the daily message

flow grew to about 38,000 messages. This overload on the gateway caused a message stoppage for several days as the M&E manager worked to reduce the number to fewer than 28,000 messages a day.

8.2.4 OTHER COMPLEMENTARY MHEALTH APPLICATIONS

PMI AIRS adopted other mHealth applications to support the decision-making process, which were valuable during the IRS campaign. The project developed the applications using an open source mobile application: ODK. PMI-AIRS, under the leadership of the M&E manager, took advantage of the mobile phones distributed to supervisors, site coordinators, and AIRS staff in the program to disseminate additional applications. These applications included:

- **E-inventory tracker:** This system was an automation of the excel e-inventory tracker used in the IRS 2017 campaign. After receiving summaries from the storekeeper, site coordinators submitted the required indicators daily using the ODK application installed on the Abt mobile phones. Storekeepers, on the other hand, submitted the report only after their reconciling their books. For each satellite store, storekeepers and site coordinators tracked chemical movement and usage through reporting on bottles issued to spray operators and bottles returned at the end of the day (returned, emptied, and lost bottles). They also tracked full bottles in stock, the supply of chemicals from the main county warehouses, and the collection of empties to inform replenishment decisions by the warehouse managers in both counties. This tool was valuable especially in the last few weeks of the campaign for chemical redistribution from one site to another to curb stock outs.
- **Incident and accident reports:** All incidences and or accidents were digitized for instantaneous documentation during the IRS 2018 campaign. The project modified the incident form to include the geographic details and the mobile number of the reporter. This made it easier for the ECO to follow up on the ground and get more details on any reported incidences or accidents. For IRS 2017 campaign, all reported incidences were on hard copy, which did not give much detail about the location or the reporter. These incidences and or accidents took longer to follow up and resolve compared with the IRS 2018 digitized system. These mobile forms were installed in all the phones across the sites and for all supervisors in the program.
- **Finance monitoring tool:** The tool tracked SOPs who worked for the day, including tracking of replacements at the operational sites in real time. It gave the finance team highlights as they prepared payroll for this cadre of staff. An unanticipated development was the many replacements that took place among the SOPs, which resulted in the need to re-install updated versions of the application in the field and in the middle of the campaign to reflect updated seasonal worker staff lists. Similarly, any person replaced required the name to be updated into the system before proceeding. Because of this, at times it took a while before the system could fully pick up changes in certain operational sites. In future campaigns, this tool will be strengthened to have a pool of backups at the sub-county level and also to enable quick updates for ease of reporting in the field.
- **PMT parallel backup:** This tool is a summary of the key indicators from the performance tracking sheet (PTS) in every operational site and was designed by the M&E Manager in the middle of the campaign following challenges with Dimagi CommCare back end system. Site coordinators filled in the PTS every evening after they ensure that data matches across all reporting levels and that supervisors and M&E assistants have verified the data. The M&E assistants then keyed in the details of the PTS using the application in ODK. The data helped validate reports submitted by the site coordinators through CommCare PMT data.
- **IEC supervisor summaries:** This tool summarizes mobilizers' door-to-door sensitization activities, follow-up community meetings attended by the mobilizers, and any replacements or absenteeism from work as reported by IEC supervisors. It also helped track the IRS cards per site in relation to the identified structures. The IEC team followed up any red flags noted in this report.

8.3 TRAINING ON MHEALTH

The project reviewed training materials and content for the relevant teams and aligned them with IRS 2018 reporting requirements. Before the start of the IRS 2018 campaign, the M&E team took advantage of the different training fora to train personnel on the program mHealth applications and reporting requirements. Support staff training that occurred in December 2017 was all inclusive of the mHealth applications content targeting 72 storekeepers, 68 site coordinators, and 18 M&E assistants. The M&E assistants were then tasked with the role of supporting the field teams in using the phones for both reporting and supervision. During TOTs, a day and a half was set aside for CommCare supervisory tools training for all 173 participants and the 68 IEC supervisors.

8.4 HARDWARE FOR MHEALTH REPORTING

A total of 322 Samsung Galaxy J2 mobile phones (225 procured and 97 in inventory from IRS 2017 campaign) were installed with all the mHealth applications and a secure applications lock software which prevented misuse of project phones. Three phones for each county were put aside for any visitors while two were set as the gateways (one purely for job aides and the other for data reports). IEC assistants and M&E assistants used tablets for both reporting and conducting DCV.

9. ENTOMOLOGY

9.1 INTRODUCTION

In 2018 the PMI AIRS Project implemented IRS with Actellic® 300CS (organophosphate) for the first time in Homa Bay County and for the second time in Migori County. To assess the quality of the spraying, the project's entomology field technicians conducted wall bioassays between 27th February and 2nd March 2018, in four sites: Rongo and Sori Karungu in Migori County, and Ndhiwa and Rachuonyo North in Homa Bay County. In each site, technicians randomly selected sprayed walls from seven mud structures and three cement houses and assessed the quality of the spraying at different heights, using laboratory-reared susceptible *An. gambiae* s.s. Kisumu strain mosquitoes. Technicians conducted cone bioassays to sprayed walls at heights of 0.5m, 1.0m, and 1.5m from the floor. They gently released two- to three-day-old mosquitoes into each cone and exposed them to the insecticide for 30 minutes, after which technicians transferred the exposed mosquitoes to a clean paper cup and sustained them on a 10% sugar solution for 24 hours.

“Fumigation effect” refers to insecticidal effect experienced within the house, away from the sprayed walls to check if mosquitoes resting on other surfaces within the house other than the sprayed walls would receive a lethal effect of the insecticide due to the insecticide being dispersed within the house.

To check the fumigation effect of the insecticide, technicians placed a small cage 20 cm x 20 cm x 20 cm with 10 mosquitoes 1m away⁷ from the sprayed wall. Exposure was 30 mins. They set a control cone on a plywood board outside of each sprayed house in a shaded area close to the house. In each house, they recorded the temperature and relative humidity. Technicians set a timer and recorded the knockdown rate at 30 mins and 60 mins, and mortality at 24 hours post exposure.

9.2 RESULTS

The project observed high mortality of susceptible *An. gambiae* s.s. following exposure to both mud and cement walls at all sites. Overall mortality in the control samples was at 2% (Table 13).

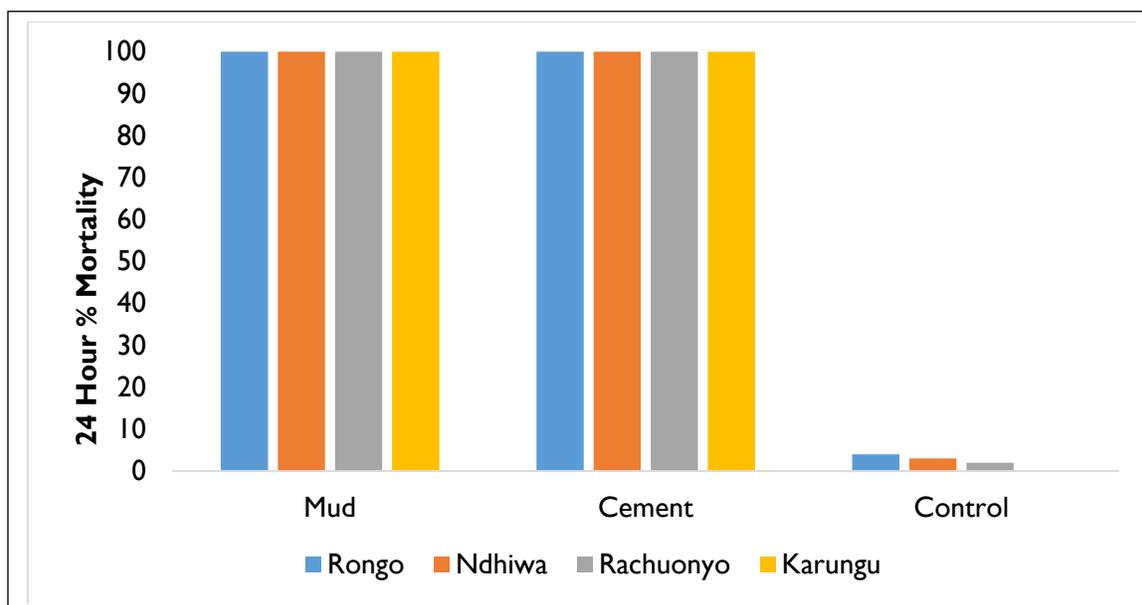
⁷ This was a protocol deviation as 10 cm was the distance from the wall stated in the standard operating procedure

TABLE 13: NUMBER OF MOSQUITOES EXPOSED AND THE PERCENTAGE OF MORTALITY AFTER 24 HOURS AFTER 30 MINUTES CONE BIO ASSAY EXPOSURE BETWEEN FEBRUARY 27 AND MARCH 2 2018

<i>An. gambiae</i> s.s. Kisumu strain										
County	Sub-County	Wall Type	Test				Control			
			Height			24 Hrs		24 Hrs		
			0.5	1	1.5	No.	% Mortality	No.	% Mortality	
Migori	Rongo	Mud	70	70	70	210	100	70	6	
		Cement	30	30	30	90	100	30	0	
	Sori Karungu	Mud	70	70	70	210	100	70	0	
		Cement	30	30	30	90	100	30	0	
Homa Bay	Ndhiwa	Mud	60	60	60	180	100	70	4	
		Cement	30	30	30	90	100	30	0	
	Rachuonyo North	Mud	66	66	66	198	100	70	3	
		Cement	30	30	30	90	100	30	0	
Total			386	386	386	1,158	100	400	2	

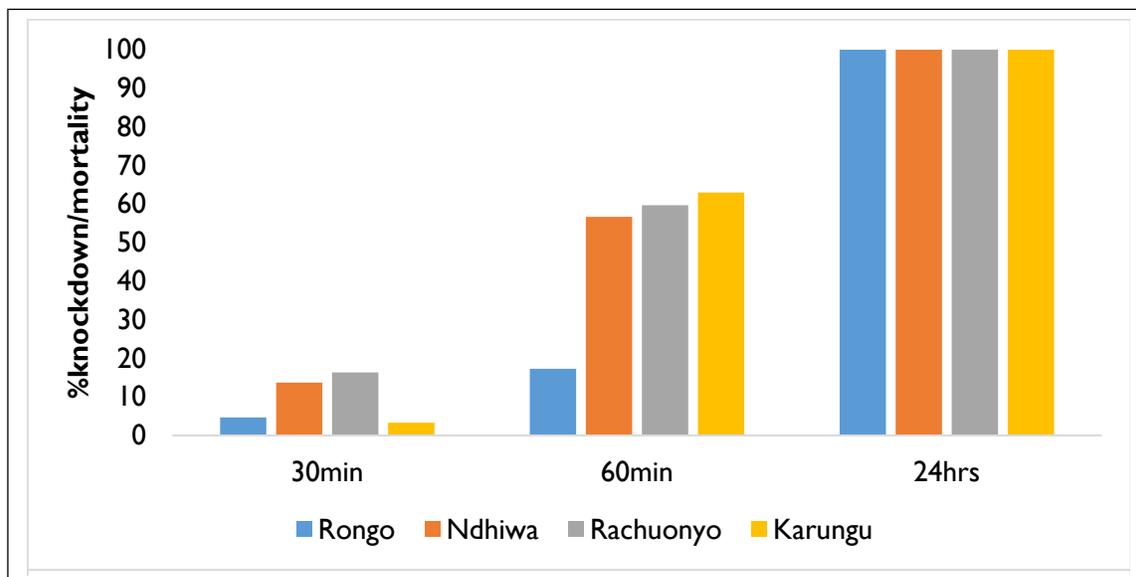
The observed mortality rate in all the four sites was 100%, indicating that the insecticide is highly effective, while the control mortality rates remained low (Figure 8).

FIGURE 8: PERCENT MORTALITY 24 HOURS AFTER 30 MINUTES CONE BIOASSAY EXPOSURE (WITHIN TWO WEEKS OF SPRAYING) OF SUSCEPTIBLE AN. GAMBIAE S.S. KISUMU STRAIN



The project observed similar trends in knockdown rates at 30 and 60 minutes across all sites, with complete mortality at 24 hours post exposure (Figure 9).

FIGURE 9 : PERCENTAGE KNOCKDOWN (30 AND 60 MINUTES) AND MORTALITY (24H) RATES OF SUSCEPTIBLE AN. GAMBIAE S.S. KISUMU STRAIN AFTER 30 MINUTES OF CONE BIOASSAY (WITHIN TWO WEEKS OF SPRAYING)



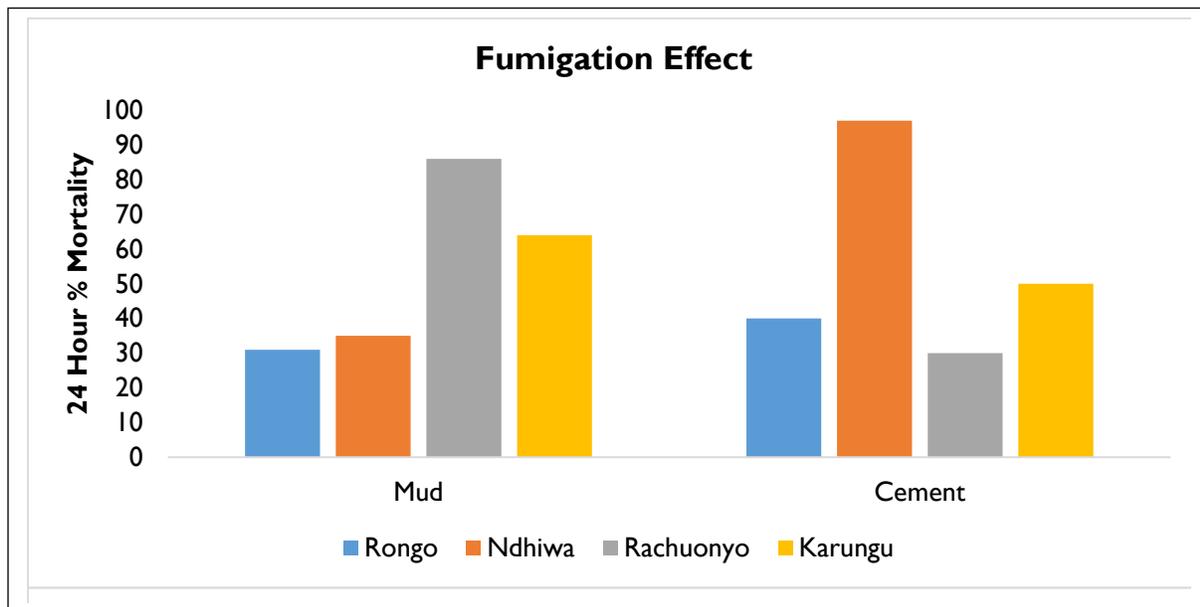
9.2.1 FUMIGATION EFFECT

Technicians observed varying levels of mortality of mosquitoes to the fumigant effect of the insecticide on different wall types at different sites following exposure within two weeks of spraying (Table 14 and Figure 10).

