



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

MOZAMBIQUE
END OF SPRAY REPORT 2014

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MOZAMBIQUE END OF SPRAY REPORT 2014

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BMP	Basic Management Practices
DPS	Provincial Directorate of Health
ICC	Inventory Control Cards
ID	Identification
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
MICOA	Ministry of Environmental Affairs
MINAG	Ministry of Agriculture
MOH	Ministry of Health
NMCP	National Malaria Control Program
ODK	Open Data Kit
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
SDSMAS	<i>Serviços Distrital da Saúde Mulher e Acção Social</i> /District Services for Health, Women and Social Welfare
SEA	Supplemental Environmental Assessment
SOP	Spray Operator
US	<i>Unidade de Saude</i> /Health Center
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

In August 2011, Abt Associates was awarded the three-year Africa Indoor Residual Spraying project (AIRS), IRS 2 Task Order 4, funded by the United States Agency for International Development (USAID) under the President’s Malaria Initiative (PMI). The mandate of the project is to limit exposure to malaria and reduce the incidence and prevalence of malaria in up to 17 countries in sub-Saharan Africa. The key objectives of the program in Mozambique are to reduce malaria-associated morbidity and mortality in select districts in Zambézia province and establish a model indoor residual spraying (IRS) program that will set national performance standards.

Abt implements the project in close collaboration with Mozambique’s National Malaria Control Program (NMCP), the Provincial Health Directorate in Zambézia province, the District Health Directorates in the select districts, the Ministry of Environmental Affairs (MICOA) and the Ministry of Agriculture (MINAG).

The project’s main achievements in 2014 are listed below:

TABLE I: AIRS MOZAMBIQUE AT A GLANCE

Number of provinces/districts covered by PMI-supported IRS in 2014	5 districts in Zambézia province (Mopeia, Milange, Morrumbala, Mocuba, and Quelimane)
Insecticide	Pyrethroid
Number of structures sprayed by PMI-supported IRS in 2014	445,118
Number of structures targeted by PMI-supported IRS in 2014 (found by Spray Operators)	477,930
2014 spray coverage	93.1%
Population protected by PMI-supported IRS in 2014	2,327,815 (including 159,830 pregnant women and 404,707 children under 5)
Dates of PMI-supported IRS campaign	20 October – 13 December 2014
Length of IRS campaign	48 days
Number of people trained with US government funds to deliver IRS ¹	1,354 ²

As part of entomological monitoring, AIRS conducted baseline and monthly monitoring activities. To determine quality of spraying, the project conducted quality assurance tests in 15 houses. The test results for average 24-hour mortality were 100% for the month of October, using standard World Health Organization (WHO) cone assays.

¹ This is based on the PMI indicator definition. It includes only spray personnel such as spray operators, team leaders, supervisors, and clinicians. It excludes data clerks, drivers, washers, porters, pump technicians, and security guards.

² 1,308 spray operators, team leaders and base supervisors, plus 22 supervisors and government staff that attended the full IRS Training of Trainers, and 24 clinicians.

I. INTRODUCTION

I.1 PROJECT OBJECTIVES IN 2014

Specific objectives of the AIRS Mozambique program in 2014 included the following:

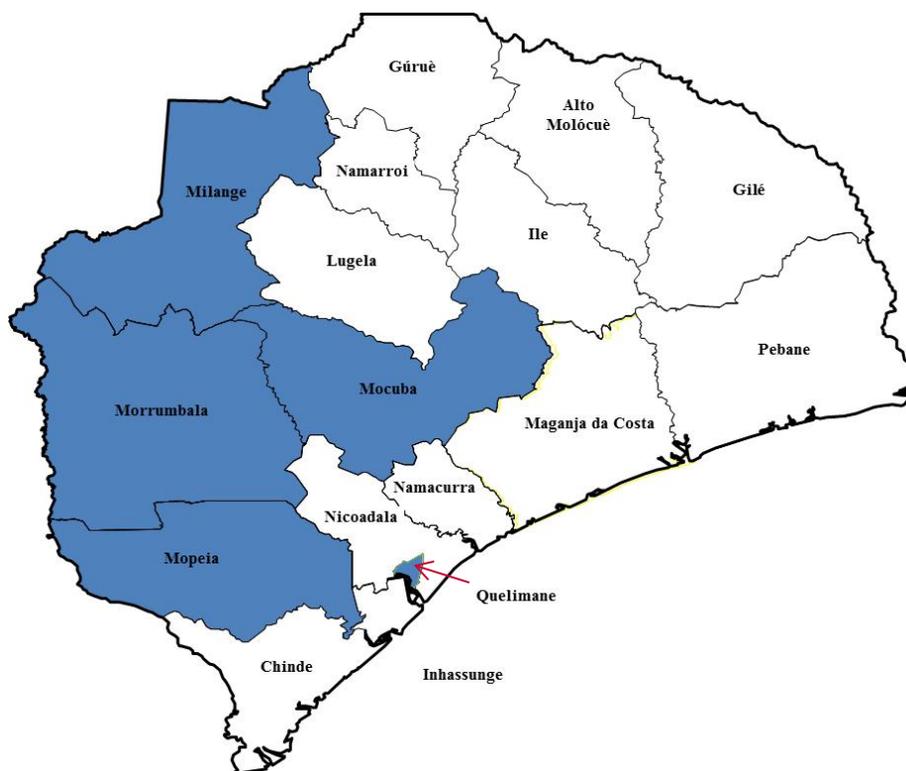
- Cover at least 85 percent of the 503,299 targeted and eligible structures found in five selected districts of Zambezia (Mopeia, Milange, Morumbala, Quelimane and Mocuba), and protect as many as 2,496,939 lives from malaria transmission in the target areas.
- Continue entomological monitoring in collaboration with *Instituto Nacional de Saúde/Centers for Disease Control and Prevention (INS/CDC)*.
- Assess and improve national and local capacity in organizing, planning, implementing, and evaluating IRS campaigns.
- Identify cost and operation-efficiency to streamline the IRS campaign, lower cost of implementation, and limit stock and supply chain error.
- Improve environmental compliance with respect to implementation of IRS.

I.2 SPRAY SITES

Zambézia province (Figure 1), located in central Mozambique, has a total population of 4,563,018³ and is divided into 17 districts. In 2014, AIRS Mozambique sprayed in five of the 17 districts—Mopeia, Milange, Morrumbala, Mocuba, and Quelimane highlighted in blue in Figure 1 below. In these districts, AIRS Mozambique established 24 operational sites with washing areas, soak pits, and refurbished stores, and also has a central warehouse in Quelimane.

³ Projection from 2007 population census.

FIGURE 1: MAP OF ZAMBÉZIA PROVINCE



1.3 INSECTICIDE SELECTION

Insecticide selection for IRS is a critical issue with the emergence of insecticide resistance throughout Africa. In February 2014, AIRS Mozambique conducted vector susceptibility testing in order to inform the insecticide selection for the 2014 campaign. *An. gambiae* s.l. and *An. funestus* s.l. mosquitoes were collected and reared to adulthood. Then they were exposed to at least one insecticide of each class of insecticide recommended by WHO (deltamethrin, bendiocarb, lambda-cyhalothrin, DDT, fenitrothion). Note that in Milange only deltamethrin was tested due to the limited productivity of the available breeding sites. The test mortality rates were over 90 percent for all insecticides tested. AIRS Mozambique recommended pyrethroids for this year's campaign after evaluating criteria such as cost, safety, and operational feasibility.

Approximately 2,000 kgs of insecticide were donated by the NMCP and transported by the AIRS Mozambique team from the Government of Mozambique (GOM) Beira warehouse in September. Another 6,000 kgs were procured through Abt Headquarters using PMI funding, which arrived in the AIRS Quelimane warehouse on September 26, 2014.

AIRS sent the donated insecticide to the South African Bureau of Standards (SABS) lab for quality testing in August. Initial results indicated that only four out of the 21 batches that were tested passed with respect to WHO specifications. Results from previous testing conducted by Global Fund through the Belgium lab, Walloon Agricultural Research Centre (CRA-W), however, indicated that all batches complied with specifications. Both labs discussed the methods used in their respective testing, and it was concluded that SABS had utilized the wrong testing method for the WG (water dispersible formulation) deltamethrin in question. SABS re-tested the batches using the correct method and found that in fact all of the samples passed specifications. AIRS also carried out pre-shipment testing for the newly procured insecticide and all samples passed specifications as well.

2. PRE-SPRAY ACTIVITIES

2.1 MICRO-PLANNING

The micro-planning meeting took place in July 2014. As in previous years, AIRS Mozambique staff facilitated the meeting and worked closely with Ministry of Health (MOH) NMCP officials, the Provincial Health Directorate (DPS), the District Health Directorates (SDSMASs), and PMI. The staff prepared a detailed roll-out strategy and action plan, which contained personnel requirements and selection criteria, as well as logistics and transportation requirements. It was during this meeting that the issue of payment of a subsidy of 100 mts/day to the community leaders who help to mobilize during the spray day was raised. After further discussions with the NMCP and PMI, it was decided that the subsidy would be provided, which is in line with the NMCP policy of subsidizing IRS mobilization activities. This was a sign of collaboration at all levels and put the campaign on solid footing in terms of relationships amongst key stakeholders.

2.2 LOGISTICS NEEDS AND PROCUREMENT

The logistics needs assessment started with the development of the 2014 IRS work plan. Table A-1 in the annex shows the key commodities the project procured internationally and domestically for the spray operation. Data from the 2013 campaign was used to determine, in collaboration with the DPS and SDSMASs, the number of operational base stores, soak pits, and spray teams needed for the spray operation in each district. A total of 24 stores and 24 soak pit locations were established for the 155 spray teams in the five districts. In addition to the 24 stores at the base level, AIRS Mozambique has a central warehouse located in Quelimane, bringing the total to 25 stores.

2.3 HUMAN RESOURCE REQUIREMENTS

The project deployed 1,441 seasonal workers, 29 percent of whom were female, for the IRS spray campaigns in the five districts as shown in Table 2 below. This is an increase of 6 percent of females contracted from the 2013 campaign.