TABLE 14: NUMBER OF MOSQUITOES EXPOSED, AND THE MORTALITY 24H AFTER 30 MINUTES EXPOSURE OF AFTER 24 HOURS, FOR AN. GAMBIAE S.S. TO THE FUMIGANT EFFECT APPROXIMATELY 1 M FROM THE SPRAYED WALLS

<i>An. gambiae s.s. Kisumu strain</i>				
County	Sub-County	Wall Type	No.	% Mortality
Migori	Rongo	Mud	70	31
		Cement	30	40
	Sori Karungu	Mud	70	64
		Cement	30	50
Homa Bay	Ndhiwa	Mud	60	35
		Cement	30	97
	Rachuonyo	Mud	66	86
		Cement	30	30

FIGURE 10: MORTALITY OF AN. GAMBIAE S.S. EXPOSED TO THE FUMIGANT EFFECT OF PIRIMIPHOS-METHYL AT APPROXIMATELY 1 M FROM THE SPRAYED WALLS



9.3 DISCUSSION

The high mortality rates observed after 24 hours across all sites show the efficacy of the insecticide and indicate that spray operators conducted the 2018 IRS campaign at a satisfactory level. Cage bioassays indicate that some degree of mortality in cone bioassays is likely to be due to the fumigant effect and not just through tarsal contact. We observed mortality on some mosquitoes which did not have contact with the walls (i.e., those in cages), which could be an indication that mortality could have been experienced even if the mosquitoes did not land on the walls. More study is necessary to further evaluate the fumigant effect by likely changing the methodology of exposure.

9.4 CHALLENGES

Some walls had very rough and weak surfaces, which either made it hard to attach cones or involved gaps and cracks through which mosquitoes would escape. This resulted in more sampling being needed to get surfaces that would hold the cones.

10. GENDER

During the 2017 IRS campaign in Migori County, of the seasonal workers that the PMI AIRS Project recruited, 48% were women. Women made up 45.5% of spray operators, 37.1% of TLs, and 44.9% of site supervisors. In the 2018 IRS campaign, the target was for at least 50% of all seasonal workers to be women; the project surpassed this goal by recruiting a pool of seasonal workers of whom 56% were women across Homa Bay and Migori Counties (59% in Homa Bay, and 52% in Migori). For the first time since IRS started, the PMI AIRS Project managed to recruit 12 female pump technicians out of the 40 pump technicians recruited in Homa Bay County which made up 30% of all pump technicians in Homa Bay County.

The overall percentages of recruited females in 2018 campaign per category were: spray operators, 45%; TLs, 52%; site supervisors, 22%; mobilizers, 76%; and security guards, 14%. There was an improvement in staffing of female TLs, security guards, and pump technicians, but a drop in the number of women supervisors compared to the 2017 IRS campaign.

To produce these results, the project sensitized all stakeholders on the importance of recruiting women in IRS campaigns, and recruiters gave priority to women who met the requirements over men. It was a requirement that all female workers regularly exposed to insecticide – spray operators, storekeepers, and washers – receive pregnancy tests before being involved in the campaign. After testing, those who did not qualify were assigned other roles. Medical examinations were done twice during the campaign.

To make women comfortable in their work, PMI AIRS:

- Ensured every woman received the correct sizes of coveralls and boots
- Provided disposable and reusable sanitary towels for use while in the field
- Constructed separate bath shelters for males and females, properly labeled and well separated for privacy
- Ensured at least two women worked per team in a “buddy system”
- Encouraged women to report any sexual harassment
- Paid all seasonal workers via Mpesa, so women can have freedom in how they spend their money

The project incorporated gender awareness and sexual harassment training in all the trainings conducted before the campaigns started. Participants learned about the importance of gender equity and equality for the success of the spray campaign, and for women’s empowerment in the society.

During the campaign, site coordinators posted gender awareness and sexual harassment guidelines (Annex E) in each operations site. No major complaints regarding sexual harassment were reported to the project gender focal point, the PMI AIRS operations manager.

II. CAPACITY BUILDING

The PMI AIRS Project's capacity-building strategy seeks to build IRS capacity equally at the local and national levels. This strategy aligns with Kenya's national devolution strategy. Beginning at the micro-planning stage of the project, the PMI AIRS Project invited a delegation from the NMCP to receive training not only on how to deliver IRS, but also on how to become co-trainers in resource planning, spray techniques, creation of data collection strategies and tools, and other key areas. However, the NMCP's supervision of and involvement in the 2018 IRS campaign were minimal, largely due to the MOH's funding constraints, in the context of a suspension of use of US government funding for Kenya Ministry of Health activities.

More positively, the Migori and Homa Bay County malaria control coordinators, directors of health, and the 14 sub-county malaria control coordinators worked closely with the PMI AIRS Project staff to recruit seasonal workers, lead trainings at operations sites, and provide daily supportive supervision. In addition, MOH staff joined project and PMI staff at the regularly held debriefing meetings to discuss challenges and best practices observed during supportive supervision, and to collectively troubleshoot and identify effective strategies to overcome challenges on the ground.

To consolidate feedback and strengthen capacity at the sub-county level, the project led weekly debriefing meetings at sub-county offices with all sub-county MOH officers, site coordinators, and site supervisors. These meetings ensured coordinated strategy across the county and built sub-county-level capacity.

12. CHALLENGES AND LESSONS LEARNED

- Supervision: In some sites, MOH site supervisors were not “hands-on,” and did not perform their duties as well as required. To improve on this, there is need to recruit non-MOH supervisors to support supervision, and/or to expand the site coordinator’s role in field supervision.
- Mobilization
 - Mop up: In most villages, mobilizers were not on the ground during mop-up activities since they had already worked their assigned 10 days. Under VectorLink, IEC Supervisors recommended hiring mobilizers for the full length of the campaign and give them a stipend instead of daily wages.
 - Mobilization Calendars: IEC supervisors asked to be involved in the development of the spray and mobilization calendars since they work directly on the ground and were better placed to advise on the best way for SOPs to move. The project will also consider the use of GPS mapping to identify structures for mop up in the 2019 campaign.
 - Recruitment: Basic literacy skills must be a pre-requisite in the selection of CHVs to serve as mobilizers as per the project’s provided best practices. Furthermore, in the future, it will be prudent to replace the weak mobilizers during training to avoid mobilization issues such as poor door marking, poor filling of data tools, and inability to communicate effectively with households to persuade them to accept IRS and to convey key messages.
 - Radio talk shows: Since IRS was planned for only two counties out of 47 counties nationwide, popular local stations were used. However, the selected local radio stations broadcasted in one local language, Dholuo. Other tribes living in the counties did not tune in into these local stations. We have since learned that national radio stations like Ramogi are more popular and widely listened to than the local ones. The project will consider using this radio station despite the higher costs associated with it.
- Household preparation: In some areas, spray operators had to prepare households for spraying on the spray day partly due to non-mobilization, lengthening the total amount of time spent to complete spraying. Mobilization supervisors should be careful to follow up with the mobilizers to make sure they inform beneficiaries that they must prepare their households for spraying. Coordination between the spray and mobilization teams should be enhanced.
- Household preparation: Household preparation was one of the key challenges noted throughout the spray campaign. In many of the villages, SOPs spent half of their time preparing households and getting items out of the structures. Additionally, SOPs were moving faster compared with mobilizers. As a result, some might have visited areas that were not mobilized, resulting in considerable time taken in household preparation. In the future, the project should ensure proper mobilization and household preparation before the SOP visit. Also, spray teams and the mobilization teams should be encouraged to coordinate and work together and follow the spray/mobilization calendar.
- Capturing true denominator: Some spray operators were observed not recording the total number of structures found and not sprayed, especially at the beginning of the campaign. Spray operators

were reminded of the critical importance of recording this information. Failure to consistently record all found but unsprayed eligible structures was observed as a cross cutting challenge for the 2018 IRS campaign in Kenya. The program will focus on this key aspect in future campaigns by continuing the production of forms with more room to record more structures, strengthening training for supervisors and SOPs, and close monitoring during activity implementation.

- To further strengthen mobilization data flow and accountability for the IRS stickers, a mobilization tracking sheet will be introduced for the 2019 IRS campaign at every site to track key mobilization indicators.
- Underuse of some operations and M&E tools by the field teams: Several supervisors noted that team leaders did not properly use the error eliminator, hard-copy DCV, and DOS tools during the campaign. Rather than using the tools to oversee the quality of spray and data capture in real time, team leaders often completed the required forms indicating no errors found, when in fact discrepancies existed and corrective action needed to be taken. For 2019, the DCV form shall be digitized for supervisors and shall prompt supervisors to make note of any errors prior to corrective action. Also, the digitized version may facilitate GPS point capture and near real-time reporting at some operation sites to monitor supervisor activity. For DOS and the EE, the program will review the utility of these tools in their current form and provide recommendations for eliminating and/or revising accordingly.
- Internet: Slow internet connectivity, especially in Homa Bay County, slowed down the data entry process. Upgrading of the internet system helped boost the speed. In the future, the project will conduct routine internet speed tests, especially in new data centers, to confirm consistently sufficient internet speeds throughout the campaign to enable a smooth data entry process.
- The project piloted and used several new mHealth tools in the 2018 campaign for the first time including a finance monitoring tool. Feedback from the review meetings indicates that the use of mHealth should continue as it enables fast data transfer and quick decision making. In the coming campaign, the project will strengthen mHealth tools to support operations, finance, and data monitoring for the program. Additionally, the project will enhance strategies to ensure 100% upload of the reports by the field teams
- In future campaigns, Dimagi, Abt Home Office, and the Kenya project teams will strengthen communication to ensure all teams are aware of system limitations to ensure a successful implementation. Thus, challenges experienced in 2018 with the PMT can be avoided in the future.
- Data discrepancies after the last week of the campaign: Discrepancies that require field revisits are a challenge the following week after end of campaign since most of the field teams have disbanded. M&E assistants and site coordinators worked to resolve most discrepancies, but the process is time consuming. There is need to devise a strategy for handling data errors identified post-spray campaign. One option is to provide transport to TLs and Supervisors for post-spray field revisits to obtain correct information. Supervisors and TL will only be cleared, signed out and receive final payment once it is determined that all errors within their purview are resolved.
- Insecticide's strong smell: This contributed to a number of refusals. Adequate aeration of a sprayed structure even after the two and a half hours have elapsed could help reduce the insecticide smell. Also, beneficiaries could be educated that they can use the smell to confirm whether a spray operator has indeed sprayed their structure(s), turning a negative to a positive.
- Heavy rains: Heavy rains which began late February/early March affected spray operations, which occurred from 12th February to 24th March 2018, and contributed to the formation of puddles in some soak pits. Location of IRS operations sites for installation of soak pits should primarily be guided by the soil type in the locality. The rains also made it difficult to reach some areas, and made it challenging to prepare households for spraying as people did not want their household goods to

get wet. IRS should be carried out before the middle of March, when rains are expected to start in South Nyanza region.

- Delayed servicing of sanitary bins: Sanitary bins provided for use by female spray team members should be serviced at least twice per campaign. Vendors should ensure timely servicing of the bins as per the contractual agreement. Female spray teams should be trained on how to use the reusable pads.
- Small wash area sizes: In the 2017 IRS campaign in Migori County, the project refurbished existing wash areas that were constructed for the pre-2012 IRS campaigns. Consequently, some of these wash areas turned out to be too small to easily handle the number of people at the site. Going forward, the project shall construct larger wash areas, based on the number of spray operators per site, up to 50 SOPs, which is the recommendation in PMI's BMP Manual.
- Challenges with transport providers at operations sites: Some vehicle vendors and drivers did not want their vehicles to make more than one trip to the field. Vehicle vendors should be taken through the PMI AIRS Project Terms and Conditions (T&Cs) for hire of motor vehicles prior to the signing of contracts making it clear that those who violate the T&C shall have their contracts terminated.
- Reuse of spray operators' polythene sheets, without knowing which side is contaminated with insecticide and therefore should always face upwards and not downwards onto a household's immovable possessions: The spray operators' polythene sheets should be marked in permanent marker on each side, to show which side should be up when covering immovable household items. It would also be helpful to have sheets with a different color on each side.
- Pregnancy test for female workers at the site: Pregnancy tests are performed for all female workers who have potential considerable exposure to insecticides. Some additional (one or two) female workers at the site are also tested, regardless of expected insecticide exposure, to provide a pool of reserve tested female workers who may be called upon during the campaign as replacement spray operators when standby (buffer) had been exhausted. In future IRS campaigns, the project will train these standbys during pre-spray SOP training because they may at times be called in to serve as SOPs after an on-the-job refresher training. .
- Working on Saturdays for the Seventh Day Adventist (SDA) communities: Saturday is day of worship for SDAs. The spray teams need to identify these groups early and book appointments on alternative days for spraying.
- Insecticide Inventory: A gap was identified in issuance and receipt of insecticide at central warehouses. Due to the volume involved at these locations, the warehouse managers conducted spot checks rather than full physical count (i.e. open each box and verify its contents) before receipt and dispatch. The "lost bottles" were identified in boxes containing insecticide delivered in 2017 which meant that during reverse logistics, incomplete boxes were not flagged and logged in appropriately. The Home Office Environment Compliance team has put in place clear guidance for physical verification of insecticide during dispatch and retrieval when large quantities are involved to eliminate similar inconsistencies in future.