TABLE 2: NUMBER AND GENDER OF HIRED SEASON STAFF

Type of Personnel	No. of Males	No. of Females	Total
Spray operators	666	269	935
Team leaders	114	42	156
Base supervisors	25	0	25
District supervisors	32	1	33
IEC supervisors	3	2	5
Pump technicians	25	0	25
Storekeepers	24	5	29
Washers	4	76	80
Security	50	0	50
Drivers	60	1	61
M&E supervisors	6	2	8

Data entry clerk	22	12	34
Total	1,031	410	1,441
Percentage	71.5%	28.5%	100%

Workers were recruited at the community level in September 2014 for the spray campaign. Abt District Coordinators and District Health technicians contacted the community leaders in the targeted communities in order to obtain a list of pre-selected candidates for the position of spray operator (SOP). A job description was established by AIRS Mozambique, and the community leaders used this guidance for pre-selection. The pre-selected candidates then took a writing test and had a health check-up, including a pregnancy test for female candidates (see Table 11 in Section 6.2 for test results), and those that passed were invited to participate in the training. The project added a 10 percent buffer to the number of spray operators invited for training to account for expected workforce attrition and to allow the best candidates to be offered positions. A second round of pregnancy tests was conducted in November and, as was done in 2013, AIRS Mozambique staff made an attempt to find jobs for those 3 women who tested positive; however, there were no jobs available at that time that did not have a risk for insecticide exposure. Per the MOH policy, the women were paid for the days worked during the campaign.

2.4 TRAINING

AIRS Mozambique conducted a series of trainings between July and September 2014 in preparation for the campaign. Some trainings took place in each of the five districts, while the Training of Trainers (TOT) and Environmental Compliance Officer (ECO) training took place in Mocuba District. AIRS Mozambique staff were trained in their respective districts depending on the type of training. The training involved classroom and practical lessons in IRS techniques. Table 3 below describes the trainings conducted.

TABLE 3: TRAINING DESCRIPTION

Type of training	From	To	Venue	Brief Description
Environmental compliance	18/08/2014	19/08/2014	Mocuba	The objective of the training was to familiarize Health, Environment and Agriculture staff with Best Management Practices for IRS. The training included discussion groups on environmental compliance for IRS.
Training of Trainers	20/08/2014	23/08/2014	Mocuba	Training topics included: IRS concept, supervision of IRS, IRS spray technique, stock control of insecticide, data recording, pump maintenance, IRS spray schedule management, environmental compliance for IRS, proper use of Personal Protective Equipment (PPE), and general personal and community safety for IRS, IEC approaches and practical instruction for the team.
Washers	29/07/2014	30/08/2014	5 districts	Trainings were on different dates from July to August, as indicated, and the topics covered were: proper use of PPE, progressive rinsing, and health and environmental compliance procedures.

Type of training	From	To	Venue	Brief Description
Stock-keepers	29/07/2014	30/08/2014	5 districts	Carried out on different dates in the target districts, the training included supply chain system, stock card use and recording, delivery note, inventories, and proper storage and handling of insecticide, as well as health and environmental risks of lost inventory.
Spray operators	1/9/2014	18/09/2014	4 districts (The Quelimane training was held in Nicoadala due to lack of training grounds in Quel; Mocuba and Mopeia training was held in Mocuba; Milange and Morrumbala trained in their respective districts.)	The training program lasted five days for the old candidates who have participated in the previous campaigns and 10 days for new candidates; the curriculum covered both lectures and practical exercises. The lecture portion included topics such as spraying techniques; insecticide (K-Othrine, Pali); health and environmental protection; care of IRS equipment; pump parts; and data collection reporting. The practical exercises consisted mainly of spray techniques, preparation, dilution and mixing of insecticide, and progressive rinsing.
Data entry and management	5/10/2014	11/10/2014	Quelimane	Separately, three training sessions were carried out during the period (DB Coordinators, M&E Assistants and DEC staff). The training addressed AIRS Access, M&E issues, database orientation, data entry and cleaning, report generation, filing of data collection forms, supervision tools, data handling protocols, data security, sugarsync, computer use and care, IRS forms, and communication flow for IRS.
Pump technicians	7/10/2014	13/10/2014	5 districts	Training curriculum included pump parts and functions, care and maintenance of PPE and other equipment, and first aid. The pump technicians were trained by the district team that had participated in the Training of Trainers.
Drivers	17/10/2014	17/10/2014	5 districts	Drivers who would transport insecticide were trained on methods and protocol for safe driving, handling insecticides, and what to do in an emergency situation when transporting insecticides. Drivers were also trained on insecticide-related security issues, handling vehicle contamination, methods for cleaning vehicles after transporting insecticide, and handling insecticide run-off.
Guards	17/10/2014	17/10/2014	5 districts	Guards were subjected to one-day trainings where they were explained their responsibilities for their sites. The training was held at the spraying sites.
Poison Management Training	18/10/2014	18/10/2014	5 districts	Pesticide toxicity, exposure to insecticides, recommended preventive measurements for insecticide contamination, treatment when exposed to insecticides

In total, the project trained 1,677 persons, as reported in Table 4 below.

TABLE 4: AIRS MOZAMBIQUE IRS TRAINING MATRIX

Categories of Persons Trained	Training of Trainers		Spray Operations		Training on IRS Delivery										Other Trainings				TOTAL				
					Data Capture		Logistics Training		ECO		Poison Management		Technical Maintenance		Base Security		Washing				Transport Security		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
MOH - District (including two from Municipality)	9	1							20		24											53	1
MOH - Provincial	2								3													5	0
MOH - Central									1													1	0
Ministry of Environmental Affairs (MICOA)									7													7	0
Ministry of Agriculture (MINAG)									5	2												5	2
District Coordinators	5								5													5	0
IEC Coordinators	3	2																				3	2
Data Clerks					31	17																31	17
M&E Assistants					5	3																5	3
DB Coordinators					2																	2	0
Spray Operators, Base Supervisors, Team Leaders			796	512																		796	512
Warehouse Keepers							26	6														26	6
Guards															50							50	0
Pump Technicians													24									24	0
Washers																	5	82				5	82

Categories of Persons Trained	Training of Trainers		Spray Operations		Training on IRS Delivery										Other Trainings				TOTAL				
					Data Capture		Logistics Training		ECO		Poison Management		Technical Maintenance		Base Security		Washing				Transport Security		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Drivers																				34	0	34	0
TOTAL Male/Female	19	3	796	512	38	20	26	6	41	2	24	0	24	0	50	0	5	82	34	0	1,052	625	
TOTAL TRAINED	22		1,308		58		32		43		24		24		50		87		34		1,677		

**TABLE 5: MOZAMBIQUE 2014 TRAINING DATA, PMI INDICATOR –
“TRAINED TO DELIVER IRS WITH USG FUNDS”**

Type of Training	Males	Female	Total
IRS Delivery TOT	19	3	22
Spray Operations	796	512	1,308
Clinicians	24	0	24
Total	839	515	1,354

3. COMMUNICATIONS ACTIVITIES

Community sensitization and awareness are key to a successful IRS campaign. During the 2014 campaign, the AIRS Mozambique Operations team collaborated with the DPS, SDSMASs, and community leaders in the target districts for community sensitization activities. Through local leaders, AIRS Mozambique was able to carry out community meetings to impart IRS messages in all 32 targeted localities. Additionally, AIRS selected community leaders to carry out house-to-house interpersonal communication efforts in their local communities to ensure that households had received key IRS messages and were aware of the timing of the spray. As mentioned above, this year the community leaders were paid a 100 mets/day subsidy, which resulted in increased participation, greater mobilization efforts, and a reduced refusal rate.

Sensitization activities began two weeks prior to the campaign and included radio spots in seven languages and meetings with the communities and their leaders. These meetings took place a day or two before spraying began in the targeted areas. The purpose of these meetings was to inform communities of the immediate visit by spray operators and educate the beneficiaries on proper preparation of their homes, environmental protection, and the importance of IRS and how it reduces malaria transmission.

In addition to verbal messages, other materials were developed and disseminated by community leaders during the spray campaign. Tables 6 and 7 show the types and numbers of communication materials produced and distributed.

TABLE 6: IRS CAMPAIGN COMMUNICATION MATERIALS

Item	No. Distributed
T-shirt	1,579
Hat	1,500
Brochures	56,000

TABLE 7: IRS CAMPAIGN COMMUNICATION ACTIVITIES

Activity	Frequency
Community meetings (45 localities x 2 meetings)	90
Radio spots in 5 districts (before and during spray)	750 (3 times a day/50 in 5 districts)
Radio spots at national level in support of the NMCP (during spray)	208
IRS launch	5 (1 per district)

On October 18, 2014, AIRS Mozambique assisted the provincial health directorate with the national IRS campaign launch ceremony, which was held in Mugeba, Mocuba District. The launch was presided over by Baltazar Candrinho, NMCP Director from the central MOH. Dr. Luisa Cumba, Director of Health, represented Zambezia's Provincial Government. It was a three-hour ceremony, which consisted of expositions, cultural group presentations (singing, dancing, and theatric groups), blood transfusion sections, diagnosis and treatment sectors, including the testing for malaria, spraying of the first structure, and also speeches from different representatives.

4. SPRAY ACTIVITIES

4.1 SPRAY OPERATIONS

IRS operations began in the five districts on October 20 and lasted for 48 working days, ending on December 13, 2014; however, a few sites were able to close earlier. Two spray sites in Mocuba closed on December 8; 14 spray sites (Morrumbala (7), Mopeia (1), Mocuba (2) and Milange (4)) closed on December 10, and the remaining eight sites closed on December 13, 2014.

Daily spray operations took place in all 24 spray sites simultaneously, except for November 7 (Liciro and Milange Sede) and November 18 (Milange Sede, Liciro, Dulanha and Dachudua) due to rain. At the start of the campaign, AIRS senior staff, together with the Province Malaria Program Managers, were positioned at strategic points in the targeted districts to supervise the first day of the event and respond to urgent requests. Throughout the campaign, DPS, SDSMAS and Health Center supervisors observed the spray activities and were provided with checklists.

Based on the number of structures to be sprayed per district, teams were located at the 24 spray bases. Each team consisted of one team leader and six spray operators. The distribution of spray teams by base is shown in Table 8.