ANNEX A: LOCATION OF PMI AIRS PROJECT OPERATION SITES

County	Sub-County	Ward	# of Operation Sites	Operation Site	Latitude – S	Longitude – E	Elevation (m)
Migori	Rongo	Central Kamagambo	4	Rongo Sub-County Hospital	-0.45449	34.35991	1,355
		East Kamagambo		Kochola Dispensary	-0.42473	34.33759	1,353
		North Kamagambo		Minyanya Dispensary	-0.41523	34.37184	1,433
		South Kamagambo		Ongo Health Centre	-0.54594	34.36500	1,591
	Awendo	Central Sakwa	4	Awendo Sub-County Hospital	-0.53923	34.32096	1,454
		South Sakwa		Mariwa Health Centre	-0.58334	34.34485	1,488
		West Sakwa		Rabondo Dispensary	-0.50812	34.29066	1,443
		North Sakwa		Dede Dispensary	-0.49012	34.31916	1,428
	Uriri	Central Kanyamkago	5	Uriri Health Centre	-0.57128	34.30777	1,531
		North Kanyamkago		Othoro Sub-County Hospital	-0.53437	34.23208	1,297
		West Kanyamkago		Lela Dispensary	-0.56824	34.24988	1,358
		East Kanyamkago		Oyani Health Centre	-1.02264	34.35226	1,475
		South Kanyamkago		Bware Dispensary	-1.00055	34.31626	1,523
	Suna East	God Jope	4	Osingo Dispensary	-1.04675	34.32099	1,546
		Kwa		Suna Rabuor Health Centre	-1.05185	34.35119	1,492
		Kakrao		Anjago Dispensary	-1.00963	34.26592	1,368
		Suna Central		Migori County Referral Hospital	-1.03836	34.28572	1,382
	Suna West	Suna Wasimbete	4	Nyamaranga Health Centre	-1.06971	34.20852	1,389
		Wasweta 2		Bondo Dispensary	-1.05899	34.24071	1,400
		Oruba Ragana		Suna Ragana Dispensary	-1.06334	34.28317	1,381
Wiga		Arombe Dispensary		-1.02086	34.21056	1,331	

County	Sub-County	Ward	# of Operation Sites	Operation Site	Latitude – S	Longitude – E	Elevation (m)
	Nyatike	East Kadem	7	Agenga Dispensary	-0.55130	34.14044	1,165
		Kanyarwanda		Macalder Sub-County Hospital	-0.57788	34.17144	1,387
		Got Kachola		Wath Onger Dispensary	-0.57068	34.12487	1,148
		Kachieng		Karungu Sub-County Hospital	-0.50844	34.09413	1,137
		Kanyasa		Alendo Chief's Camp	-0.48679	34.13110	1,301
		Muhuru		Muhuru Health Centre	-1.00775	34.07888	1,154
		Kaler		Nyandago Koweru Dispensary	-1.036527	34.254975	1,235
Homa Bay	Homa Bay Township	Homa Bay Central	4	CHMT Offices	-0.52578468	34.45931391	1,146
		Homa Bay East		Marindi Health Center	-0.65261987	34.52008731	1,355
		Homa Bay East		Nyalkinyi Health Center	-0.53281853	34.49296462	1,133
		Homa Bay East		Pala Masogo Health Center	-0.64011588	34.52995452	1,358
	Kabondo	Kabondo East	4	Othoro Sub-County Hospital HB	-0.43505558	34.95552863	1,542
		Kabondo West		Kabondo Sub-County hospital	-0.42090915	34.8740497	1,487
		Kojwach		Ringa Health Center	-0.47363336	34.84582991	1,504
		Kokwanyo Kakelo		Ober Kakelo Chiefs Camp	-0.48763827	34.81076274	1,408
	Kasipul	Central Kasipul	5	Koywech Dispensary	-0.44750976	34.72869681	1,368
		East Kamagak		Sino Health Center	-0.44634792	34.76655354	1,341
		South Kasipul		Ombek Health Center	-0.56843591	34.6640523	1,387
		West Kamagak		Rachuonyo Sub-County Hospital	-0.50623276	34.73352096	1,397
		West Kasipul		Nyangiela Sub-County Hospital	-0.53814793	34.70689671	1,381
	Mbita	Gembe	5	Kitare Health Center	-0.50591097	34.33057889	1,188
		Lambwe		Ogongo Sub-County Hospital	-0.57356178	34.37182316	1,283
		Mfangano		Ugina Health Center	-0.47831045	33.98628715	1,130
Mfangano		Wakula Dispensary		-0.45075598	33.98801149	1,125	
Kasgunga		Mbita Sub-County Hospital		-0.42262834	34.20786151	1,141	

County	Sub-County	Ward	# of Operation Sites	Operation Site	Latitude – S	Longitude – E	Elevation (m)
	Ndhiwa	Kologi	7	Malela Dispensary	-0.58751096	34.39323284	1,240
		Kologi		Okok Dispensary	-0.68283755	34.42873774	1,339
		Kosewe		Ndhiwa Sub-County Hospital	-0.7282658	34.36676252	1,310
		Kwabwai		Got Kojowi Health Center	-0.761292	34.26509993	1,415
		North Kabuoch		Magina Health Centre	-0.69830267	34.5185516	1,313
		North Kabuoch		Ombo Kachieng	-0.73354772	34.45549842	1,288
		South Kabuoch		Pala Dispensary	-0.80499844	34.44449221	1,349
	Rachuonyo North	Kanyaluo	6	Omboga Dispensary	-0.43923956	34.62319988	1,221
		Kindu Town		Kendu Sub-County Hospital	-0.3715601	34.65093902	1,129
		North Karachuonyo		Wagwe Dispensary	-0.3494268	34.57394676	1,150
		Wang Chieng		Chuthber Dispensary	-0.39896167	34.72353167	1,349
		West Karachuonyo		Homa Bay Hills Health Centre	-0.35376538	34.46418332	1,121
		West Karachuonyo		Okiki Amayo Health Centre	-0.4121725	34.51181103	1,289
	Rangwe	East Gem	4	Rariw Dispensary	-0.58096577	34.61745685	1,414
		Kagan		Ndiru Health Center	-0.52243419	34.57793888	1,262
		Kochia		Nyagoro Health Center	-0.51527421	34.53464634	1,186
		West Gem		Rangwe Sub-County Hospital	-0.60094244	34.58115493	1,335
	Suba	Gwasssi North	5	Nyandiwa Health Center	-0.72461631	34.05122449	1,140
		Gwasssi South		Magunga Health Center	-0.68984738	34.14990767	1,346
		Kaksingiri West		Nyamrisa Health Center	-0.57040916	34.0965403	1,137
		Kaksingiri West		Suba Sub-County Hospital	-0.53774445	34.16802427	1,119
Ruma Kaksingiri East		Nyatoto Health Center		-0.55654279	34.27202955	1,183	

ANNEX B: 2018 IRS IMPLEMENTATION SCHEDULE AND TIMELINE

Component	Activity	Person/Partner Responsible	Planned Date	Output	Implementation Date	Remarks
Pre-spray activities/ mobilization	Micro-planning meetings	Abt/NMCP	October 2017	Sub-county IRS plans, stores, and locations and recruitment modalities concluded	Migori: October 2-3, 2017; Homa Bay: October 5-6, 2017	
	Recruitment of spray personnel	Abt/NMCP	October to November 2017	List of short-listed personnel	November 20-December 15, 2017	
	Medical fitness tests for spray personnel					
	Medical fitness tests for spray	Abt/NMCP	January 2018	List of medically fit and unfit staff submitted to ECO	Homa Bay: January 16-19, 2018; Migori, January 23-26, 2018	
	Training of trainers, and spray operator/spray personnel training	Abt/NMCP	January 2018	Trained spray personnel	Homa Bay: January 8-14, 2018; Migori: January 15-21, 2018	
	Training of health workers on insecticide poisoning	Abt/MoH	January 2018	Trained clinicians on insecticide poisoning	February 5-10, 2018	
	Refurbish sub-county offices and stores	Abt	September to November 2017	Sub-county offices and stores refurbished	Migori: January 22, 2018; Homa Bay: January 18, 2018	
	Conduct pre-season environmental assessment	Abt /NEMA	January 2018	EC pre-inspection done	September 13-November 24, 2017	

Component	Activity	Person/Partner Responsible	Planned Date	Output	Implementation Date	Remarks
Procurement and logistics	Conduct logistics needs assessment – local and offshore procurement	Abt	October to December 2017	Insecticides, PPE, and equipment procurement	November 14-December 1, 2017	
	Deliver insecticide, PPE, and equipment to targeted counties	Abt	December 2017	IRS commodities delivered to counties	July 31-December 15, 2017	
IEC development and implementation	Advocacy meetings with key regional and sub-county stakeholders	Abt/NMCP	November to December 2017	Buy-in of regional and county government	January 24-February 9, 2018	
	Disseminate IEC messages via radio, including community dialogues	Abt	December 2017 to March 2018	IEC activities conducted	Migori: November 22-30, 2017; Homa Bay: November 17-28, 2017	
Spray operations	Conduct spray operations	Abt	February to March 2018	Spraying completed	January-March 2018	
	Supervision of spray operation	Abt/NMCP/county officials	February to March 2018	Supervision of IRS campaign	Migori: February 19-March 24, 2018; Homa Bay: February 12-March 24, 2018	
	Conduct mid-season environmental inspection	Abt/NEMA	February to March 2018	EC mid-season inspection done	Migori: February 19-March 24, 2018; Homa Bay: February 12-March 24, 2018	

Component	Activity	Person/Partner Responsible	Planned Date	Output	Implementation Date	Remarks
Monitoring & Evaluation	mHealth phone set up	Abt	November 2017		November 2017-January 2018	The mHealth trainings during ToT, and subsequent trainings, made use of the phones. This required wiping out the data after each training before the phones could be used in the actual campaign.
	Data center set up	Abt	December 2017		December 2017	
	Capacity building for M&E seasonal staff	Abt	February 2017 to May 2018		December 2017	All M&E personnel were fully trained by December 2017. The rest was mentorship to ensure they perform their duties well.
	Data collection and reporting	Abt	February to May 2018	IRS data collected & reporting done	February-May 2018	PSDQA data will be collected in May 2018.
	Close-out of the data centers, and inventory summary handover to warehouse managers	Abt	April 2018	Inventory of both IT and data items	April 2018	
	Archiving of the data files	Abt	April 2018	Data files stored in the data archiving room	April 2018	
	EOSR submitted to client	Abt	May 2018		May 2018	
Entomological monitoring and surveillance	Conduct entomology surveillance	Abt	September 2017 to October 2018	Entomology surveillance reports submitted to PMI	September 2017-October 2018	

Component	Activity	Person/Partner Responsible	Planned Date	Output	Implementation Date	Remarks
Post-spray operations	IRS operations closeout	Abt	May to June 2018	Equipment and supplies recaptured	March 26-April 7, 2018	
	Maintenance of equipment	Abt	May to June 2018	IRS spray pumps repaired and stored	May-June 2018	
	Inventory assessment	Abt	May 2018	Post-spray inventory completed	June 2018	
	County IRS evaluation meetings	Abt/NMCP/county officials	April 2018	IRS review meetings held	Homaby: April 16-17, 2018; Migori: April 18-19, 2018	
	Demobilization of short-term sub-county personnel	Abt	April to May 2018	Spray operations teams demobilized	Migori: April 5, 2018; Homa Bay: April 6, 2018	
	IRS waste disposal	Abt/NEMA	May 2018		April 6-13, 2018	
	Post-season inspection	Abt/NEMA	April to May 2018		April 10-20, 2018	

ANNEX C: NUMBER OF SEASONAL WORKERS HIRED

MIGORI COUNTY															
Position	County		Awendo		Nyatike		Rongo		Suna East		Suna West		Uriri		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Site coordinators	22	6	3	1	5	2	2	2	4	0	3	1	5	0	28
Storekeepers	24	6	3	1	6	1	3	2	4	0	3	2	5	0	30
Security guards	54	2	8	0	14	0	7	1	8	0	7	1	10	0	56
Supervisors	75	24	10	4	19	0	9	6	10	5	9	5	12	3	99
Team leaders	79	58	12	10	21	10	10	10	12	8	9	9	15	11	137
Spray operators	446	390	74	56	98	89	59	62	69	54	60	56	86	73	836
Alternate spray operators	24	14	3	2	5	2	3	1	3	3	2	5	8	1	38
Drivers	98	0	14	0	21	0	12	0	13	0	12	0	16	0	98
Washers	6	67	2	9	0	17	0	10	1	10	0	10	3	11	73
Mobilizers	339	748	44	153	80	158	29	142	53	101	63	71	70	123	1087
IEC supervisors	11	17	3	1	3	4	2	2	1	3	1	3	1	4	28
Pump technicians	28	0	4	0	7	0	4	0	4	0	4	0	5	0	28
Logistics assistant	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Finance assistants	4	3	1	0	1	0	1	0	0	1	0	1	1	0	7
IEC assistants	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
EC assistants	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
M&E assistant	3	4	1	0	1	1	1	0	0	1	0	1	0	1	7
Warehouse assistant	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Data entry clerks (DECs)	13	12	0	0	0	0	0	0	0	0	0	0	0	0	25
Total	1228	1354	181	237	281	284	142	238	182	186	173	165	237	227	2582
Percentage women	52%		57%		50%		63%		51%		49%		49%		
TOTAL	2582		418		565		380		368		338		464		2582