TABLE 8: DISTRIBUTION OF SPRAY TEAMS BY SPRAY BASE SITES

District	Spray sites (bases)	Nr of spray operators	Nr of teams
Quelimane	Quelimane	96	16
Mocuba	Mocuba Sede	114	19
	Mugeba	60	10
	Muaquiua	24	4
	Namanjavira	30	5
	Alto Benfica	18	3
	Munhiba	36	6
	Mopeia	Mopeia Sede	24
Mopeia	Chimuara	23	4
	Posto de Campo	24	4
	Milange	Milange Sede	114
Milange	Liciro	24	4
	Coromana	42	7
	Molumbo	54	9
	Dulanha	18	3
	Majaua	30	5
	Morrumbala	Morrumbala Sede	66
Muandiuá		30	5
Sabe		12	2
Megaza		12	2
Pinda		18	3
Chire		36	6
Derre		24	4
Guerissa		6	1
Total			935

As per the previous campaigns, daily spray activities started at 6:00 a.m. and ended around 1:00 p.m. As is the case every year, in some bases the spray schedule was set according to the communities' daily routines. For example, the spray teams had to occasionally stay beyond 2:00 p.m. to spray structures owned by farmers who left home for field work early in the morning and did not come back until after 1:00 p.m.

Per the system used in previous years, spray operators collected spray data using the Daily Spray Operator Form, and their team leaders collected and verified the data and then deposited the forms at the bases. The forms were delivered to the district level from the base sites by hired staff with motorbikes. In parallel, base supervisors and stock-keepers completed the Performance Tracking Sheet, which was designed to provide an operational-level evaluation for the sites' progress. This information was reported directly to each District Coordinator through a cell phone on a daily basis. Then each District Coordinator reported the information to the Operations Manager, who compiled and reported the information to the Operations Director on a weekly basis. This system allowed immediate measures to be taken as necessary. Supervision and monitoring were prioritized throughout the spray period, and included representatives from many government agencies, as shown in Table 9.

TABLE 9: SUPERVISION AND MONITORING BY PARTNERS

Organization	Number of People	Average Number of Days
NMCP (National level)	2	10
NMCP (Province level)	9	20
MOH (District level)	25	35
Ministry of Agriculture (Province level and District level)	6	15
Ministry for Environmental Coordination (Province and District level)	6	15
Municipality (Milange and Mocuba)	2	15

4.1.1 MID-TERM MEETING

On November 14th, the DPS held a very productive and positive mid-term spray meeting, including participants from all districts, as well as MICOA. The SDSMAS staff noted that the 2014 campaign was “one of the most organized they have ever seen”.

The following key recommendations were highlighted by the DPS:

1. **Falsification of Data:** It was noted that there had been a case of falsification of data. The DPS recommended that the M&E team present the probability of fake data in the database during the End-of-Spray meeting, i.e. if a district presents 40% coverage, what percent of the reported spray coverage would be false data? AIRS Mozambique is working with the AIRS M&E technical team to assess ways in which to present this data.
2. **Balance Meetings:** The DPS recommended that in the next spray round there should be three meetings: the first after 10 spray days, the second in the middle, then, the last meeting at the end of the campaign.
3. **SDSMAS Supervision:** The DPS noted that some supervisors were paid without taking any action in the field. In order to make sure that the district supervisors are doing supervision in the field, the DPS recommended AIRS Mozambique not pay the supervisors prior to getting DPS approval.
4. **Breakfast:** The DPS proposed juice or another cool drink to be provided along with the breakfast, as only water had been provided.

4.1.2 PROVISION OF BREAKFAST

This year AIRS Mozambique provided water and food for the SOPs prior to the start of the spray each day. Local suppliers were found for each base and the items were transported by 5:00 a.m. to an area near the base where the SOPs congregated each morning. The provision of these items significantly increased morale, hence performance, of the spray personnel, and it is recommended that this practice continues in future years.

4.2 LOGISTICS AND STOCK MANAGEMENT

Like last year, the project used inventory control cards (ICC) to record each item in the central warehouse and 24 peripheral storerooms. At the storerooms, issues and receipts of items were recorded on the stock cards with details of transactions and quantities involved. The ICC for the insecticide stock in every storeroom was closely monitored. Storekeepers updated the cards daily with the movement of stock in or out of the storage facility.

Prior to dispatch of commodities from the central warehouse to the storerooms, a distribution spreadsheet was designed, tracking the flow of the commodities from the central warehouse to the district level and from this point to peripheral storerooms. This spreadsheet also showed the number of teams at each spray site. A dispatch book was designed to control all IRS commodities going in and out at the central and district warehouses. All insecticide boxes were numbered according to their final destination, so each district received boxes of insecticides with different marked numbers. A dispatch note was used to track distribution from the warehouse to the operational store, which returned a signed copy as proof of delivery. The quantities of each item received were entered on the items' ICCs.

In addition to tracking insecticide use via the Daily Spray Operator Forms, all insecticide was also tracked at the storeroom level. In the base storerooms, insecticide sachets were issued only to team leaders who completed and signed the issue forms. The storekeeper would immediately enter this on the ICC to obtain the stock balance record. At the end of each spray day, spray operators turned in their used and unused sachets to the team leader, who collected them and submitted them to the storekeeper, who in turn, recorded the full sachets on the stock card as a positive adjustment, updated the stock balance, and returned the unused sachets to the full stock. The used/empty sachets were recorded on the Daily Utilization Record Form that tracks each store's empty sachets and utilization trend. This reconciliation process enabled the storekeepers to ensure a valid daily inventory and to alert AIRS Mozambique program staff of discrepancies between the stock and the records.

5. POST-SPRAY ACTIVITIES

5.1 CLOSING OF IRS OPERATIONS

5.1.1 POST-SPRAY INSPECTION

The 2014 IRS operations officially ended on December 13, 2014. As is done every year, immediately after the campaign came to an end, the environmental post-spray evaluation was implemented in the five districts in coordination with the Ministries of Health, Agriculture and Environment. The evaluation consisted of verifying the complete closure of latrines, rinsing areas, soak pits and washing areas, including the gates of the site in general, and ensuring that all environmental standards were followed during the movement of insecticide and empty sachets. The Open Data Kit (ODK) system forms on the smartphone were used to evaluate the level of completion.

5.1.2 POST-SPRAY EVALUATION MEETING AND PSDQA

Due to severe flooding in the North and Central region of Mozambique, the DPS recommended that the post-spray evaluation meeting be held March 31, 2015. In addition, because all resources were reassigned to the emergency floods, PMI made the decision to cancel the PSDQA since its activities would have to be postponed to more than 90 days after the end of the spray campaign. A PSDQA will be proposed for Year 1 of the PMI AIRS Project.

5.2 LOGISTICS

Following completion of spray operations, stocks of insecticide were moved from the 24 operational centers to the central warehouse in Quelimane. AIRS Mozambique transported used insecticide sachets and masks, unused sachets, pumps, and other commodities to the central warehouse facility. Progressive rinsing barrels and washing buckets were also collected and stored in the central warehouse. The inventory shown in Table A-2 in the annex will be maintained and monitored until the next spray round.

6. ENVIRONMENTAL COMPLIANCE

6.1 PRE-SEASON ENVIRONMENTAL ASSESSMENT

During the week of 23 June 2014, the AIRS Mozambique team conducted pre-spray environmental assessments in the five IRS districts at the 24 bases. This was done using smartphones which were pre-programmed with environmental assessment checklists. Data was entered in the e-forms on the smartphones while at the field operational sites and submitted to a central database on an automated server at Abt Associates' Bethesda office. A work list was generated which was then instantly shared with the AIRS Chief of Party (COP), Technical Manager and the Environmental Compliance and Safety Manager to guide them on the actions to be taken in preparing the operation sites for IRS. The assessments involved identifying storage facilities and determining the suitability of soak pits that were used in the previous IRS round. In total, 24 storage facilities were provided by the sector authorities at the sector office premises. The refurbishments generally included fixing double locks on stores, reinforcing doors and windows, clearing bushes in and around the soak pits, and fixing poles to further stabilize the fence. Table 10 shows the details of the refurbishments that were done at the operation sites.

AIRS has prepared and submitted to PMI a Supplemental Environmental Assessment (SEA) in preparation for the 2015 IRS campaign. It is currently under review and editing.

TABLE 10: CONSTRUCTION AND REFURBISHMENTS AT IRS OPERATION SITES

District	Site refurbished and/or built (soak pit, storeroom, fence, etc.)
Mopeia	3 soak pits built/0 soak pits refurbished 1 office and 3 storage facilities provided by sector authorities 0 office and storage facilities rented
Quelimane	0 soak pits built/0 soak pits refurbished 1 office and storage facility provided by sector authorities 1 office and storage facilities rented
Mocuba	2 soak pits built/2 soak pits refurbished 1 office and 6 storage facilities provided by sector authorities 0 office and storage facilities rented
Morrumbala	0 soak pits built/4 soak pits refurbished 1 office and 8 storages facility provided by sector authorities 0 office and storage facilities rented
Milange	1 soak pit built/2 soak pits refurbished 0 office and 6 storage facility provided by sector authorities 1 office and storage facilities rented

6.2 SAFETY AND ENVIRONMENTAL COMPLIANCE DURING THE SPRAY CAMPAIGN

Prior to the start of operations, all females were tested for pregnancy. Table II shows the results for the first round of pregnancy tests.

TABLE II: PRE-SPRAY PREGNANCY TEST RESULTS

Morrumbala:	
Total tested	48
Total positive	2
Mocuba:	
Total tested	147
Total positive	3
Milange:	
Total tested	78
Total positive	1
Mopeia:	
Total tested	32
Total positive	0
Quelimane:	
Total tested	57
Total positive	0

A second round of pregnancy tests was conducted in November (after 30 days of spraying) and, as was done in 2013, AIRS Mozambique staff made an attempt to find jobs for the three women who tested positive; however, there were no jobs available at that time that did not have a risk for insecticide exposure. Per the MOH policy, the women were paid for the days worked during the campaign.

See Table 12 for the results below.