HOMA BAY COUNTY

	County		Homa Bay Township		Kabondo		Kasipul		Mbita		Ndhiwa		Rachuonyo North		Rangwe		Suba		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Site coordinators	28	12	1	3	4	0	4	1	4	1	5	2	3	3	4	0	3	2	40
Store keepers	25	17	1	3	4	0	2	4	4	2	5	2	3	3	2	2	4	1	42
Security guards	69	12	4	4	8	0	10	1	10	0	12	2	10	2	8	0	7	3	81
Supervisors	88	22	12	2	12	2	10	2	11	5	13	3	8	4	12	1	10	3	110
Team leaders	89	55	7	7	11	5	10	7	12	8	17	8	13	10	7	7	12	3	144
Spray operators	483	377	54	30	36	60	47	54	74	44	88	60	79	60	40	45	65	24	860
Alternate spray operators	58	22	7	1	5	3	8	2	4	6	9	5	14	-2	5	3	6	4	80
Drivers	107	0	23	0	10	0	11	0	12	0	15	0	15	0	10	0	11	0	107
Washers	4	70	0	7	0	8	0	9	3	7	0	12	0	13	0	8	1	6	74
Mobilizers	313	1264	35	134	30	151	26	158	22	155	55	219	45	213	43	117	57	117	1577,
IEC supervisors	17	23	3	1	1	3	2	3	1	4	3	4	2	4	3	1	2	3	40
Pump technicians	28	12	2	2	2	2	3	2	4	1	6	1	5	1	3	1	3	2	40
Logistics assistant	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Finance assistants	8	1	1	0	1	0	1	0	1	0	2	0	1	0	1	0	1	0	9
IEC assistants	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
EC assistants	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
M&E assistants	9	2	0	1	1	0	1	0	1	1	2	0	2	0	1	0	1	0	11
Warehouse assistants	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Data entry clerks (DECs)	1313	1414	13	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Total	1343	1904	167	210	125	234	135	243	163	234	232	318	200	311	139	185	183	168	3247,
Percentage women	59%		56%		66%		65%		59%		59%		61%		59%		48%		
TOTAL	3,247		377		359		378		397		550		511		324		351		3,247

ANNEX D: NUMBER OF SEASONAL WORKERS TRAINED

Categories of Persons Trained	Training on IRS Delivery										Other Trainings															
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
MIGORI COUNTY																										
Spray operators			446	390							446	390	446	390	446	390										
Standby spray operators			24	14							24	14														
Team leaders			79	58							79	58	79	58	79	58										
Training of trainers	97	30									97	30	97	30									97	30	97	30
M&E assistants			3	4	3	4					3	4	3	4											3	4
DECs			14	12	14	12					14	12	14	12												
Storekeepers			24	6			24	6			24	6			24	6			24	6			24	6	24	6
Site coordinators	22	6	22	6			22	6	22	6	22	6	22	6	22	6			22	6			22	6	22	6
Supervisors	75	24	75	24							75	24	75	24	75	24							75	24	75	24
Logistics assistants	0	1	0	1			0	1			0	1							0	1					1	
Warehouse assistant	1	0	1	0			1	0			1	0							1	0					1	
Mobilizers									339	748	335	744	335	744												
IEC assistant	0	2	0	2					0	2	0	2														
IEC supervisor	11	17									11	17													11	17
Washers			6	67							6	67			6	67										
Drivers											98	0											98	0		

Categories of Persons Trained	Training on IRS Delivery										Other Trainings															
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Security guards										54	2									54	2					
Health workers for poisoning case management										42	26											42	26			
Financial assistants	4	3								4	3					4	3									
Pump technicians			28	0						28	0															
% of women trained	28%		46%		48%		22%		68%		51%		54%		46%		43%		22%		4%		20%		28%	
% of men trained	72%		54%		52%		78%		32%		49%		46%		54%		57%		78%		96%		80%		72%	
Total	206	80	722	584	17	16	47	13	361	756	1335	1406	1071	1268	652	551	4	3	47	13	54	2	358	92	208	81
Grand total	286		1306		33		60		1117		2741		2339		1203		7		60		56		450		289	

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
HOMA BAY COUNTY																											
Spray operators			483	377							483	377															
Standby spray operators			58	22							58	22															
Team leaders			91	53							91	53															
Trainer of trainers	73	14									73	14					73	14					73	14	73	14	
M&E assistants					9	3					9	3	9	3											9	3	
DECs					14	15					14	15	14	15													
Storekeepers							25	17			25	17											25	17	25	17	
Site coordinators	28	12					28	12			28	12	28	12			28	12	28	12			28	12	28	12	
Supervisors	94	24									94	24	94	24			94	24	94	24			94	24	94	24	
Logistics assistant	1	0					1	0			1	0							1	0					1		
Warehouse assistant	1	0					1	0			1	0							1	0					1		
Mobilizers									314	1,263	314	1,263															
IEC assistant	1	1							1	1	1	1															
IEC supervisors	17	23							17	23	17	23															
Washers											2	72			2	72											
Drivers											107	0											107	0			
Security guards											70	12									70	12					

⁸ The PMI indicator for Trained on IRS Delivery includes the following cadres: Supervisors, SOPs, SOP TLs

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Health workers for poisoning case management												58	64													58	64
Financial assistants	8	1										8	1					8	1								
Pump technicians												28	12														
% of women trained	25%		42%		44%		35%		79%		36%		30%		97%		20%		20%		15%		27%		21%		
% of men trained	75%		58%		56%		65%		21%		64%		70%		3%		80%		80%		85%		73%		79%		
Total	223	75	632	452	23	18	53	29	332	1287	999	1985	145	54	2	72	203	51	197	50	70	12	195	50	204	53	
Grand total	298		1084		41		82		1619		2984		199		74		254		247		82		245		257		

ANNEX E: GENDER AWARENESS AND SEXUAL HARASSMENT GUIDELINES



REPUBLIC OF KENYA



President's Malaria Initiative
Aedes Indoor Residual Spraying Project



US President's Malaria Initiative

PMI AIRS Project Anti-Sexual Harassment Guidelines

The PMI AIRS Project is committed to creating a work place that is safe for all of its employees.

Sexual Harassment

To ensure a safe workplace, the project will not tolerate sexually-oriented conduct, whether it is intended or not, that is unwelcome. Sexual Harassment has the effect of creating a workplace environment that is hostile, offensive, intimidating, or humiliating to male or female workers. These guidelines specifically prohibit sexual harassment as well as other types of harassment based on:

- ❖ Race
- ❖ Color
- ❖ Sex
- ❖ Marital Status
- ❖ Ethnic Or Tribal Status
- ❖ Religion
- ❖ Sexual Orientation
- ❖ Gender Orientation
- ❖ Age
- ❖ National Origin
- ❖ Disability

Any retaliation against an individual who has complained about harassment will not be tolerated.

Definition of Sexual Harassment

These guidelines cover all forms of sexual harassment. Sexual harassment is defined as: Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when:

- Submission to or rejection of such advances, requests or conduct is made either explicitly or implicitly a term or condition of an individual's employment or as a basis for employment decisions; or,
- Such advances, requests or conduct have the purpose or effect of unreasonably interfering with an individual's work performance by creating an intimidating, hostile, humiliating or sexually offensive work environment.

Definition of Other Work-Related Harassment

Other work-related harassment is the unwelcome, deliberate or repeated unsolicited verbal, physical, or visual contact or solicitation of favors that are offensive, abusive, intimidating, hostile, denigrating, or demeaning. It includes, but is not limited to, the following:

- Verbal harassment such as derogatory remarks, slurs, accusations or negative stereotyping;
- Physical harassment such as assault, impeding or blocking movement, or any physical interference with normal work or movement which is directed at an individual;
- Visual forms of harassment such as graphic materials, derogatory posters, cartoons or drawings.

Sexual Harassment Complaints

The PMI AIRS Project takes any allegations of sexual harassment seriously. All complaints should be made to your **Gender Focal Point**. *Your focal point will address your complaint and if deemed necessary will work with Abt Associates Human Resources team to investigate and take appropriate action.*

*Complaints can also be directed to: **Abt Helpline at 888-928-4231 or www.integrity-helpline.com/abtassoc.jsp***

Please also contact *Migori County Government office* that focuses on gender based violence for further support

ANNEX F: MONITORING AND EVALUATION PLAN

INDICATOR MATRIX

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
1.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	Data source: Project records – insecticide procurements Reporting frequency: Each spray campaign	By spray campaign	1; 100%	1; 100%	1; 100%	1; 100%
1.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	Data source: Project records – international procurements Reporting frequency: Each spray campaign	By spray campaign	1; 100%	1; 100%	1; 100%	1; 100%
1.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	1; 100%	1; 100%	1; 100%	1; 100%
1.1.4 Number and percentage of local procurements for PPE delivered 14 days before the start of spray operations	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	1; 100%	1; 100%	1; 100%	1; 100%

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
1.1.5 Successfully completed spray operations without an insecticide stock-out	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	Completed	Completed	Completed	Completed
1.2.1 Complete exemption and clearance process within the minimum 2 weeks	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	Completed	Completed	Completed	Completed
1.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	Data source: Training records Reporting frequency: Each spray campaign	By spray campaign By gender	34; ⁹ 100%	62; ¹⁰ 179%	145; ¹¹ 100%	146; ¹² 101% Male 102 Female 42
1.3.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	32; ¹³ 100%	31; ¹⁴ 97%	75; ¹⁵ 100%	75;100%
1.3.3 Submit up-to-date inventory records 30 days after the end of each spray campaign	Data source: Project records Reporting frequency: Each spray campaign	By spray campaign	Completed	Completed	Completed	Completed

⁹ 28 sites storekeepers and 1 central warehouse manager.

¹⁰ 28 site coordinators, 30 storekeepers, 1 warehouse manager, 1 logistics coordinator, 1 logistics assistant, and 1 warehouse assistant.

¹¹ 72 storekeepers, 68 site coordinators, 3 warehouse assistants, and 2 logistics assistants.

¹² 72 storekeepers, 68 site coordinators 2 warehouse assistants, 2 logistics assistants, and 2 warehouse managers.

¹³ 30 site stores and 2 central stores.

¹⁴ 28 site stores, 2 central distribution stores in the site, and 1 main warehouse.

¹⁵ 68 operational site stores and 4 distribution centers, and 3 central stores (Kisumu, Migori, and Homa Bay).

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
2.1.1 Annual PMI AIRS country work plan developed and submitted on time	Data source: Project records Reporting frequency: Annually	By spray campaign	Completed	Completed	Completed	Completed
2.1.2 Percentage reduction in project operational expenses per structure from the previous year, excluding insecticide costs	Data source: Project financial records Reporting frequency: Annually	By spray campaign	N/A ¹⁶	N/A	5%	TBD
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the PMI COR team	Data source: Project records – submitted SEAs/ letter reports Reporting frequency: Each spray campaign	By spray campaign	Completed	Completed	Completed	Completed
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation	Data source: Project records and training reports Reporting frequency: Each spray season	By spray campaign By gender	1,303	2,311 ¹⁷	6,260 ¹⁸	5700 ¹⁹ Male 2478 Female 3222
2.2.3 Number of health workers receiving insecticide poisoning case management training	Data source: Project records and training reports Reporting frequency: Each spray season	By spray campaign By gender	75	75	264	190 Male 100 Female 90

¹⁶ For Year 1 we are at baseline, hence we have no comparison expenses from the previous year.

¹⁷ 86 supervisors, 56 security guards, 75 HCWs, 141 spray operator team leaders, 841 spray operators, 49 standby spray operators, 767 mobilizers, 28 mobilizer team leaders, 28 pump technicians, 74 washers, 28 site coordinators, 30 storekeepers, 106 drivers, 1 logistics assistant, and 1 warehouse assistant. (The 75 HCWs were not among hired staff. 24 DECAs, 6 M&E assistants, and 3 assistants were not trained.)

¹⁸ 193 supervisors, 2,295 spray operators, 308 spray operator TLs, 88 IEC/mobilizer supervisors, 2,653 mobilizers, 4 IEC assistants, 72 storekeepers, 68 site coordinators, 68 pump technicians, 164 washers, 102 security guards, 218 drivers, 25 M&E assistants, and 2 EC assistants.

¹⁹ 217 supervisors, 1,696 spray operators, 281 spray operator TLs, 2,664 mobilizers, 68 IEC supervisors, 4 IEC assistants, 72 storekeepers, 68 site coordinators, 68 pump technicians, 147 washers, 138 security guards, 205 drivers, 18 M&E assistants, 52 DECAs, and 2 EC assistants.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
2.2.4 Number of adverse reactions to pesticide exposure documented	Data source: Incident report forms Reporting frequency: Each spray campaign	By spray campaign By residential/occupational exposure	0	0	0	0
2.2.5 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	Data source: Project records and reports submitted by county environmental officers Reporting frequency: Each spray season	By spray campaign By soak pit By storehouse	30 soak pits; 100% 32 storehouses; 100%	28 soak pits; 93% 31 storehouses; 97%	68 soak pits (0 mobile soak pits); 72 storehouses; 100%	68 soak pits (0 mobile soak pits); 72 storehouses; 100%
2.3.1 Number of radio spots and talk shows aired	Data source: Project records Reporting frequency: Per spray campaign	By spray campaign	40 radio spots 5 talk shows	18 (16 radio spots and 2 talk shows)	111 (66 talk shows: 1 talk show per week per county; 45 radio spots: 3 daily for 3 weeks)	515 talk shows (1 per week per county), and 1 radio spot per hour per day for 3 weeks
2.3.2 Number of IRS print materials disseminated	Data source: Project records Reporting frequency: Semi-annually	By spray campaign By type of printed material and message(s)	14,000	158,517 ²⁰	519,022 ²¹	542,925 ²²

²⁰ 154,787 IRS cards, 2,200 T-shirts, 30 banners, and 1,500 posters.

²¹ 488,323 IRS cards, 9,390 IRS adhesive stickers, 6,340 T-shirts, 69 banners, 3,400 posters, and 11,500 USAID stickers.

²² 522,862 IRS cards, 75 banners, 13,329 stickers, 2,919 mobilizer pocket guides, and 3,740 posters.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	Data source: Mobilization Data Collection Forms Reporting frequency: Daily per mobilization conducted	By spray campaign By gender	840,700	362,973 male 159,278 female 203,580	397,982 ²³	975,612 ²⁴ Male 438,071 Female 537,541
2.4.1 Number of structures targeted for spraying	Data source: Previous spray campaign data, enumeration data (targets); Daily Spray Operator Forms (results) Reporting frequency: Daily per spray campaign	By spray campaign	226,827	217,100	488,323	468,656
2.4.2 Number of structures sprayed with IRS	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By spray campaign	192,803 ²⁵	212,029	415,075	440,969
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (spray coverage)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By spray campaign	85%	98%	85%	94%

²³ 161,437 household heads in Migori County and 236,545 household heads in Homa Bay County. The information on households was based on the county household mapping exercise before mass net distribution.

²⁴ Population as reported on revised mobilization form 1A, including all household members 12 years and above present for mobilization activity.