TABLE 12: MID-SPRAY PREGNANCY TEST RESULTS

Morrumbala:	
Total tested	47
Total positive	0
Mocuba:	
Total tested	134
Total positive	1
Milange:	
Total tested	83
Total positive	1
Mopeia:	
Total tested	29
Total positive	1
Quelimane:	
Total tested	51
Total positive	0

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

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

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

Mid-spray environmental compliance inspections were carried out during the spray operations in the five IRS districts to ensure that mitigation measures put in place during spray operations were adhered to. The inspection was done by AIRS Mozambique staff in conjunction with the district environmental officers using smartphones, as well as paper checklists.

The inspection teams assessed the use of PPE during spraying and washing activities, stores' records and arrangement, transportation of SOPs, and use of warning signs and first aid kits. Preparations of households for spraying and the instructions given to residents on what to do during and after spraying

operations were monitored. The inspection teams also ensured that wastes were correctly handled and packed during the operations in preparation for disposal at the end of the operations. Part of the inspections also involved observing the spray operators in the field. Additionally, fire extinguishers in storerooms were inspected. A summary of the inspections follows:

Morning mobilization: During the spray campaign, the AIRS Mozambique ECO completed eight morning mobilization forms. Seven of them were in compliance with the most critical issues. In one of the eight, it was noted that one driver had not gone through the ECO training, the vehicle had not been inspected, and the driver did not have PPE. As a response, the vehicle was stopped from carrying out the SOPs, the driver was trained by the ECO, and the vehicle was inspected. After that an inspection certificate for the vehicle was given to the driver.

Spray Operator Performance: The AIRS Mozambique ECO performed 27 checklists of SOP performance during the campaign. As a result of these inspections, 24 were in compliance with the critical issues; however, the other three SOPs had not informed the households in time about the IRS, which resulted in the refusal of two households as they had not removed their belongings. At the end of the day for each spray site visited, the base supervisors were instructed to work in close collaboration with the local authorities in order to get the households informed about IRS and have them accept the activity.

End of Day Clean-Up: During the 2014 campaign, the AIRS Mozambique ECO completed 21 End of Day Clean Up forms. From these, 20 were observed as being in accordance with the most critical issues; however, one was noted as not complying with the recommendations of the ECO. The situation was related to team leaders who were not witnessing the process of cleaning the pumps at the end of the day. The following morning the team leaders were recommended to organize their SOPs by teams and observe the SOPs washing up their pumps in order to make sure the process was done accordingly. In addition, the drums used during the rinsing process were not covered after the clean-up process, so the site supervisors were also instructed to make sure covers were used. Another issue was related with skin irritation due to non-compliance with correct PPE use. This was addressed to the SOPs during the morning meetings with the team leaders and supervisors.

Storekeeper performance: A total of 18 storekeeper performance checklists were completed during the 2014 campaign. From these, 11 were reported as not complying with the recording of the pregnancy test results as this should be done by the technicians of the health facility near the spray site. Next year this practice will be included as part of the TOT and a certificate for the tested SOPs will be produced and kept at the spray site. In addition, a district level health technician will be present during the SOP testing in order to make sure the results being obtained reflect reality.

Tables 13-16 below reflect the results of the mid-spray inspections. Note NC = non-compliant; C = compliant.

TABLE 13: MID-SPRAY INSPECTION RESULTS: MORNING MOBILIZATION

Morning mobilization	Number of inspections	PPE Use		Drivers with Cellphone and PPE		Physical Inspection of SOPs		Vehicle inspection		Vehicle with spill kit and fire extinguisher		Drivers training	
		C	NC	C	NC	C	NC	C	NC	C	NC	C	NC
	8	7	1	8	0	0	8	7	1	7	1	7	1

TABLE 14: MID-SPRAY INSPECTION RESULTS: SOP PERFORMANCE

Spray operator performance	Number of inspections	Homeowner removes belongings		Spray Operator records data		Residents informed in advance about the IRS		Households refusing IRS	
		C	NC	C	NC	C	NC	C	NC
	27	27	0	27	0	26	1	24	3

TABLE 15: MID-SPRAY INSPECTION RESULTS: END OF DAY CLEAN-UP

End of day Cleanup	Number of inspections	SOPs eating or drinking with PPE prior to removing PPE and washing		SOPS complaining of irritation		Covers placed on the 7 triple rinse drums after all pumps are cleaned		Team leaders supervising the cleaning and wash up		Pumps hung upside down to dry	
		C	NC	C	NC	C	NC	C	NC	C	NC
	21	20	1	20	1	20	1	20	1	4	17

TABLE 16: MID-SPRAY INSPECTION RESULTS: STOREKEEPER PERFORMANCE

Storekeeper Performance	Number of inspections	Records of pregnancy test		Spill kit, first aid kit and fire extinguisher		Provision of Antidotes for pesticides at the nearest health facility		Thermometer for monitoring the daily temperatures		Recording of Waste stock	
		C	NC	C	NC	C	NC	C	NC	C	NC
	18	7	11	13	5	16	2	15	3	15	3

6.3 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS

Each of the five IRS districts had a team in charge of adverse effects. The team was comprised of a coordinator, a doctor who was based at the district hospital and nurses based at each health center affiliated with each IRS operation site. These teams were responsible for addressing any adverse effects experienced by community members and/or the spray operations support staff during the spray operations. Before the start of the IRS operations, this team received refresher training at each district on management of IRS adverse effects. For the 2014 spray campaign, AIRS Mozambique reported one case of exposure involving seven SOPs. These cases were attended to appropriately and the persons affected recovered within a few hours of attention. Table 17 below provides a summary of the adverse effects that were reported in all districts and were attended to at either a health center or district hospital.

TABLE 17: NUMBER OF ADVERSE EFFECTS CASES

District	Number of Cases	Symptoms
Quelimane	7	Dermal irritation

6.4 POST-SEASON ENVIRONMENTAL ASSESSMENT

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

6.5 IRS WASTE DISPOSAL

IRS waste will be disposed at different sites according to the type generated during the IRS operations. The team has 1,149 kg of used gloves that will be recycled at IPANEMA company in Maputo, 2,244 kg of gumboots to be washed and distributed to SOPs, and 1,310 kg of overalls.

In addition AIRS Mozambique has 596.30 kg of used masks that will be incinerated in April at OKANGA Company in Nicoadala district. The process had been scheduled for February; however, the incinerator became inoperable during the flooding that occurred January through March. There are also 3,728.13kgs of empty sachets to be incinerated at the same company, "OKANGA".

6.6 INCIDENT REPORTS

In 2014 five incident reports were reported before and during spraying:

Before starting the spray round AIRS Mozambique reported the theft of DDT from the central warehouse in September 2014. Two hundred nineteen boxes of expired DDT were left in the AIRS warehouse that was transferred to Abt in January 2012. The DDT was leftover buffer stock that had been used by RTI, which had expired before being handed to AIRS and was locked in a compartment to which AIRS had no access. It appears that the theft was done through the ceiling by pulling one zinc cover off of the roof. This incident is still under police investigation.

The second incident report involved seven SOPs that had irritation on November 20, 2014 during spray, and they were immediately provided clinical assistance. The mentioned SOPs were identified during the

field visit in Quelimane District in November 2014. It was observed that they had not been wearing their PPE properly, specifically their head cover, which was corrected thereafter.

The third incident reported on November 25, 2014, stated that two spray operators were involved in the theft of insecticide at Mugeba Spray site in Mocuba District. The SOPs were found after the spray day with 16 sachets and seven sachets of insecticide, respectively. This was a result of the District supervisors' field visit when the SOPs were being taken in the vehicles to their residences. The two SOPs had kept the insecticide in their pockets. As a result, they were immediately dismissed.

The fourth incident was observed on December 9, 2014, and was related to the exposure of a pregnant SOP in Dulanha spray site in Milange District. The SOP in question had concealed her pregnancy, and the health official who had administered the pregnancy tests also concealed the positive test results. The female SOP complained of being tired during an AIRS ECO field visit, and that is when it came to light that she was pregnant. As a result, she was kept out of any activities exposing her to insecticide, and was given a temporary job as a base supervisor's assistant.

The fifth incident reported on December 28, 2014, was related to the theft of 27 sachets of K-Othrine by a team-leader in Chire Spray Site in Morrumbala District. After filing a police report and starting a criminal investigation the 27 sachets were recovered. The Team Leader was dismissed from the remainder of the spray campaign.

6.7 MITIGATION OF INCIDENTS

To prevent more incidents for the next spray round we'll be testing all female SOPs at a health facility with the presence of a District Health technician in order to witness the process. In addition, we will reinforce messages on risk of exposure to insecticide while pregnant during the seasonal worker trainings. We will also be sure to clearly express that if SOPs test positive for pregnancy, they will either be placed in a different role (with no insecticide exposure), or they will be compensated for the wages lost. AIRS Mozambique will continue strict supervision in the field to prevent the theft of insecticide. The security at the AIRS Mozambique Central Warehouse will need to be reinforced by training the guards to prevent anymore cases of spray materials/insecticide theft.

7. ENTOMOLOGY

AIRS Mozambique worked closely with the NMCP and the DPS to conduct entomological monitoring. The NMCP and DPS technicians, as well as the AIRS Mozambique Entomologist and Entomological Assistant, were engaged in the monthly mosquito collections. For monitoring vector behavior, density, species composition, and seasonality, five sentinel sites were selected (Milange, Morrumbala, Mocuba, Mopeia and Maganja da Costa). Four sites in intervention areas were selected, and one site in a comparable non-intervention district (Maganja da Costa) was selected.

Pyrethrum spray collection, human landing catches, and CDC light trap collections were carried out in the areas. Pyrethrum spray collection and human landing catches were conducted in all the districts with the exception of Mopeia where only the light trap was used to collect mosquitoes.

7.1 MONITORING VECTOR DENSITY, DISTRIBUTION, AND SEASONALITY AND BEHAVIOR

Entomological data collection on vector density, distribution, and seasonality and behavior began three months before the start of spray operations. Collections were done monthly, including October when the spray began. Subsequent monthly post-spray entomological monitoring activities were continued and will be conducted on a monthly basis for one year.