²⁵ 85% of the 226,827 targeted structures.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
2.4.4 Number of people residing in structures sprayed (number of people protected by IRS)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By spray campaign By gender By pregnant women By children <5 years old	714,595	906,388 ²⁶	2,072,648	1,833,860 Male 911,106 Female 922,754 Pregnant women 31,977 Children<5 228,980
3.1 Submit AIRS country M&E Plan to PMI for approval	Data source: Project records Reporting frequency: Semi-annual	By spray campaign	Completed	Completed	Completed	Completed
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	Data source: Spray operations reports Reporting frequency: Per spray campaign	By spray campaign	Completed	Completed	N/A	Yet to be conducted in May 2018
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By spray campaign By guideline/checklist/tool	11 ²⁷	15 ²⁸	11 ²⁹	14 ³⁰

²⁶ Male, female, pregnant women, children <5 years.²⁷ Structure definition document, EE forms, DVC forms, 4 supervision forms, PSECA forms, IRS cards, Mobilization forms and spray operator forms.

²⁷ Structure definition document, EE forms, DVC forms, 4 supervision forms, PSECA forms, IRS cards, Mobilization forms and spray operator forms.

²⁸ Structure definition document, EE form, DCV, DOS, 4 CommCare supervision forms, 2 PSECA forms, IRS Cards, Mobilization form, spray operator form, TL Summary, Performance tracker sheet.

²⁹ Structure definition document, DCV, DOS, 4 CommCare supervision forms, IRS stickers, Mobilization form, spray operator form, TL Summary.

³⁰ Structure definition document, DCV, DOS, 4 CommCare supervision forms, IRS stickers, Mobilization form, spray operator form, TL Summary, Community mobilizer feedback form, IEC supervisor summary form, serialized insecticide bottle tracker.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
4.2 Number of articles/best practices documents published	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By spray campaign By IRS Technical Area	1	1 ³¹	1	In progress
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By spray campaign By IRS Technical Area	1	1 ³²	1	1 ³³
4.4 Number of enterprises engaged through public-private partnerships	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By spray campaign	1	4 ³⁴	1	2 ³⁵
5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location)	Data source: Entomological reports Reporting frequency: Annually	By spray campaign	12 ³⁶	12	20	12
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	Data source: Entomological reports Reporting frequency: Annually	By spray campaign	12; 100%	12; 100%	20; 100%	12; 100%

³¹ Fighting the bite in Kenya: What we've learned about malaria control, by Bradley Longman

³² Post-spray review meeting.

³³ Post-IRS Review meeting presentations.

³⁴ Dimagi Inc. for CommCare, Kisumu Medical and Education Trust for reusable pads, NMCP for insecticide donation, and MOH for atropine and operations sites.

³⁵ Resonate for reusable pads, and MOH for atropine and operations sites.

³⁶ 8 Trial for Bionomics (of which 3 will include feeding time and location), 2 Control for Bionomics.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	Data source: Entomological reports Reporting frequency: Annually	By spray campaign	12; 100%	12; 100%	20; 100%	12; 100%
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	Data source: Entomological reports Reporting frequency: Annually	By spray campaign By Insecticide class	50%	NA ³⁷	8; 100%	6; 75%
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Data source: Entomological reports Reporting frequency: Per spray campaign	By spray campaign	40	40	40	40
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Data source: Entomological reports Reporting frequency: Per spray campaign	By spray campaign	40	40	40	40
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Data source: Entomological reports Reporting frequency: Per spray campaign	By spray campaign	30 ³⁸	NA	128	40

³⁷ Yet to begin in May 2018.

³⁸ 5 insecticides for each of the 16 sentinel sites.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
5.2.1 Collect routine epidemiological data	Data source: Project reports Reporting Frequency: Annually	By spray campaign	N/A		6	6
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI AIRS Project	Data source: Epidemiological reports Reporting frequency: Annually	By spray campaign	N/A		TBD	NA
6.1.1 Number of people trained to deliver IRS in target Counties	Data source: Project records – Training reports Reporting frequency: Semi-annually	By spray campaign By spray campaign By gender Percentage of women trained	1,269	1,986: ³⁹ male, 991; female, 1,010; 50% women	5,465 ⁴⁰	2,312 ⁴¹ Male 1,350 Female 962 41.6% women trained

³⁹ 86 supervisors, 841 spray operators, 49 standby spray operators, 141 spray operator TLs, 6 M&E assistant, 30 storekeepers, 28 site coordinators, 1 logistics assistant, 1 warehouse assistant, 24 DECs, 767 mobilizers, and 28 mobilizer TLs.

⁴⁰ 193 supervisors, 2,295 spray operators, 25 M&E assistants, 72 storekeepers, 68 site coordinators, 2 logistics assistants, 3 warehouse assistants, 62 DECS, 2,653 mobilizers, 88 mobilizer TLs, and 4 IEC assistants.

⁴¹ 217 supervisors, 1696 SOPs, 118 Standby SOPs, 281 SOP TLs

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
6.1.2 Total number of people trained to support IRS in target counties	Data source: Project records – Training reports Reporting frequency: Semi-annually	By spray campaign By spray campaign By gender Percentage of women trained	3,536	2,270 ⁴²	6,607 ⁴³	6037 ⁴⁴ Male 2674 Female 3363 56% women trained
6.1.3 Number and percentage of women recruited (i.e., number/percentage of women on the selection list) for IRS employment	Data source: Project records – Recruitment reports Reporting frequency: Semi-annually	By country	1,061; 30%	1,085; 102%	3,073, 50% representation of females in recruitment list	3222; 56% representation of females in recruitment list
6.1.4 Number of people trained at IRS Training of Trainers	Data source: Project records – Training reports Reporting frequency: Semi-annually	By spray campaign By gender Percentage of women trained	N/A	70 Male 54 Female 16 23% are women	244	377 ⁴⁵ Male 262 Female 115 30.5% women trained

⁴² 86 supervisors, 841 spray operators, 49 standby spray operators, 141 spray operator TLs, 6 M&E assistants, 30 storekeepers, 28 site coordinators, 1 logistics assistant, 1 warehouse assistant, 24 DECS, 767 mobilizers, 28 mobilizer TLs, 74 washers, 56 security guards, 106 drivers, and 3 financial assistants.

⁴³ 193 supervisors, 2,295 spray operators, 308 spray operator TLs, 88 mobilizer TLs, 2,653 mobilizers, 72 storekeepers, 68 site coordinators, 2 logistics assistants, 3 warehouse assistants, 2 EC assistants, 4 IEC assistants, 68 pump technicians, 164 washers, 102 security guards, 218 drivers, 2 finance assistants, 14 finance clerks, 25 M&E assistants, 62 DECS, and 264 health workers.

⁴⁴ 217 supervisors, 1696 spray operators, 118 Standby SOPs, 281 spray operator TLs, 68 IEC supervisors, 2,664 mobilizers, 72 storekeepers, 68 site coordinators, 2 logistics assistants, 2 warehouse assistants, 2 EC assistants, 4 IEC assistants, 68 pump technicians, 147 washers, 137 security guards, 205 drivers, 2 finance assistants, 14 finance clerks, 18 M&E assistants, 62 DECS, and 190 health workers.

⁴⁵ 68 Site coordinators, 217 supervisors, 2 logistics assistants, 2 warehouse assistants, 4 IEC assistants, 68 IEC supervisors and 16 finance clerks

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
6.1.5 Total number of people hired to support IRS in target county	Data source: Project records – Contracts signed Reporting frequency: Semi-annually	By spray campaign By gender Percentage of women hired	3,536	2,270 ⁴⁶	6,325 ⁴⁷	5711 ⁴⁸ Male 2489 Female 3222 56% women hired
6.1.6 Number of women hired in supervisory roles in target counties (this number includes site supervisors, team leaders, M&E assistants, and others who supervise seasonal staff)	Data source: Project records – Contracts signed Reporting frequency: Semi-annually	By spray campaign Percentage of women hired By role	49	99 ⁴⁹	280 ⁵⁰ 50% representation of females in supervisory roles	178 ⁵¹ ; 41% representation of females in supervisory roles

⁴⁶ 28 site coordinators, 30 storekeepers, 56 security guards, 86 supervisors, 141 spray operator team leaders, 841 spray operators, 49 standby spray operators, 106 drivers, 74 washers, 767 mobilizers, 28 mobilizer team leaders, 28 pump technicians, 1 logistics assistant, 3 finance assistants, 1 IEC assistant, 6 M&E assistants, 1 warehouse assistant, and 24 DECs.

⁴⁷ 68 site coordinators, 72 storekeepers, 102 security guards, 193 supervisors, 308 spray operator team leaders, 2,295 spray operators, 218 drivers, 164 washers, 2,653 mobilizers, 88 mobilizer team leaders, 68 pump technicians, 2 logistics assistants, 2 finance assistants, 14 assistant clerks, 4 IEC assistants, 17 M&E assistant, 3 warehouse assistants, 52 DECs, and 2 EC assistants.

⁴⁸ 68 site coordinators, 72 storekeepers, 137 security guards, 209 supervisors, 281 SOP team leaders, 1696 SOPs, 205 drivers, 147 washers, 2664 mobilizers, 68 IEC supervisors, 68 Pump technicians, 2 Logistics assistants, 2 finance assistants, 14 finance clerks, 4 IEC assistants, 2 EC assistants, 18 M&E Assistants, 2 warehouse assistants and 52 DECs

⁴⁹ 7 site coordinators, 21 site supervisors, 53 spray operator team leaders, 8 mobilizer team leaders, and 3 M&E assistants.

⁵⁰ 8 M&E assistant, 34 site coordinators, 154 spray operator team leaders, 34 IEC supervisors, 45 site supervisors, 1 F&A assistant, 1 EC assistant, 2 IEC assistants, and 1 logistics assistant.

⁵¹ 18 site coordinators, 113 SOP TLs, 40 IEC supervisors, 1 finance assistant, 6 M&E assistants

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregated	Annual Targets and Results			
			Year 1		Year 2	
			Target	Results	Target	Results
6.1.7 Number of staff (permanent and seasonal) who have completed gender awareness training	Data source: Project records – Training reports Reporting frequency: Semi-annually	By spray campaign By gender Percentage of women	33,570	2,255 ⁵²	6,349 ⁵³	5746 ⁵⁴ Male 2,510 Female 3,236 56% women trained
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – training reports Reporting frequency: Semi-annually	By spray campaign By gender Percentage of women	46	70: 54 male, 16 female (23% women)	193 ⁵⁵	287
6.2.2 Implement all activities outlined in their yearly Capacity Building Action Plan	Data source: Project records – capacity assessment reports Reporting frequency: semi-annually	By spray campaign	Completed	Completed	Completed	Completed
6.2.3 Kenya government implements at least one aspect of the IRS program independently	Data source: Project records – MOUs Reporting frequency: Semi-annually	By spray campaign	Completed	None	Completed	Completed

⁵² 28 site coordinators, 30 storekeepers, 56 security guards, 86 supervisors, 141 spray operator team leaders, 841 spray operators, 49 standby spray operators, 106 drivers, 74 washers, 767 mobilizers, 28 mobilizer team leaders, 28 pump technicians, 1 logistics assistant, 3 finance assistants, 1 IEC assistant, 1 warehouse assistant, and 15 AIRS staff.

⁵³ 176 supervisors, 2,295 spray operators, 308 spray operator TLs, 88 mobilizer TLs, 2,653 mobilizers, 72 storekeepers, 68 site coordinators, 2 logistics assistants, 3 warehouse assistants, 2 EC assistants, 68 pump technicians, 4 IEC assistants, 164 washers, 102 security guards, 218 drivers, 16 finance assistants, 25 M&E assistants, 52 DECAs, and 24 Abt staff.

⁵⁴ 217 supervisors, 1696 SOPs, 281 SOP TLs, 68 IEC supervisors, 2664 mobilizers, 72 storekeepers, 68 site coordinators, 2 logistics assistants, 2 warehouse assistants, 2 EC assistants, 68 pump technicians, 4 IEC assistants, 147 washers, 137 security guards, 205 drivers, 2 finance assistants, 14 finance clerks, 18 M&E assistants, 52 DECAs and 27 Abt staff

⁵⁵ 91 site supervisors, 84 sub-county supervisors, 14 county supervisors, and 4 NMCP.

ANNEX G: IEC MESSAGES

Key Messages

- It is important that all community mobilizers and stakeholders have and are able to share factual and consistent information.

General Messages

- IRS is part of the Government of Kenya's comprehensive program to fight malaria.
- The chemical to be used for the 2017 campaign is Actellic 300CS. It has been tested and found effective in killing the mosquito that causes malaria.
- It is not the same chemical used for storing grains. This one specifically targets mosquitoes that cause malaria.
- Indoor spraying kills the mosquitoes that transmit malaria.
- You must continue to use treated mosquito nets even after your house has been sprayed.
- If you or your children suspect that any of you has malaria, seek help at the local nearest clinic.
- IRS does not cost anything to the family. It is free and voluntary.
- IRS operators will spray the insecticide on the interior walls of your house.
- IRS is safe for you, your family, and domestic animals if you follow the precautions. It only kills mosquitoes and some non-targeted insects.
- If you see increased numbers of other insects, it is because the insecticide has disturbed them. They will settle down or die after a while.

Before Spraying

- Painting, plastering, or cleaning of walls should be done BEFORE the house is sprayed.
- On the morning of the spray operations, all movable household items should be removed outside. This includes all utensils, drinking water, and food.
- Pets and other animals should also be removed from the household and tethered so that they do not roam around structure that has just been sprayed so they cannot come back in while the insecticide is fresh.
- Items that cannot be moved outside should be moved to the center of the house and covered with a nylon paper, to be provided by the spray operators.
- Every household should provide 10 liters of water to help in mixing the chemical.
- On the day of spraying, an adult should be at home to open the door for the spray operator.

During Spraying

- An adult should be around to ensure all moveable stuff is outside the house.
- The adult should observe the mixing of the insecticide with the water. However, the SOP might not have exhausted all the insecticide while spraying the previous household. The adult needs to confirm with the neighbor if actually some chemical remained.
- People and animals must stay away from the sprayed structure for 2 hours.
- Ensure that the windows and doors remain closed for 2 hours after spraying.
- **EATING, DRINKING, or SMOKING** while spraying is going on is strictly prohibited. **Community members should be discouraged from offering food or drinks to the spray operator. This is for the safety of the spray operator.** If the spray operator **MUST** drink water, he or she should wash his or her hands several times with soap and water first and remove his or her protective clothing as instructed during the training.

After Spraying

- Open doors and windows for another 30 minutes after the 2 hours closure, to allow fresh air to circulate.
- Do not paint, plaster, or clean walls for 9 months after the spraying.
- Sweep the house and clear all dead insects. Bury them or throw them in a pit latrine.
- Continue to sleep under a mosquito net.
- Pregnant women should continue visiting the clinic for further advice about malaria prevention.
- Uncover items that could not be removed, and wipe them with a damp cloth.
- If any itching or soreness is observed after the spraying, visit the local health facility for further advice.

ANNEX H: ENVIRONMENTAL MITIGATION AND MONITORING REPORT

Implementing Organization: Abt Associates
 Geographic location of USAID-funded activities: Migori and Homa Bay Counties, Kenya
 Period covered by this Reporting Form and Certification: 2018

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
Ia. Pre-contract inspection and certification of vehicles used for insecticide or spray team transport	Pre-contract inspection of vehicles used for IRS operations was decentralized and conducted at selected operation sites in each of the 14 sub-counties in Migori and Homa Bay between January 8 and 19, 2018. Between February 1 and 7, 2018, the vehicles were re-inspected for certification after compliance with PMI AIRS Project requirements. A total of 205 supervision, spray operator transportation, and logistics vehicles were hired to support IRS operations.	Some vehicle vendors replaced inspected vehicles with new ones, and did not report the fact to the EC team in a timely manner. As a result, turnaround time for site inspection of a replacement vehicle could take up to a day.	Vehicle vendors should provide standby/back-up vehicles for inspection and certification up front. This will eliminate the need to carry out site inspections of new replacement vehicles, as the vendors would pick from a pool of inspected standby vehicles. That will avoid delays in movement as well as inconveniences to the spray teams and site operations.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
Ib. Driver training	The IRS drivers' safety training in Homa Bay took place on February 10, 2018. In Migori, the training took place on February 17, 2018. All 205 drivers were trained on safety issues related to IRS operations, including observing speed limits, maximum vehicle carrying capacity, proper use of PPE, and PMI AIRS Project spill and emergency response procedures, as well as Abt's policy on motor vehicle use during the IRS campaign. PMI AIRS Project sexual harassment guidelines were also incorporated in the drivers' training.	Some of the trained drivers failed to turn up for the spray operations. However, the ECO and the EC assistants conducted on-job safety training for all the replacement drivers. Some drivers were reluctant to decontaminate their vehicles at the end of each spray day, forcing the site coordinators to personally oversee compliance.	Vehicle vendors should provide some standby drivers, at least two per sub-county, to attend the one-day driver-safety training.
Ic. Cell phone, personal protective equipment (PPE), and spill kits on board during pesticide transportation	All vehicle vendors in each of the 14 sub-counties were asked to provide their drivers with mobile phones. The respective site coordinators kept the contact details for each operations site driver.	Initial inspection reports for spray operator transportation vehicles indicated that some vehicles lacked spill response kits on board. Some drivers also reported that the required PPE had not been issued to them. Central warehouse managers in Homa Bay and Migori were tasked to ensure that all site storekeepers issued complete spill kits and PPE to each spray operator driver.	Tremendous improvement in drivers' compliance with rules for use of PPE was reported, especially in incidence of insecticide spillages that required clean-up, and during decontamination of the vehicles at the end of each spray day.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
Id. Initial and 30-day pregnancy testing for female candidates for jobs with potential insecticide contact	All female spray operators, storekeepers, pump technicians, and washers in both counties underwent an initial pregnancy test between January 29 and February 8, 2018, at selected health centers in the 14 sub-counties of Migori and Homa Bay. Those who were found pregnant were placed in positions that did not expose them to the insecticide, mostly as IRS mobilizers.	The PMI AIRS Project relied on medical practitioners at the respective health centers where operations sites are located to carry out the pregnancy tests. Competing tasks at these facilities meant that turnaround time for submission of results took longer than intended, and therefore some seasonal workers who were found unfit to be engaged in IRS had to be replaced on Day 2 of their training.	The PMI AIRS Project will firm up discussions on dates for such pregnancy tests with the MOH team, to lock in the dates and have the reports submitted on time, prior to the training of the seasonal workers.
Ie. Health fitness testing for the spray teams	All spray operators, suit washers, pump technicians, and storekeepers underwent a medical fitness examination at selected health centres between January 29 and February 8, 2018. They were checked for physical fitness, signs of respiratory problems, and allergic reactions to the insecticide.	The PMI AIRS Project relied on medical practitioners at the respective health centers which were operations sites to carry out the medical examination of the spray teams. Competing tasks at these facilities meant that turnaround time for submission of results took longer than intended, and therefore some seasonal workers who were found unfit to be engaged in IRS had to be replaced on Day 2 of their training.	
If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact	All local and international procurement was carried out in good time prior to the training of IRS seasonal workers on matters of safety, hygiene, and personal protection against potential insecticide exposures, incidents, and accidents.		
Ig. Training on mixing insecticide and the proper use and maintenance of spray pumps	The correct insecticide mixing procedure, as well as triple rinsing of insecticide bottles, was included in all the training sessions from the TOT workshop through to the spray operators training. All the pump technicians in Migori and Homa Bay were trained on pump maintenance and repair between December 4 and 8, 2017.	Faulty spray pump parts, resulting in spillage, were reported in some sub-counties.	Basic maintenance of the pump, especially the insecticide discharge section, should be emphasized for pump technicians, TLs, supervisors, and spray operators, to ensure that the shut-off cock, thrust-less shut-off, and lance are tightly secured.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
Ih. Provision of adequate facilities and supplies for end-of-day clean-up	Fenced-off wash areas, with cemented concrete slabs and adjacent soak pits, were installed in all 68 operations sites before the start of the IRS campaign in Migori and Homa Bay. Temporary bathing units covered with canvas sheets were also provided, separately for male and female spray operators. After cleaning PPE, suit washers set up seven progressive rinse barrels at each wash area for the triple-rinsing of pumps. A basin with enough soapy water was also provided at the wash area to facilitate cleaning of rubber hand gloves, face shields, and helmets. Enough plastic basins, soap, and water were also provided for spray operators to take a shower as part of end-of-day clean-up.	A few spray operators were reluctant to take a shower at the bathing units, saying it was too cold out. TLs, supervisors, and site coordinators were tasked to ensure that all spray operators at the very least washed off their hands and faces with soap and water.	Provision of slippers for spray operators in future IRS campaigns would ease the whole process of taking a shower while standing on gravel that was placed at the pits dug in the bathing units.
Ii. Enforce spray and clean-up procedures.	Directly observed spraying and end-of-day clean-up were supervised daily by team leaders and often by field supervisors from the PMI AIRS Project, NEMA, and the sub-county and county MOH teams.	mHealth supervision reports indicated that some team leaders were busy compiling daily summary reports instead of monitoring their team members during the end-of-day clean-up.	Emphasize the need for team leaders and the site supervisors to closely monitor spray and cleanup procedures.
2a. IEC campaigns to inform homeowners of responsibilities and precautions	IEC campaigns were carried out using two primary approaches: house-to-house visits by mobilizers, and information through media. Local Dholuo radio stations played a key role in disseminating key information. All IRS structure cards also contained key messages about homeowner responsibilities before, during, and after spraying.	Incidents of dogs attacking and biting spray operators or mobilizers were reported in some sub-counties.	For future IRS campaigns, emphasize that beneficiaries must cage their animals prior to spraying. Mobilizers should also be advised to seek the company of a beneficiary before walking into an unknown compound.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
2b. Prohibition on spraying houses that are not properly prepared	Spray operators underwent a thorough five days' training where they were directed on how to identify eligible structures and were given clear instructions on preparedness for IRS. This entails removing food and other belongings, covering immovable household items, and not spraying rooms used as food stores, as well as not spraying structures with sick people who could not be moved outside.	In both counties, some households had maize harvests kept in the eligible structures, either in food stores, in the bedrooms, or in sitting rooms. The PMI AIRS Project instructed the spray operators not to spray food stores. Where a large amount of the food items were stored in sprayable rooms and could not be moved outside, the PMI AIRS Project advised the spray operators to ensure that the sacks were moved away from the walls and then covered with two polythene sheets.	The need to ensure proper preparation by homeowners was continuously emphasized during morning briefs to the spray operators.
2c. Two-hour exclusion from house after spraying.	Mobilizers, spray operators, team leaders, and field supervisors constantly reminded homeowners to stay away from sprayed structures for two hours, and only re-enter at that point to open doors and windows for aeration, and then to stay away for an additional 30 minutes before occupying such structures again.		
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside	Mobilizers, spray operators, team leaders, and field supervisors worked together to instruct homeowners to wash itchy skin and then go to the nearest health center if symptoms persisted.	Supervisory errors in reporting and use of the mHealth tools contributed to close to 95% of all reported cases of potential insecticide exposure for both spray operators and homeowners.	Intensified mHealth training is needed for all supervisors to enable them to comprehend the provisions of the homeowner and spray operator performance checklist.
3a. Indoor spraying only	The PMI AIRS Project, NEMA, and the county and sub-county MOH teams emphasized indoor (only) residual spraying of eligible structures and surfaces throughout the 2018 IRS campaign period.		Emphasize eligibility of structures and surfaces for IRS in future spray operator trainings.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
3b. Training on proper spray technique	Spray operator training on proper swathing, spray distance, spray speed, pump agitation, and 5cm spray overlap was conducted between February 5 and 9, 2018 concurrently in Migori and Homa Bay Counties.		
3c. Maintenance of pumps	Each of the 68 IRS operations sites in Migori and Homa Bay had a pump technician whose main role was to service spray pumps and fix any pump-related problems. The pump technicians were equipped with a tool and spares kit for their work, including screwdrivers, screw spanners, pliers, and oil.	Faulty spray pump parts, resulting in spillages, were reported in some sub-counties.	Most of the reported faulty pumps used in the 2018 campaign were inherited from previous IRS implementers and were old; these need to be replaced. However, efforts will be made to ensure that the old pumps are well maintained to serve as backup as needed.
4a. Choose sites for disposal of liquid wastes, including mobile soak pit sites, according to PMI BMPs.	The PMI AIRS Project technical team, in collaboration with respective SCMCCs, carried out a geographical reconnaissance and IRS needs assessment for 56 sites in Homa Bay and 28 sites in Migori between August 28 and September 15, 2017. Of the 56 proposed sites, 40 operations sites were selected in Homa Bay. In Migori, 27 operations sites used for the 2017 campaign were retained, while the site at Bande in Nyatike Sub-County was relocated to Nyandago Koweru within the same administrative ward, Kaler.		Nyandago operations site was considered a more centrally placed site operationally and equally met all EC requirements.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
4b. Construct fixed and/or mobile soak pits with charcoal to adsorb pesticide from rinse water	All soak pits used for IRS operation in the 2018 spray campaign were fixed-location soak pits. In Homa Bay, 40 soak pits were newly constructed, while in Migori, 26 soak pits previously used in the 2017 campaign underwent minor repairs, two were overhauled, and one was newly constructed at Rongo SCH for an additional wash area that was installed to decongest the old one. The PMI AIRS Project technical team, working with the respective SCMCCs, supervised the workmanship for all construction and refurbishments, based on the guidelines provided in the PMI-BMP for IRS. The PMI AIRS Project used no mobile soak pits.		
4c. Maintain soak pits as necessary during season.	All soak pits and wash area surroundings were cleared of vegetation, and each plastic pipe retrofitted onto the soak pits was unclogged regularly to ensure uniform distribution of effluent over the filter media. Filter vent caps were also installed on newly constructed wash areas, to prevent vegetation getting into the wash area slab and passing through the plastic pipe retrofit and causing clogging.	There were three reported cases of soak pits not adequately draining the effluent, at Kendu SCH, Omboga, and Anjago operations sites. The puddle on the soak pits was primarily a result of excessive use and wastage of water during cleaning of pumps and PPE, as well as unanticipated poor water retention by the soil.	Secondary (retention) soak pits were constructed in the course of the 2018 IRS campaign at Kendu SCH and Omboga operations sites to address drainage problems. This solved puddle formation completely at Kendu SCH and partially at Omboga. To manage the situation and prevent effluent overflows from the soak pits at the Anjago and Omboga sites, plastic barrels were used to collect excessive waste waters scooped from the pits. Once the soak pits had dried out, the collected content was returned to them in a controlled manner.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
4d. Inspection and certification of solid waste disposal sites before spray campaign	On December 15 and 16, 2017, the PMI AIRS Project ECO visited, and inspected, Kamongo Waste Paper Ltd and VINTZ Plastics Limited, both in Nairobi, to determine their suitability for IRS paper/carton and plastics wastes recycling, respectively. The PMI AIRS Project then formally entered into separate MOUs with the two waste recycler companies. The ECO also visited and inspected ECCL in Migori, the selected IRS contaminated waste incineration facility. An MOU was also agreed upon and signed between the PMI AIRS Project and ECCL for thermal destruction of all the 2018 IRS-contaminated wastes.		
4e. Monitoring waste storage and management during campaign.	Solid wastes generated during spray operations were segregated and stored separately at the site stores. Proper documentation for the wastes was also kept, including stock/bin cards and goods issue notes, when transferring the wastes from such stores to the central warehouses in Migori and Homa Bay.	Accumulation of wastes was reported in some site stores, even after segregation. Site coordinators were requested to liaise with the logistics team to have the empty insecticide bottles and other solid wastes at the stores collected. These wastes were picked up from all the site stores at the beginning of the third week, to free up space so that other commodities could be properly arranged.	Use of gunny bags (sacks) to collect segregated wastes worked well, as opposed to the polythene waste bags used in the 2017 spray campaign. The gunny bags were sizeable and more durable.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
4f. Monitoring disposal procedures post-campaign	The PMI AIRS Project ECO witnessed the destruction and recycling process for all IRS-uncontaminated paper and carton wastes at Kamongo Wastepaper Ltd. All cleaned empty insecticide bottles and other assorted plastic wastes were recycled at VINTZ Plastics Limited, a facility licensed by NEMA and certified by the Directorate of Occupational Health and Safety. The ECO also witnessed the plastic waste recycling. All IRS-contaminated wastes will be incinerated at ECCL Migori, a private facility licensed by NEMA to incinerate hazardous wastes.		
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles	Insecticide receipt and dispatch was documented from the Kisumu main warehouse down to the Homa Bay and Migori Central warehouses. Dispatch and receipts from these central warehouses to and from the site stores were also documented. The same procedure applied to empty bottles and other IRS commodities. Record documents maintained at the various levels include ledger books, GRNs, delivery notes, GIN, stock cards, and insecticide tracker sheets and booklets.	Late updating of the ledger book and stock cards was a key noncompliance issue, which was addressed on a daily basis by site supervisors, who carried out physical verification of insecticide stocks.	
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used	Field supervisors and site coordinators carried out a daily check of the spray performance tracker sheet to verify insecticide use rate.		