7.1.1 PYRETHRUM SPRAY COLLECTION

A total of 215 female adult malaria vector mosquitoes (*An. gambiae* s.l. and *An. funestus* group) were collected in all areas by Pyrethrum Spray Collection from July to November 2014 with the exception of Mopeia. Of the total of 215 mosquitoes collected in the four sites, 130 were *Anopheles funestus* s.l. (60.47) and 85 (39.53) were *An. gambiae* s.l. In each site, collection was done in a total of 10 houses every month. Table 14 presents the densities and number of mosquitoes collected per species in the intervention and control sites. A total of 1,203 culicine mosquitoes were also collected from all the sites through pyrethrum spray collections. No other anopheline mosquitoes were collected in all the sites during this period.

TABLE 18. INDOOR RESTING DENSITY IN FOUR SENTINEL SITES, JULY TO NOVEMBER 2014 (*NUMBERS IN PARENTHESIS ARE DENSITY PER ROOM)

Month	Intervention (3 sites)		Control (1 site)		Total	
	<i>An. gambiae</i> s.l.	<i>An. funestus</i> s.l.	<i>An. gambiae</i> s.l.	<i>An. funestus</i> s.l.	<i>An. gambiae</i> s.l.	<i>An. funestus</i> s.l.
July	0 (0.00)*	17(0.57)	1(0.10)	22(2.2)	1	39
August	4(0.13)	6(0.20)	19 (1.90)	40 (4.00)	23	46
September	2(0.07)	1(0.03)	33 (3.30)	17 (1.70)	35	18
October	1(0.03)	1(0.03)	16 (1.60)	10(1.00)	17	11
November	1(0.03)	0 (0.00)	8 (0.80)	16(1.60)	9	16

7.1.2 HUMAN LANDING CATCHES

Human landing collections were carried out in two structures (homes) per village in four villages (Samora Machel in Mocuba, Coqueiro in Morrumbala, 12 de Outubro in Milange, and Motinho in Maganja da Costa). Night (6 p.m. – 6 a.m.) mosquito collections were carried out to monitor vector feeding times and location. Two collectors were assigned to sit indoors and another two outdoors for nightly collections on three consecutive nights per month (July to November). A total of 260 adult malaria vector mosquitoes were collected using Human Landing Catches. Human Landing Catches showed that in general *Anopheles gambiae* s.l. and *Anopheles funestus* s.l. tend to feed mainly indoors in the control area where there is no IRS. In the Milange intervention area where a relatively higher biting rate is reported, both species tended to feed mainly indoors before the IRS intervention. The biting rate was generally low in the other intervention sites (Morrumbala and Mocuba).

TABLE 19: NUMBER OF ANOPHELES GAMBIAE S.L. AND ANOPHELES FUNESTUS COLLECTED BY THE HUMAN LANDING CATCHES, JULY–NOVEMBER 2014

Months of collection	DISTRICTS OF ENTOMOLOGY MONITORING															
	Mocuba				Morrumbala				Milange				Maganja			
	<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>	
	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor
July	0	0	0	0	0	0	0	0	10	5	7	7	9	1	0	4
August	1	0	0	0	0	0	0	0	4	5	17	9	11	6	40	6
September	0	0	0	0	0	0	0	0	5	5	7	8	7	2	13	1
October	0	0	0	0	0	0	0	0	7	0	13	5	0	1	14	5
November	0	0	0	0	0	0	0	0	0	0	7	1	5	0	5	7

Results from field surveys showed variations on vectors' biting rates between intervention and control areas. Generally, in intervention areas the biting rates of malaria vectors were lower as compared to the control area; Milange vectors had a higher biting rate as compared to the other intervention areas. Out of the total of 260 malaria vector mosquitoes, 67.69% were *Anopheles gambiae* s.l. and 32.31% were *Anopheles funestus* s.l.

The human biting rate for each intervention and control sites are shown in Table 20. Mosquitoes were collected for three nights in two houses per each site. Each night, collections were done by two persons indoor and two outdoor in each house. However, the two persons indoor and the two persons outdoor were working in four shifts per night. At a given collection time only one person was indoor and another person outdoor in each house. Therefore, the person-night used for the calculation of biting rate for each collection site indoor or outdoor was $2 \times 3 = 6$.

TABLE 20: THE BITING RATE OF ANOPHELES GAMBIAE S.L. AND ANOPHELES FUNESTUS IN INTERVENTION AND CONTROL AREAS, JULY–NOVEMBER 2014

Month of collection	Mocuba				Morumbala				Milange				Maganja			
	<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>		<i>An. funestus</i>		<i>An. gambiae</i>	
	Indoor	Outdoor	Indoor	Outdoor												
July	0.00	0	0	0	0	0	0	0	1.67	0.83	1.17	1.17	1.50	0.17	0.00	0.67
August	0.17	0	0	0	0	0	0	0	0.67	0.83	2.83	1.50	1.83	1.00	6.67	1.00
September	0.00	0	0	0	0	0	0	0	0.83	0.83	1.17	1.33	1.17	0.33	2.17	0.17
October	0.00	0	0	0	0	0	0	0	1.17	0.00	2.17	0.83	0.00	0.17	2.33	0.83
November	0.00	0	0	0	0	0	0	0	0.00	0.00	1.17	0.17	0.83	0.00	0.83	1.17

Monthly monitoring of the biting rate and vector density will continue in both the intervention and control villages to assess the impact of the IRS intervention.

7.1.3 CDC LIGHT TRAP COLLECTION METHOD

The CDC light trap was a method introduced later than other methods (pyrethrum spray collection and human landing catches). In each district mosquitoes were sampled from four (4) houses for three (3) nights per month. Data was collected only in October 2014, due to problems with battery chargers and power transformer; collections were not continued in subsequent months. Recently the team received battery chargers that don't need a power transformer, and will continue collections in all the sites. Consistent with the other collection methods, more mosquitoes have been collected in Milange intervention area and the control site (Maganja).

TABLE 20. NUMBER OF MOSQUITOES COLLECTED PER DISTRICT, COLLECTION PER TRAP PER NIGHT

Months of collection	Districts of entomology monitoring									
	Intervention site (Four Districts)								Control site	
	Mocuba		Milange		Mopeia		Morrumbala		Maganja da Costa	
	<i>An. funestus</i>	<i>An. gambiae</i>	<i>An. funestus</i>	<i>An. gambiae</i>	<i>An. funestus</i>	<i>An. gambiae</i>	<i>An. funestus</i>	<i>An. gambiae</i>	<i>An. funestus</i>	<i>An. gambiae</i>
October	0 (0)	0 (0)	9 (0.75)	16 (1.33)	0 (0)	3 (0.25)	0 (0)	0 (0)	9 (0.75)	0 (0)
November	-	-	-	-	-	-	-	-	-	-

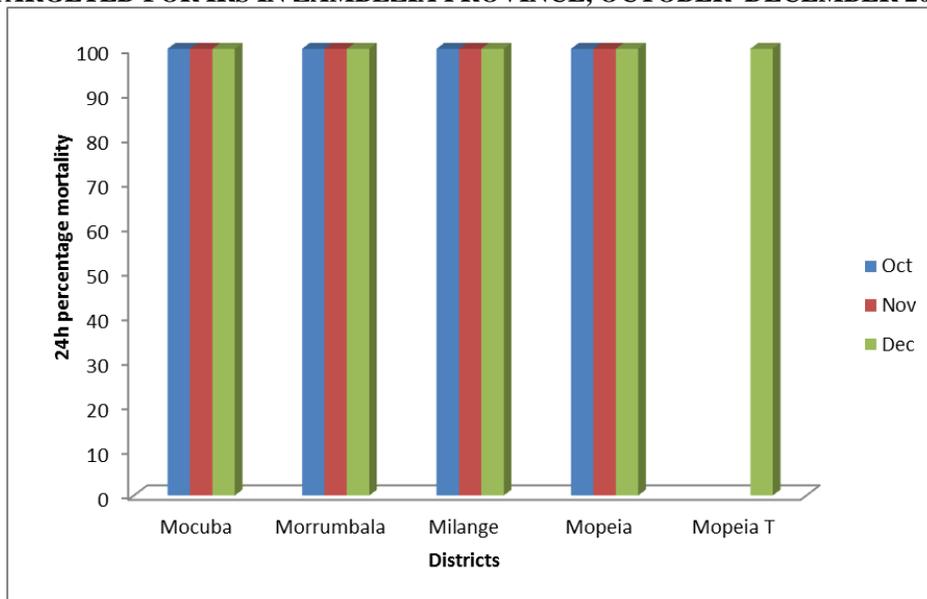
7.2 CONE/WALL BIOASSAY TESTS

7.2.1 DETERMINATION OF QUALITY OF SPRAYING AND DECAY RATE OF INSECTICIDE SPRAYED

The standard WHO cone bioassays were used to evaluate the quality of the spray operation. The bioassay tests were conducted 24 hours after spraying and two months after spraying in Samora Machel, 12 de Outubro, Coqueiro and 24 de Julho villages in the districts of Mocuba, Milange, Morrumbala and Mopeia, respectively. The wall bioassay tests showed high mortality rates (100%) of susceptible mosquitoes (*Anopheles arabiensis*) exposed to deltamethrin-sprayed walls (K-Othrine WG 250, Bayer) in all districts for the tests conducted 24h post-spray. Two months after IRS the mortality remained 100% in all villages, Milange (12 de Outubro), Mocuba (Samora Machel), Morrumbala (Coqueiro) and Mopeia (24 de Julho). Additionally, in December a bioassay for quality assurance was done in Mopeia to understand the activity of deltamethrin WG 250 from Tagros. In this test 10 houses were used and the 24h mortality was 100% for all the tests.

Figure 2 shows the residual efficacy of insecticide sprayed from the monthly cone bioassay tests on the wall surfaces of 30 structures in four (4) districts, namely Morrumbala, Mocuba, Milange and Mopeia. In each district five (5) structures were used for the cone bioassay tests (plus 10 additional structures in Mopeia for the Tagros deltamethrin testing). In each house a total of three (3) tests were conducted at the bottom, middle and top position of the wall surfaces.