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
5c. Visual examination of houses sprayed to confirm pesticide application	PMI AIRS Project technical staff, as well as MOH supervisors, conducted a directly observed spraying for the spray operators as well as DCVs in beneficiaries' structures, looking out for traces of the applied insecticide on the walls, ceilings and eaves.		
5d. Perform physical inventory counts during the spray season	Physical verification of insecticide stocks, empty bottles, and other IRS commodities was carried out on a daily basis by all supervisors at the site stores, and was guided by the storekeeper performance checklist, an m-Health tool.	In a few site stores where physical verification did not tally with figures on the record documents, it was established that the challenge arose as a result of less-experienced storekeepers, most of them being new to IRS. Site supervisors corrected such anomalies, and the concerned storekeepers were tasked with updating their records accordingly, on a daily basis.	IRS storekeepers need sufficient training on recordkeeping, as well as focused supportive supervision in conducting physical inventory verification for future IRS campaigns.

ANNEX I: CERTIFICATES

I-I: ENVIRONMENTAL IMPACT ASSESSMENT LICENSE



nema
mazingira yetu | uhai wetu | wajibu wetu

**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT LICENSE**

License No: **NEMA/EIA/PSL/4560**
Application Reference No: **NEMA/EIA/PSR/7654**

This is to certify that the Environmental Impact Assessment Project Report received from **PMI Africa Indoor Residual Spraying Project (Kenya)**,
P.O. Box 895 - 40123, Kisumu,
submitted to the National Environment Management Authority in accordance with the Environmental Impact Assessment & Audit Regulations, 2003 regarding the:
Proposed Indoor Residual Spraying (IRS) Using Organophosphates, Actelic@300 CS for Malaria Control,
whose objective is to carry on
Indoor Residual Residual spraying (IRS) using organophosphates, actelic@300 cs for Malaria Control,
located at
Migori County,
has been reviewed and a license is hereby issued for the implementation of the project, subject to attached conditions.

Issue date : **12 April, 2017**


Signature
(seal)
Director-General
The National Environment Management Authority.

P. T. O.

ISO 9001 : 2008 Certified



nema
nawazogha yema | ukhai wakha | wajibu wakha

**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT LICENSE**

License No: **NEMA/EIA/PSL/5673**

Application Reference No: **NEMA/EIA/PSR/9696**

This is to certify that the Environmental Impact Assessment Project Report received from
PMI Africa Indoor Residual Spraying Project.

P.O. Box 895-40123, Kisumu.

submitted to the National Environment Management Authority in accordance with the
Environmental Impact Assessment & Audit Regulations, 2003 regarding the
Proposed Indoor Residual Spraying.

whose objective is to carry on
**Indoor Residual Spraying using organophosphates, actelic@300 cs for malaria
control.**

located at
Homa Bay County.

has been reviewed and a license is hereby issued for the implementation of the project,
subject to attached conditions.

Issue date : **24 January, 2018**

Signature

(seal)

**Director-General
The National Environment
Management Authority.**

P.T.O



ISO 9001: 2008 Certified

I-2: CERTIFICATE OF RECYCLING



KAMONGO WASTE PAPER LTD.

DEALERS IN WASTE PAPER COLLECTION ALL OVER KENYA
INDUSTRIAL AREA, KAMPALA ROAD,
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E-mail: kkamongo@hotmail.com / info@kamongo.co.ke / Website: www.kamongowastepaper.com

9th April, 2018

RECYCLING CERTIFICATE

AIRS Kenya
P.O. Box 895-40123
KISUMU.

Dear Sir/Madam,

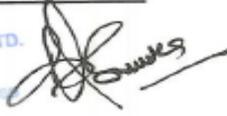
RE: DESTRUCTION OF IRS PAPER & CARTON WASTE

This is to confirm that we have received IRS paper & cartons waste from your organization at our plant for recycling in accordance with the rules and regulations of our country and International Environmental Authorities.

We issue this certificate to confirm that we have recycled the total weight of 10340kgs by pulping method

Yours faithfully,

For: KAMONGO WASTE PAPER LTD.


KAMONGO WASTE PAPER LTD.
P.O. Box 67313 - 00200
NAIROBI
OLIVER ABUKA
TRANSPORT & LOGISTICS.

DIRECTORS: H. DEVJI, K. DEVJI

VINTZ PLASTICS LIMITED

P.O BOX. 79329-00200 NAIROBI, KENYA.

PIN/V.A.T NO: PO51333161V

TEL: +254 (724764862)

EMAIL:vintzplastics2010@hotmail.com

CERTIFICATE OF RECYCLING

Issued to: AIRS Kenya
Address: 895-40123, Kisumu Kenya
Date Processed: 07/04/2018 - 09/04/2018
Description of Wastes: Clean empty Actellic 300CS Plastic bottles and Lids, polythene and other assorted plastic wastes.
Quantity/Total weight: 162,468 empty Actellic bottles and Lids.
2117kg of polythene and other assorted plastic wastes

VINTZ Plastics Limited certifies acceptance of the material referenced on this document. The destruction process will ensure that all AIRS Kenya High density plastic waste material will be recycled to produce non-household plastic items, such as dust bins and all blow plastic waste material recycled to produce the black DPC sheets.

I certify that the information in or accompanying this document is true, accurate and complete as to the identification of the materials received from the waste generating organization and the processing of the wastes in accordance with the National Environment Management (NEMA) waste management regulations.

Name: Wilfrida Rachel Jumba

Designation: Supervisor

Signature: [Signature]

Date: 09/04/2018

VINTZ PLASTICS LTD
P. O. Box 79329-00400,
NAIROBI

I-3: CERTIFICATE OF DESTRUCTION

ENVIRONMENTAL & COMBUSTION CONSULTANTS LTD.
P.O. BOX 72828 - 00200 NAIROBI, TEL: 020-6556242 / 6551878, 0724 - 973772

CERTIFICATE OF DISPOSAL

No. 3151

CLIENT: A.B.T. Associates – AIRS Project Kenya

WASTE TYPE: Hazardous Waste

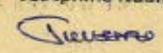
QUANTITY (Kgs / Litres) 2,580 Kgs.

DISPOSAL METHOD: HIGH TEMPERATURE INCINERATION

This is to certify that the wastes described above have been successfully disposed at
Buhembu Integrated Waste Management Facility

Date: 12th April, 2018

Director Dr. Philip Mwabe


Witness Josephine Ndunge



Member

I-4: CERTIFICATE OF ANALYSIS


MINISTRY OF HEALTH

Telephone: 057-20-21985
Mobile: 0772 632726
E-mail: info@kisumugovchem.go.ke
Web: www.kisumu.governmentchemists.go.ke
(Behind Jaramogi Oginga Odinga Teaching and Referral Hospital)

GOVERNMENT CHEMISTS' DEPARTMENT
P.O. Box 2006 -40100,
KISUMU

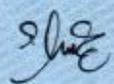
When replying please quote
Ref. No. P/WATER/WQ/VOL.3/141/2017 Date: 24/10/2017

CERTIFICATE OF ANALYSIS

Report No. : 141(A)/2017
Date Received: 19/10/2017
Sender: SAFEGLOBAL CONSULTANCY FIRM LIMITED
Sender's Reference: -- 12/18/10/2017
Description of Sample: SOIL FROM HOMA BAY COUNTY HEALTH CENTRE OPERATION SITE
Examination Required: PESTICIDE ANALYSIS
Analytical Report:

PARAMETER	RESULTS	KEBS LIMITS (KS 05 – 459 of 1996)
1. pH (at 26.7°C)	7.95	
2. Organophosphates	Not Detected	Less than 3 µg/L

Remark:


JAVAN MADOYA
for: Government Chemist/Analyst





MINISTRY OF HEALTH

Telephone: 057-20-21985
Mobile: 0772 632726
E-mail: info@kisumugovtchem.go.ke
Web: www.kisumu.governmentchemists.go.ke
(Behind Jaramogi Oginga Odinga Teaching and Referral Hospital)

GOVERNMENT CHEMISTS' DEPARTMENT
P.O. Box 2006 -40100,
KISUMU

When replying please quote
Ref. No. **P/WATER/WQ/VOL.3/141/2017**

Date: **24/10/2017**

CERTIFICATE OF ANALYSIS

Report No. : 141(D)/2017
Date Received: 13/10/2017
Sender: SAFEGLOBAL CONSULTANCY FIRM LIMITED.
Sender's Reference: - 9/18/10/2017
Description of Sample: WATER FROM MAKONGENI VILLAGE IN HOMABAY
Examination Required: PESTICIDE ANALYSIS
Analytical Report:

PARAMETER	RESULTS	KEBS LIMITS (KS 05 - 459 of 1996)
1. pH (at 27.7°C)	7.30	6.5 - 9.2
2. Turbidity	182	10 NTU
3. Conductivity (at 27.9°C)	192.3	2500µS/cm
4. Total Dissolved Solids (TDS)	81	1500mg/L
5. Organophosphates	Not Detected	Less than 3 µg/L

Remarks:



Javan Madoya
JAVAN MADOYA
for: Government Chemist/Analyst



MINISTRY OF HEALTH

Telephone: 057-20-21985
Mobile: 0772 632726
E-mail: info@kisumugovtchem.go.ke
Web: www.kisumu.governmentchemists.go.ke
(Behind Jaramogi Oginga Odinga Teaching and Referral Hospital)

GOVERNMENT CHEMISTS' DEPARTMENT
P.O. Box 2006-40100,
KISUMU

When replying please quote

Ref. No. P/WATER/WQ/VOL 3/139/2017

Date: 24/10/2017

CERTIFICATE OF ANALYSIS

Report No. : 139(F)/2017
Date Received: 13/10/2017
Sender: SAFEGLOBAL CONSULTANCY FIRM LIMITED.
Sender's Reference: -- 5/12/10/2017
Description of Sample: WATER FROM RIVER SARE
Examination Required: PESTICIDE ANALYSIS
Analytical Report:

PARAMETER	RESULTS	KEBS LIMITS (KS 05 - 459 of 1996)
1. pH (at 27.7°C)	7.64	6.5 - 9.2
2. Turbidity	146	10 NTU
3. Conductivity (at 27.9°C)	186.5	2500µS/cm
4. Total Dissolved Solids (TDS)	98	1500mg/L
5. Organophosphates	Not Detected	Less than 3 µg/L

Remark:



JAVAN MADOYA
for: Government Chemist/Analyst

ANNEX J: REFURBISHMENT OF IRS OPERATIONS SITES IN MIGORI AND HOMA BAY COUNTIES

County	Sub-County	No. of Operations Sites	Site Refurbishment (Soak Pit/Wash Area, Storeroom, Roof Catchment and Water Storage, etc.)
MIGORI	Suna East	4	<ul style="list-style-type: none"> • All four soak pits and wash areas at Migori County Referral Hospital (MCRH), Anjego, Osingo, and Suna Rabuor were repaired to meet the PMI best management practices (BMP) requirements. • Three of the four storerooms used in the 2017 IRS campaign were made available the by the health centers where the sites are located. At MCRH, an alternative storeroom which met BMP requirements for an ideal storeroom was provided. • Minor repairs were done for roof catchment systems at the four sites.
	Suna West	4	<ul style="list-style-type: none"> • All four soak pits and wash areas at Suna Ragana, Bondo, Arombe, and Suna Nyamaraga were repaired to meet the PMI BMP requirements. • Three of the four storerooms used in the 2017 IRS campaign were made available to the PMI AIRS Project by the health centers where the sites are located. At Nyamaraga, an alternative but ideal storeroom was provided for the 2018 IRS operations. • Minor repairs were done for roof catchment systems at the four sites.
	Awendo	4	<ul style="list-style-type: none"> • Three soak pits and wash areas at Awendo, Rabondo, and Dede were repaired to meet the PMI BMP requirements. At Mariwa, an overhaul of the soak pit and wash area slab was done to address a clogging problem experienced in the previous campaign. The work resolved the clogging problem. • All storerooms used previously were available for the 2018 campaign in Awendo Sub-County. • Minor repairs were done for roof catchment systems at the Dede site.
	Rongo	4	<ul style="list-style-type: none"> • Four soak pits and wash areas at Rongo SCH, Minyenya, Ongo, and Kochola operations sites were repaired to meet BMP requirements. • An additional soak pit and wash area were set up at Rongo Sub-county Hospital (SCH) to decongest SOP traffic during the end-of-day clean up. • Minor repairs were done to improve the roof catchment system at Rongo SCH, Kochola, and Minyenya.
	Uriri	5	<ul style="list-style-type: none"> • Four soak pits and wash areas at Uriri HC, Oyani, Othoro, and Lela were repaired to meet the PMI BMP requirements. At Bware, an overhaul of the soak pit addressed a clogging problem experienced in the previous campaign. The repair work resolved the clogging problem. • All storerooms used previously were available for the 2018 campaign in Urir Sub-County. • Minor repairs were done for roof catchment systems at Uriri HC, Oyani, Lela, and Bware operations sites.