FIGURE 2: PERCENTAGE MORTALITY FROM THE CONE BIOASSY TESTS IN FOUR DISTRICTS TARGETED FOR IRS IN ZAMBÉZIA PROVINCE, OCTOBER–DECEMBER 2014



8. MONITORING AND EVALUATION

8.1 KEY OBJECTIVES AND APPROACH

For the 2014 spray campaign's Monitoring and Evaluation (M&E), AIRS Mozambique closely followed the processes outlined in the annual AIRS Mozambique Work Plan and the AIRS M&E Concept Paper developed by the AIRS Home Office team. The main objectives of the M&E Activities were as follows:

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

8.2 DATA COLLECTION AND MANAGEMENT

Data was collected using standardized data collections forms designed to capture all core PMI indicators. All data collection was preceded by training on data capture. During spray operations, all spray data was collected by spray operators and subsequently verified by spray supervisors.

In 2014, the AIRS project continued the use of standardized data quality assurance tools - the Error Eliminator (EE) and the Data Collection Verification (DCV) form - to improve supervision, and ultimately the quality, of data collection and data entry.

Supervision of the data collection process was carried out at various levels through field visits.

TABLE 21: NUMBER OF STRUCTURES VISITED USING THE DCV FORM

District	# Structures visited using the DCV form
Milange	184
Mocuba	243
Morrumbala	256
Quelimane	103
Mopeia	121
Grand Total	907

TABLE 22: USE OF DCV FORM; COMMON ISSUES FOUND AND CORRECTIVE ACTIONS TAKEN

Errors/Issues Observed	Corrective Actions Taken
<ul style="list-style-type: none"> Names of head of households are not filled for the non-sprayed houses Cards are not given to the non-sprayed houses 	<p>These issues were addressed at morning assembly to Team leaders and SOPs, and it was emphasized to the SOPs to give IRS cards to households whether they spray or not.</p>
<ul style="list-style-type: none"> Observed the difference of 1-2 in population figures (number of men, women) between DCV and SOP forms. Found that some SOPs were only counting adult males and females without counting children, especially those less than 5 years. 	<p>The issue was discussed with spray teams and SOPs were encouraged to probe further when collecting population figures to ensure that it included all those living in the structure (adults and children).</p>
<ul style="list-style-type: none"> In some cases, the IRS code on the IRS card given to the household did not match the IRS code recorded by the SOP on his/ her SOP form. 	<p>The issue was discussed with spray teams and SOPs were asked to pay attention in recording IRS codes during data collection.</p>
<ul style="list-style-type: none"> Some household names were not written correctly. For example, Issufo written as Ossufo or Tisufo. 	<p>These issues were addressed at morning assembly to Team Leaders and SOPs. It was emphasized to them to pay attention when writing the household head names. Sometimes they can ask for IDs to confirm and write the name correctly.</p>
<ul style="list-style-type: none"> Some structures indicated they refused to spray, but did not give any reason. Other unsprayed structures indicated that they were not available at the time of the SOPs visit, but were willing to be sprayed. Also, some of the unsprayed structures were not recorded by SOPs and they did not have household IRS cards. 	<p>For the structures that were willing to spray, SOPs were sent back to spray. For the structures that refused to spray, spray teams were encouraged to capture their information to avoid having missed structures</p>

8.2.1 DATA ENTRY

As in previous years, the AIRS Mozambique M&E team worked with Abt’s internal Client Technology Center to develop a Microsoft Access-based database system. The project procured additional laptops, adding to the stock of data entry clerk laptops that were available from previous campaigns. Thirty-seven data entry clerks were employed at five data entry sites, one site in each district, with four to 11 data entry clerks assigned per site depending on the amount of data a district collected per day.

Data were entered simultaneously at each of the five districts. The database was designed to allow two levels of data entry; *totals* and *details* data. *Totals* data was meant to facilitate quick reporting for program decisions, while *details* data was used for the final End of Spray Report.

Data cleaning was done at the district-level during and after spray. It involved the following:

- Ensuring that all data cards were entered correctly (by the double entry method (both by *totals* and by *details*)).
- Making necessary corrections to ensure that the *totals* and *details* data entry were in agreement.
- Checking and removing duplicate records.
- Identifying and entering missing records.

Data cleaning was done using a Microsoft Access-based IRS Cleaning/Reporting tool. The Data Entry Clerks and M&E Assistants cleaned spray data daily throughout the spray campaign with final data cleaning completed in less than 14 days after the spray campaign was completed in each district.

This database system used a server system for a single data storage site at each of the five data entry centers and a cloud-based file transfer system to compile data from all five data entry centers to create IRS progress reports at the national level.

8.2.2 DATA STORAGE

Paper data forms are stored in three-ring binders. Spray data were filed by date and base name.

At the end of every day, all databases were backed up electronically. Backup was performed in three different ways: first, into a backup folder on the district data entry server; second, into a cloud back-up system (Sugar Sync); and third, onto an external flash drive that was provided to each District M&E Assistant.

8.2.3 REPORTING

Regular district-level reporting was carried out on a daily basis for both internal planning purposes and external reporting using the automated reports in the AIRS Access Cleaning/Reporting Tool. These push button reports were created by the M&E manager to provide feedback to the District Coordinators to facilitate program management and decision-making.

On a national-level, data across all five districts were aggregated to produce Weekly IRS Progress Reports for PMI and DPS.

8.3 RESULTS

The complete list of all program indicators for the 2014 spray campaign is presented in the Monitoring and Evaluation Plan matrix in Annex A-3. The following sections provide summaries on the core PMI indicators and other spray indicators.

8.3.1 SPRAY OPERATION DATA

- During the spray campaign a total of 477,930 structures were found by spray operators, of which 445,118 were sprayed, representing 93.13% spray coverage.
- The total population protected by IRS (all ages) was 2,327,910. A total of 404,707 children under the age of five years and 159,830 pregnant women were protected.

Table 23 provides the summary of the 2014 spray operations data per district, following data cleaning and verification.

TABLE 23: 2014 SUMMARY OF IRS SPRAY RESULTS PER DISTRICT

District	Structures Found by SOP	Structures Sprayed	Spray Coverage	Total Population Protected	Males Protected	Females Protected	Pregnant Women Protected	Children <5 Years Protected	Population Not Protected	Total Pop	% Population Protected
Morrumbala	114,416	107,650	94.09%	464,301	230,789	233,512	33,217	84,872	20,071	485,002	95.73%
Milange	136,522	130,151	95.33%	664,359	331,411	332,948	43,216	115,020	6,689	671,048	99.00%
Mocuba	140,365	128,638	91.65%	788,106	381,127	406,979	58,055	143,612	68,668	856,774	91.99%
Quelimane	49,276	44,076	89.45%	261,060	122,500	138,560	16,535	35,235	27,468	288,528	90.48%
Mopeia	37,351	34,603	92.64%	149,989	74,473	75,516	8,807	25,968	4,079	154,068	97.35%
Grand Total	477,930	445,118	93.13%	2,327,815	1,140,300	1,187,515	159,830	404,707	127,605	2,455,420	94.80%

8.3.2 OTHER SPRAY INDICATORS

Data on insecticide use and spray operator performance are presented in Table 24.

TABLE 24. INSECTICIDE USE PER DISTRICT

Indicator	Districts					Total for all 5 Districts
	Morrumbala	Milange	Mocuba	Quelimane	Mopeia	
Total Sachets in Stock in Quelimane Central Warehouse at Campaign Start	n/a	n/a	n/a	n/a	n/a	404,629
Total Sachets Distributed to Districts	81,746	112,679	119,315	50,240	28,892	392,872
Total Sachets Used	73,795	109,798	111,771	38,080	23,363	356,807
Total Sachets Damaged/Lost	9	6	41	11	7	74
Total Sachets Existing Stock Remaining in Quelimane	n/a	n/a	n/a	n/a	n/a	47,748
Avg. # Structures Sprayed/Sachet	1.5	1.2	1.2	1.2	1.5	1.3
Avg. # Structures Sprayed by Spray Operators/Day	12.3	10.7	10.8	10.7	11.3	11.2
Avg # Sachets per Spray Operator/Day	8.4	8.8	9.3	9.2	7.5	8.6
Avg # of Spray Operators who Worked/ Day	195.0	254.8	247.6	85.6	61.4	160.3

8.4 ENHANCED MALARIA REPORTING SYSTEM

In 2014, AIRS Mozambique continued to assist and supervise malaria data collection in eight districts (24 health facilities) in Zambezia to assess whether the epidemiological data collected at the health facility follows our primarily collected entomological data. The DPS was insistent that during this period the AIRS Enhanced Surveillance (ES) team continued to monitor sites outside of the selected 24 health facilities to assess whether the number of reported malaria cases had decreased in IRS districts as compared to non-IRS districts. This point needs to be revisited with the DPS under the PMI AIRS Project. Below are some key recommendations from the June 2014 to January 2015 Semi-Annual Report, including actions taken by the AIRS Mozambique team to address the recommendations.

8.4.1 KEY RECOMMENDATIONS

- Data Collection at Health Facility (HF) level: All clinicians should be trained on the use of new data collection forms. The Malaria Focal Persons, who received a TOT training on the use of new malaria data collection tools, did not train clinicians in their respective districts. The training of clinicians will reduce data collection errors. Also, follow-up supervision should be conducted at the health facilities that are failing to report monthly.
 - During the week of October 6, 2014, the AIRS Mozambique ES M&E Assistant conducted a refresher training for DPS and SDSMAS staff on the malaria collection tools.
- The DPS has very limited transport available for all health-related activities (HIV, cholera, health planning) and a reduced budget for fuel. Routine access to HFs using DPS vehicles is not feasible.

- In discussions between the ES Coordinator and the DPS in December 2014 the DPS stated that they need support for the already formed M&E teams in terms of fuel and per diem. The AIRS ES Coordinator is presently joining these teams for routine supervision as part the ES activity.
 - Access to some sites during the rainy season (December – March) is only possible by motorbike. During this period the DPS does not access these facilities due to lack of a suitable means of transport.
 - AIRS Mozambique has recently seen the inclusion of the ES activity in the monthly DPS supervision plan, which is seen as a success in terms of the DPS acknowledging the importance of the activity. In most cases, the DPS relies on transport / fuel from either AIRS or another implementing partner for the supervision efforts. AIRS Mozambique will encourage the continuation of this supervisory planning and suggest that the planning is done on a quarterly basis in order to avoid lack of transport due to conflicting activities amongst the partners.
 - AIRS will continue work with the DPS to develop innovative ideas in order to overcome the extensive transport challenges.
- The various malaria data collection forms used by HF and district personnel have design issues that hamper their use in accurately collecting data. For example, the district-level monthly reporting form that facilitates the aggregation of the monthly HF data has a space to record the number of HFs reporting a stock out of ACTs for the month, but the monthly HF form does not have a space to record that the individual HF experienced a stock out. Also, to further complicate matters, the various forms issued by the government to collect malaria data have multiple ways of collecting the same indicator (i.e. a tick sheet for a particular indicator and then a monthly summary form) and often the data for the indicators are inconsistent between the various forms used. Additionally, the ES Coordinator has observed that the data on the various data collection and reporting tools (patient registry, pharmacy log, monthly malaria reports) are likewise inconsistent.
 - AIRS Mozambique created a checklist that helps to identify data inconsistencies.
 - Lack of organized storage spaces for registers and files have resulted in lost data.
 - A simple recommendation is for AIRS Mozambique to advocate for the purchase of file cabinets specifically for the malaria data at each HF. If the DPS is unable to include this procurement in their annual budget, AIRS Mozambique may solicit PMI approval to make this purchase under the PMI AIRS Project, which would be an easy fix for one of the causes of data loss.
 - Identify a smaller number of health facilities with high quality data and proper record keeping and focus our efforts on these sites in the next year
 - AIRS Mozambique has been working with health facilities and collecting their epidemiological data in Zambezia for two years. Going forward, the team will work with PMI Washington and PMI Mozambique the best way to ensure that we are analyzing the best quality data to give us an accurate picture of the malaria incidence in our spray districts as compared to non-spray districts.

9. FINANCE AND PAYMENT STRATEGIES

The financial unit worked closely with the technical and operational teams throughout the year. In 2013, AIRS Mozambique signed an MOU with the MOH / NMCP, which allowed for the DPS to contract the temporary operations staff (SOPs, Supervisors, Team Leaders, Pump Technicians) directly. AIRS Mozambique was only responsible for making the payments in two cycles, the dates of which were determined by the DPS. As was implemented during previous campaigns, the AIRS Mozambique program explored different strategies for paying the large number of temporary staff during the spraying season, including paying cash through a security agent; using funds transferred into field workers' bank accounts; and mobile banking units. Due to the limitations of the banking system in Mozambique, the most viable option was to pay cash with the help of a security agent.

According to local labor law restrictions on AIRS Mozambique to contract temporary staff directly, AIRS Mozambique used a temporary agency in 2014, as was done in 2013, for contracting the more specialized temporary staff for the campaign, including the Database Coordinators, M&E Assistants, and Data Entry Clerks. This method continued to be a highly effective and efficient method for contracting these staff.

10. CHALLENGES

The following are a few of the key challenges, including proposed solutions, faced during the 2014 campaign:

- 1. Collection of accurate spray data:** As was reported in previous years, some spray operators were found to be forging spray data. This was detected in Mocuba spray site, and as a result, spray operators were dismissed and previous spray data was audited.

Solution: In order to ensure the spray operators were reporting correct data, AIRS Mozambique reinforced site supervision and monitored the structures reported as sprayed by the spray operators on a daily basis.
- 2. Theft of insecticide:** Spray operators were identified with stolen sachets of insecticide. Even with coding of the sachets SOPs continued with attempts of theft. They take out the content of the sachet and bring back the empty sachets to the site.

Solution: SOP contracts should include a clause stating that in case of theft, the SOP will be immediately dismissed and will forfeit any future earnings, as well as earnings for previous days worked.
- 3. Non recording of unsprayed structures:** During supervision field visits, staff found that some SOPs were not recording unsprayed structures. Most SOPs would revisit these structures the same day to spray the structure and it would be marked as sprayed; however, a few SOPs neglected to record the structure if the house was still closed when they returned the second time. This resulted in a lower than expected number of eligible structures found.

Solution: For next year's TOT, the M&E manager will emphasize the importance of recording ALL visited structures and will ask that all supervisors stress this in the SOP trainings as well. Furthermore, during the supervision, supervisors will be responsible for making sure that proper marking and recording of sprayed and unsprayed structures happens consistently throughout the campaign.
- 4. Refusals in the first week of the campaign:** In Quelimane District there was a high number of refusals in some villages during the first week of the campaign due to the community leaders' delay in mobilization efforts. The refusals were also related to the conflict between the three political parties in the district.

Solution: Community mobilization was reinforced in these villages with an increased number of radio spots. The AIRS Mozambique team also managed to get a radio spot to announce the spray calendar for Quelimane District. This will be the standard practice for the next spray rounds, as well as gathering the three political parties prior to spray in order to clarify the importance of their collaboration for the success of this activity and the mobilization process.

II. LESSONS LEARNED

The following are a few of the key lessons learned during the 2014 campaign:

1. **Marking of all structures:** AIRS Mozambique will include in both the TOT and the SOP training the standardized practice of marking all eligible structures, regardless of whether or not the structures were sprayed. Previously, SOPs only marked sprayed structures, and it was difficult to find out if a SOP had visited certain structures that had not been sprayed. In order to avoid these circumstances, AIRS Mozambique will require that SOPs mark all eligible structures with the IRS number and once the structure has been sprayed, the structures will be marked with “IRS 2015” in order to let SOPs and supervisors know which structures have been treated.
2. **Pregnant women during spray activities:** As mentioned earlier, in one district, a pregnant woman did not disclose her pregnancy as she feared she would be dismissed from her post. Based on this, it will be mandatory to have one health technician from the district level witness pregnancy testing in order to validate the results. Also, AIRS Mozambique will discuss with the DPS the importance of finding jobs for female seasonal workers that have positive pregnancy tests so that they can receive their entire expected wage.
3. **List of PPE received for SOP:** Some SOPs were found with incomplete PPE in the field alleging to have not received all the items. In order to avoid such situations each SOP will sign a PPE checklist confirming to have received all the items. The same process will be done when returning the non-consumable equipment/materials.

12. RECOMMENDATIONS

The following are a few of the key recommendations that were included in the 2013 EOSR that were followed this year with positive results:

1. **Creation of additional bases:** Per the recommendations of the DPS, a base was created in Alto Benfica, Mocuba District, to enhance our ability to serve the target population. This was done with full Best Management Practices (BMP) compliance.
2. **Mid-term meeting:** Last year it was recommended by the DPS that the mid-term meeting should be held prior to week five of the campaign, as it was in 2013. This year the mid-term meeting took place in week four per the DPS plan. See Section 4.1 for a complete summary of the mid-term meeting.
3. **Ensure quality PPE:** In 2013, there were reports of poor quality PPE during the first few weeks of the campaign. This was partly due to the internal decision to re-use the RTI work suits, which mostly were in fine condition but appeared old. This year a full set of work suits were purchased for the SOPs.
4. **Greater transparency of SDSMAS Warehouse Assistants:** Recruitment of warehouse assistants needs to be more transparent amongst the SDSMAS staff. In 2014 AIRS Mozambique worked closely with the DPS in order to select warehouse assistants based on merit, not family relations. This proved to be a successful intervention as the warehouse assistants recruited in 2014 were new staff, eager to learn and succeed.
5. **Increased stock of smaller size boots:** Having boots in the correct size to fit all spray operators is a recurring problem in many AIRS programs, and was observed by the PMI team in Mozambique by the lack of smaller sizes for women. Ensuring that a buffer of smaller-sized boots was in stock before the start of the spray campaign was a top priority for the 2014 campaign. An assessment was conducted prior to purchasing boots to ensure appropriate sizes, ranging from size 36 – 42..
6. **Professional development:** It was advised by PMI that in order to maintain the skilled AIRS Mozambique entomology staff, in particular the head of the insectary, it was recommended that they are provided opportunities to work with the INS in Maputo to strengthen their skills and help with the backlog of work there. In light of this recommendation, the AIRS Entomological Coordinator relocated to Maputo in 2014 and worked closely with the INS and the NMCP entomological staff.

The following are key recommendations for the next campaign based on feedback from the MOH / DPS and internal reviews conducted in 2014:

1. **Addition of a second spray balance meetings:** In order to rectify any issues in a timely manner, the DPS recommends having the first meeting after two spraying weeks, and a second meeting should be added and take place the fourth week. The End of Spray meeting will be held as usual post campaign.
2. **Payment of subsidies:** The payment of the DPS/SDSMAS technicians involved in the IRS supervision needs to be approved by the Province Medical Chief Officer prior to its completion. This is based on the fact that some of the supervisors are not greatly involved in the process of supervision even after going through the TOT process. This would enable the project to pay only the most effective supervisors. A supervision tool will be used for the district supervisors and sent to the DPS for review.

3. **Creation of new districts:** Two new districts were created, one in Morrumbala (Derre District) and the other in Milange (Molumbo District). The DPS recommended that for the next spray rounds these two new districts be considered as separate from their original districts. This modification needs to be discussed with the PMI team during discussions for Year One planning under the PMI AIRS Project.
4. **Creation of additional base:** It is extremely difficult to reach the Lua-Lua Localit in Mopeia District. As a result, the participants of the mid-term meeting proposed the creation of a new base in that locality next year.