County	Sub-County	No. of Operations Sites	Site Refurbishment (Soak Pit/Wash Area, Storeroom, Roof Catchment and Water Storage, etc.)
	Nyatike	7	<ul style="list-style-type: none"> • Six soak pits and wash areas at Sori Karungu, Alendo, Macalder, Agenga, Muhuru, and Wathonger were repaired as recommended in the needs assessment report. • The IRS operation site at Bande was relocated to Nyandago Koweru to meet operational, logistical, and environmental compliance requirements • A water tank with gutter systems was installed at Nyandago while minor repairs on the roof catchment systems were done at the Agenga, Macalder, and Alendo sites.
	Homa Bay Township	4	<ul style="list-style-type: none"> • All refurbished to meet PMI BMP requirements for IRS operation sites. • All four sites at Marindi, Nyalkinyi, CHMT, and Pala Masogo were set up with newly installed soak pits, wash areas, and roof catchment systems. The four storerooms were also made available to PMI AIRS by the health facilities where the sites are located.
	Mbita	5	<ul style="list-style-type: none"> • In the mainland, three sites at Mbita SCH, Kitare, and Ogongo were set up with newly installed soak pits and wash areas. At Mfangano Island, two sites were also set up at Ugina and Wakula. • All five storerooms were made available to PMI AIRS by the health facilities where the sites are located. Roof catchment systems were also set up at the two Island sites.
	Suba	5	<ul style="list-style-type: none"> • All five sites at Suba SCH, Nyandiwa, Magunga, Nyatoto, and Nyamrisra were set up with newly installed soak pits and wash areas. The five storerooms and well-maintained roof catchment systems in Suba Sub-County were also made available to PMI AIRS by the health facilities where the sites are located.
Homa Bay	Ndhiwa	7	<ul style="list-style-type: none"> • All seven sites at Malela, Magina, Okok, Ombo Kachieng, Ndhiwa SCH, Got Kojowi, and Pala Koguta, were set up with newly installed soak pits, wash areas, and roof catchment systems. Four storerooms were also made available to PMI AIRS by the health facilities where the storerooms are located.
	Rangwe	4	<ul style="list-style-type: none"> • All four sites at Ndiru, Rangwe SCH, Rariw, and Nyagoro were set up with newly installed soak pits, wash areas, and roof catchment systems. Four storerooms were also made available to PMI AIRS by the health facilities where the sites are located.
	Rachuonyo North	6	<ul style="list-style-type: none"> • All six sites at Chuthber, Kendu SCH, Wagwe, Omboga, Okiki Amayo, and Homa Hills were set up with newly installed soak pits, wash areas, and roof catchment systems. Six storerooms were also made available to PMI AIRS by the health facilities where the sites are located.
	Kabondo	4	<ul style="list-style-type: none"> • All four sites at Ober, Ringa, Kabondo SCH, and Othoro were set up with newly installed soak pits, wash areas, and roof catchment systems. Four storerooms were also made available to PMI AIRS by the health facilities where the sites are located.
	Kasipul	5	<ul style="list-style-type: none"> • All five sites at Ombek, Nyangiela, Rachuonyo SCH, Sino, and Koywech were set up with newly installed soak pits, wash areas, and roof catchment systems. Five storerooms were also made available to PMI AIRS by the health facilities where the sites are located.

ANNEX K: ENVIRONMENTAL COMPLIANCE ISSUES NOTED DURING SUPERVISION

Compliance Issue	Sub-County	Measures Taken by PMI AIRS Project
Improper use of PPE by SOPs	Nyatike, Kabondo, Suna West	SOPs were advised on the importance of proper use of provided PPE for personal safety and health reasons. Field demonstrations were conducted by supervisors to enforce compliance and avert potential insecticide exposure.
Pooling of waste water at some soak pits (Anjego, Bware, Alendo, CHMT, Kendu, Omboga)	Suna East, Uriri, Nyatike, Rachuonyo North, Homa Bay Township	<p>Washers were instructed to remove soil, grass, and leaf fragments from the top filter layer of the soak pit, which posed filtration challenges causing clogging. They were advised to prevent water wastage, especially from running taps. Where clogging was persistent (Anjego and Omboga), the site coordinators were advised to scoop excess effluent and pour it into a standby barrel placed in the wash area. From there, the team could control disposal of the effluent back to the soak pit.</p> <p>Anjego and Omboga operation sites--formed effluent puddles periodically. Site supervisors reported spillage outside the soak pit at Anjego site, while the Site Coordinator observed potential seepage outside the wash area at the Omboga site. The ECO and a field technician from the Government Chemists' Department took soil and water samples from the vicinity of the two sites on April 17, 2018, for laboratory analysis to determine the extent of contamination to the immediate environment (if any) as a result of the challenges at the two soak pits. The results are in Annex H-5.</p>
Team leaders not conducting daily morning health and physical checks on the SOPs	Rangwe, Nyatike, Suna West, Awendo, Rachuonyo North	The site coordinators and TLs were advised on the importance of carrying out health and physical checks on the SOPs before going to the field. They were encouraged to ensure that only SOPs who are fit and not exhibiting any health issues would be allowed to work on any given day. This was meant to prevent any accidents/incidents that would potentially occur as a result of fatigue or weakness. Supervisors were asked to check through the daily health check forms filed at the site stores.
Overcrowding at some wash areas during the end-of-day clean up	Nyatike, Rongo	Site coordinators and TLs were advised to ensure that the SOPs got into the wash area by teams (not more than five SOPs) so they have enough space to clean pumps properly. The site coordinators were also advised to arrange the seven barrels properly in the wash area so that order is observed during the end-of-day clean up. At Rongo SCH, a second wash area was installed to help reduce congestion due to the large number of SOPs. Supervision was also stressed during the end-of-day clean up to maintain order and proper cleaning.

Compliance Issue	Sub-County	Measures Taken by PMI AIRS Project
Wastes not properly separated and arranged during the first week in some stores	Awendo, Suna West, Homa Bay Township, Rachuonyo North, Ndhiwa	Storekeepers were advised to label the gunny bags properly for different categories of wastes. They were also advised to store the contaminated wastes in the same store room as the insecticide and the non-contaminated wastes with the other commodities.

ANNEX L: SUMMARY OF INCIDENTS/ACCIDENTS FOR THE 2018 IRS CAMPAIGN

Sub-County	Date	Operations Site	Nature and Description of Incident/Accident	Corrective Action Taken by PMI AIRS Project
MIGORI COUNTY				
Uriri	23/02/2018	Uriri HC	IR 2018 010; An SOP was attacked and bitten by an uncaged dog as she approached a beneficiary's house.	Community mobilization was enhanced with the key message that all animals were to be caged or kept away prior to, during, and for two and a half hours after spraying.
Rongo	24/02/2018	Rongo SCH	IR 2018 011; An SOP was attacked and bitten by an uncaged dog as she approached a beneficiary's house.	Community mobilization emphasized that the key message to beneficiaries is that all animals must be caged or kept away prior to, during, and for two and a half hours after spraying.
Uriri	02/03/2018	Uriri HC	IR 2018 015; When pressurizing his pump at a beneficiary's compound, an SOP's loose pump section dislodged, causing spillage on the ground and on one sack of maize that was being sundried nearby.	The homeowner was paid KES 4,000 as compensation. Pump technicians were reminded to ensure that each SOP pump assembly is tightly secured before the SOPs leave for the field each spray day. Surface digging was done to clean up the ground contamination. The dug out soil and grass as well as the contaminated maize were collected in gunny bags and transported to the Kochola operation site in Rongo for temporary storage prior to incineration.
Suna West	08/03/2018	Arombe	IR 2018 016; A TL and four SOPs colluded and attempted to steal four litres of insecticide by emptying it into plastic containers found in the community.	The incident was reported to the Masara Police post. All the five culprits were dismissed, and the rest of the spray teams warned not to engage in similar actions. Supervisors were advised to closely monitor variant trends in SOPs' insecticide usage data. The recovered four litres of insecticide were reconstituted at the operation site and used by the spray teams as leftover insecticide.

Sub-County	Date	Operations Site	Nature and Description of Incident/Accident	Corrective Action Taken by PMI AIRS Project
Awendo	14/03/2018	Mariwa	IR 2018 017; Seven SOPs colluded and attempted to steal eight litres of insecticide by emptying it into plastic containers found in the community.	The incident was reported to the Mariwa Administration Police post. All seven culprits were dismissed, and the rest of the spray teams warned not to engage in similar actions. Supervisors were advised to closely monitor variant trends in SOPs' insecticide usage data. The recovered eight litres of insecticide were reconstituted at the operation site and used by the spray teams as leftover insecticide.
Awendo	23/03/2018	Rabondo	IR 2018 018; A TL was hit by a speeding motorcycle in a hit and run accident as she was crossing the road to board an SOP transport vehicle.	During morning mobilizations at the operation sites, spray teams were advised to be cautious when at the pick-up and drop off points, watching out for motorcycle riders using the roads.

HOMA BAY COUNTY

Suba	13/02/2018	Magunga	IR 2018 001; Suspected incident of insecticide exposure to two SOPs who complained of dizziness, headaches, and nausea after day one of spraying.	SOPs were reminded to hydrate in the morning before donning PPE. As a precaution, all SOPs were reminded to use their full PPE at all times when spraying. Site supervisors were also given refresher training on exposure symptoms and treatment for Actellic 300 CS.
Kasipul	15/02/2018	Nyangiela	IR 2018 002; A spray operator complained of irritation of the skin, nose and eyes after a day of spraying. At the Nyangiela Health center, the SOP was diagnosed with an allergy to Actellic 300 CS.	The SOP was monitored for any potential allergy symptoms to the insecticide until the end of the campaign. None was reported.
Rangwe	15/02/2018	Rariw	IR 2018 003; A punctured, empty plastic insecticide bottle was found among 11 other full insecticide bottles in a carton of days after insecticide had been to Rariw operation site. Upon receipt of insecticide, the concerned storekeeper failed to carry out a physical verification of quantities of insecticide delivered to the site.	The Storekeeper was reminded of the correct stores procedures and all other storekeepers were also reminded to check contents of all the cartons and the bottles upon receipt. Warehouse staff were reminded to verify the contents during reverse logistics.

Sub-County	Date	Operations Site	Nature and Description of Incident/Accident	Corrective Action Taken by PMI AIRS Project
Homa Bay Township	16/02/2018	Marindi	IR 2018 004; A female SOP was chased away from a mobilized household by an individual armed with a machete and purporting to have been the household head. A member of the CHMT, Mathews Ajwala, visited the household and reported that the said individual had been high on marijuana at the time of the incident.	Mobilizers instructed to work more closely with spray supervisors in the community particularly to alert spray operators of potentially problematic people living there.
Ndhiwa	16/02/2018	Ombo Kachieng	IR 2018 005; A mobilizer was attacked and bitten by a dog while at a beneficiary's compound.	Mobilizer supervisors were advised to ensure that their teams of mobilizers emphasized the key message requiring beneficiaries to cage or keep away all animals prior to spraying.
Homa Bay Township	15/02/2018	Nyalkinyi	IR 2018 006; An SOP's pump discharge section dislodged while he was spraying, splashing the insecticide over the roof and causing a run down from the roof and spillage over food items placed outside against the wall.	SOPs were advised to secure their lances tightly and ensure that any food items removed from the households were placed not less than five meters away from eligible structures.
Ndhiwa	16/02/2018	Ombo Kachieng	IR 2018 007; An SOP was injured on the foot by a falling pump when the strap of the pump she was trying to lift dismantled.	SOPs were advised to ensure their shoulder straps for the pumps are intact and tightly secured before leaving for the field.
Rachuonyo North	19/02/18	Wagwe	IR 2018 008; After boarding a transport vehicle at the end of the spray day, a SOP fainted on the way back to Wagwe operation site. The SOP was taken to Wagwe Health Center, diagnosed with dehydration and exhaustion following a full day of spraying and possible low intake of water and received appropriate treatment.	As part of SOP breakfast, each SOP was provided 500mL of drinking water at Wagwe operation site. Site coordinator and supervisors were tasked to ensure that adequate water was being provided at the site by the contracted food vendor. Reminder to SOPs to drink water was also provided as part of breakfast.
Suba	21/02/2018	Magunga	IR 2018 009; A mobilizer was attacked and bitten by a dog while walking in the village carrying out community mobilization.	Mobilizer supervisors were advised to ensure that their teams of mobilizers emphasized the key message requiring beneficiaries to cage or keep away all animals prior to spraying.

Sub-County	Date	Operations Site	Nature and Description of Incident/Accident	Corrective Action Taken by PMI AIRS Project
Kasipul	27/02/2018	Ombek	IR 2018 012; A parked SOP transport vehicle carrying six SOPs dislodged, moved on its own, and knock into a nearby gate. The driver of the vehicle had stepped out shortly before the incident. The six SOPs sustained minor aches and pains.	Site coordinators were directed to give refresher driver safety training to ensure that all drivers comply with safety procedures for IRS SOP and insecticide transportation. All six SOPs were attended to at Rachuonyo sub-county hospital, diagnosed with only minor aches and pains, and provided with pain killers.
Kasipul	28/02/2018	Nyangiela	IR 2018 013; An SOP was attacked and bitten by an uncaged dog in a beneficiary's compound as she was mixing insecticide in the sprayer pump.	The key message emphasized during community mobilization is that all animals must be caged or kept away prior to, during, and for two and a half hours after spraying
Kasipul	28/02/2018	Koywech	IR 2018 014; A SOP lost a full insecticide bottle while in the field. SOP claimed that a damaged zipper on his bag could have resulted to the loss. Case was reported to Kosele Police Station. The police called AIRS Kenya ECO days after the incident, having the bottle in their possession a lost and found item.	All SOPs were reminded to be careful when handling insecticide and ensure the bottles were properly secured in the bags. SOPs were also advised to surrender any torn or damaged bags to their storekeepers and site coordinators for repair and/or replacement.

ANNEX M: WASTE QUANTIFICATION CHART

[2018] [Kenya] Waste Quantification Chart

Waste Type	Amount of Waste	Disposal Method	Disposal Site	Date of Disposal
Empty bottles ACTELLIC 300 CS	162,468 Bottles	Recycled	VINTZ Plastics Limited	09/04/2018
Contaminated Cardboard, used nose masks and other assorted contaminated wastes including used dry cell batteries.	2580kg	Incinerated	Environmental and Combustion Consultants Limited (ECCL)	12/04/2018
Non-Contaminated Cardboard and paper wastes	10, 340kg	Recycled	Kamongo Waste Paper Ltd	09/04/2018
Assorted polythene and plastic wastes (non-Contaminated)	2117kg	Recycled	VINTZ Plastics Limited	09/04/2018