ANNEX

TABLE A-1: INTERNATIONAL AND LOCAL PROCUREMENT INVENTORY

Items	Quantities Received	Items	Quantities Received
<i>International Procurement</i>		<i>Local Procurement (continued)</i>	
		Insecticide stock card A5	1,500
Mouth nose mask	56,880	Insecticide stock card A4	1,500
Insecticide (<i>Deltamethrin</i>) sachets	403,700	First aid kit	78
Nozzles 8002E HSS	900	T-shirt	1,500
<i>Local Procurement</i>		Rubber gloves	1,168
Scissors	20		
3V Battery	9,299		
Bathing soap (units)	2,580		
Towels	1,000		
Plastic 100 meter sheets	14		
Tool kits	10		
Clipboards	207		
Detergent (sunlight 150 grms pcs)	193		
Pregnant test	1,030		
Markers	7,090		
White Chalk (boxes of 100 pcs)	470		
SOPs working suits 2 pcs	600		
Engine oil for pump lubricating (liters)	40		
Rubber boots (pairs)	511		
Flash lights	14		
Black files	350		
Padlocks	58		
Plastic masks	75		
Calculators	100		
Insecticide stock card A5	1,500		

TABLE A-2: POST-SPRAY PROJECT EQUIPMENT AND MATERIALS INVENTORY

Description	Initial Stock	Additional/Supplementary Qty	Total Stock	Material distributed	Total Returned Useable	Total Damages/used	Stock Balance
Megaphones	99	0	99	83	83	0	99
Markers	11	7090	7101	2422	0	0	4679
Charcoal pencils	555	0	555	460	0	460	95
Adhesive tape	214	0	214	78	0	78	136
Scissors	5	20	25	25	0	25	0
Calculators	108	100	208	175	77	98	110
Clipboards	0	207	207	207	0	207	0
First Aid Kits	23	78	101	101	0	101	0
Pregnancy test	230	1030	1260	1249	0	1249	11
Plastic Aprons	95	0	95	89	55	34	61
Team leader ID reflectors	290	0	290	192	177	15	275
Paper masks	9384	56880	66264	60768	23400	37368	28896
Gloves short	461	1168	1629	1507	45	1462	167
Gloves long	118	0	118	98	88	10	108
Liquid soap 5L	0	0	0	0	0	0	0
Funnels with filter	480	0	480	283	165	118	362
Detergent (150g)	7825	193	8018	7867	152	7715	303
Batteries	568	9299	9867	9553	0	9553	314
Flashlight	85	14	99	85	54	31	68
Strainers (big)	50	0	50	45	44	1	49
Towels	331	1000	1331	977	0	977	354
Leather boots	3	4	7	3	0	3	4
Rubber boots	1148	511	1659	1506	1378	128	1531
Work suit 2pcs	1318	600	1918	1899	1090	809	1109
Bags	1544	0	1544	1272	1247	25	1519
Hat	2452	0	2452	1745	1590	155	2297
Brace Metal	2000	0	2000	1394	1208	186	1814
Visors	1828	0	1828	1405	1118	287	1541
Helmets	1357	0	1357	1253	1055	198	1159
Hand grass mower	28	0	28	22	19	3	25
Machetes	22	0	22	22	14	8	14
Rakes	19	0	19	19	14	5	14
Hoes	19	0	19	19	13	6	13
Shovel	38	0	38	38	32	6	32
Rope 100m	0	22	22	22	0	22	0
Pipe wrenches	0	0	0	0	0	0	0

Description	Initial Stock	Additional/Supplementary Qty	Total Stock	Material distributed	Total Returned Useable	Total Damages/used	Stock Balance
Screwdriver / wrench	17	0	17	17	16	0	16
Hammers	25	0	25	10	9	1	24
Pliers	0	10	10	10	8	2	8
Wrench, (size 10/11)	7	0	7	0	0	0	7
Star spanner	0	10	10	10	0	10	0
Spray pumps spare parts kits	40	0	40	36	0	36	4
8002E Spare Pump Nozzles	1576	900	2476	932	822	110	2366

TABLE A-3: MONITORING AND EVALUATION PLAN (MEP) MATRIX

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
Component 1: Establish cost-effective supply chain mechanisms including procurement, distribution and storage of IRS-related commodities and execute all aspects of logistical plans for IRS-related activities.											
I.1 Procurement											
I.1.1 Number and percentage of international insecticide procurement orders delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<p>[<i>Numerator</i>: Number of international insecticide procurement orders delivered in country, at port of entry, at least 30 days prior to the start of spray operations]</p> <p>[<i>Denominator</i>: Total number of international insecticide procurement orders]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] x 100</p>	Y1, Y2, Y3	<p><i>Data source</i>: Project records – ex: international procurement documents, air way bills, commercial invoices</p> <p><i>Reporting frequency</i>: Each spray season (annual/ semi-annual)</p>	By Spray Campaign	AIRS	I; 100%	I; 100%	n/a (insecticide will be donated by the MOH)	n/a (insecticide was donated by the MOH)	I; 100%	I; 100%

⁴ See Annex B, Table 2 for training plan details from the 2012 AIRS Mozambique Work Plan that provided applicable training indicator targets.

⁵ Results for Year 1 will be added to the matrix after the completion of the 2012 End of Spray Report.

⁶ Targets for Year 2 will be added to the matrix after the 2013 Work Plan has been approved.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
1.1.2 Number and percentage of international procurement orders for equipment, including PPE, received at port of entry, 30 days prior to start of spray operations.	<p>[<i>Numerator</i>: Number of international procurement orders for equipment, including PPE, at port of entry, 30 days prior to start of spray operations]</p> <p>[<i>Denominator</i>: Total number of international procurement orders for equipment, including PPE.]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] × 100</p>	Y1, Y2, Y3	<p><i>Data source</i>: Project records</p> <p><i>Reporting frequency</i>: Each spray season (annual/ semi-annual)</p>	By Spray Campaign	AIRS	1; 100%	1; 100%	2; 100%	2; 100%	1; 100%	1; 100%
1.1.3 Number and percentage of local PPE procurement orders that are delivered to the main warehouse 14 days before the start of spray operations	<p>[<i>Numerator</i>: Number of local PPE procurement orders delivered 14 days before the start of spray operations]</p> <p>[<i>Denominator</i>: Total number of local PPE procurement orders.]</p> <p><i>Calculation</i>: [Numerator ÷ Denominator] × 100</p>	Y1, Y2, Y3	<p><i>Data source</i>: Project records – ex: such as delivery notes, goods receiving notes, inventory control cards</p> <p><i>Reporting frequency</i>: Each spray season (annual/ semi-annual)</p>	By Spray Campaign	AIRS	#N.A. ⁷ ; 100% delivered to the main warehouse 14 days before the start of spray operations	100%	3; 100%	3; 100%	3; 100%	3; 100%

⁷ Number of local procurements not targeted in Year 1.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
1.1.4 Successfully completed spray operations without an insecticide stock-out	Milestone: (Achieved/Not Achieved)	Y1, Y2, Y3	<i>Data source:</i> Project records – ex: inventory control cards <i>Reporting frequency:</i> Each spray season (annual/ semi-annual)	By Spray Campaign	AIRS	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
1.2 In-country Logistics, Warehousing, and Training											
1.2.1 Number and percentage of logistics, warehouse managers, and storekeepers trained in IRS supply chain management	<i>[Numerator:</i> Total number of logistics and warehouse managers trained in IRS supply chain management using AIRS Project resources.] <i>[Denominator:</i> Total number of AIRS logistics and warehouse managers.] <i>Calculation:</i> [Numerator ÷ Denominator] × 100	Y1, Y2, Y3	<i>Data source:</i> Routine training records <i>Reporting frequency:</i> Semi-annually	By Spray Campaign By Gender	PMI	29; 100%	34; 100% (31 male, 3 female; 8.8% female)	25; 100%	25; 100% (24 male, 1 female; 4% female)	31; 100%	32; 100%
1.2.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<i>[Numerator:</i> Number of base stores where physical inventories are verified by up-to-date stock records] <i>[Denominator:</i> Total number of base stores audited.] <i>Calculation:</i> [Numerator ÷ Denominator] × 100 (See PIRS for details on sample size for operational audits)	Y2, Y3	<i>Data source:</i> Project records - ex: inventory control cards <i>Reporting frequency:</i> Each spray season (annual/ semi-annual)	By Spray Campaign	AIRS	N.A.	33; 100%	21; 100%	21; 100%	24; 100%	24; 100%

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
1.2.3 Submit up-to-date inventory records to AIRS Home Office 30 days after the end of each spray campaign	Milestone: (Completed/Not Completed)	Y2, Y3	Data source: Project records - ex: warehouse inventory control cards Reporting frequency: Each spray season (annual/ semi-annual)	By Spray Campaign	AIRS	N.A.	Not Completed	Completed	Completed	Completed	Completed
Component 2: Implement safe and high-quality IRS programs and provide operational management support											
2.1 Planning and Design of IRS Programs											
2.1.1 Annual IRS country work plan developed and submitted on time	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: Project records Reporting frequency: Annually		AIRS	Completed	Completed	Completed	Completed	Completed	Completed
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations											
2.2.1 SEA/letter report submitted on time ⁸	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: Project records – submitted SEAs/ letter reports Reporting frequency: Each spray campaign	By Spray Campaign	AIRS	Completed	Completed	Completed	Completed; Submitted on July 16, 2013.	Completed	Completed
2.2.2 Number and percentage of soak pits and warehouse/storerrooms inspected and certified prior to spraying	[Numerator: Number of soak pits or storehouses inspected and certified by AIRS Environmental Compliance Office prior to spraying]	Y1, Y2, Y3	Data source: Project records – Reports submitted by environmental officers Reporting frequency: Each spray season	By Spray Campaign By soak pits and warehouses/storerrooms	AIRS	33 storerooms; 28 soak pits; 100%	33 storerooms; 28 soak pits; 100% inspected	21 storerooms; 20 soak pits; 100% inspected and certified prior	21 storerooms; 20 soak pits	25 storerooms; 24 soak pits; 100%	25 storerooms; 24 soak pits; 100%

⁸ In Year 1, SEAs were due 30 days prior to the commencement of spraying and letter reports were to be submitted 14 days prior to the commencement of spraying. In Year 2 and Year 3, due dates agreed upon with Washington-PMI will be noted in each country-specific Monitoring and Evaluation Plan to assess indicator 2.2.1.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
	[Denominator: Total number of project soak pits or warehouses/ storerooms] Calculation: $[\text{Numerator} \div \text{Denominator}] \times 100$					inspected and certified prior to spraying	and certified prior to spraying.	to spraying	100% inspected and certified prior to spraying	inspected and certified prior to spraying	inspected and certified prior to spraying
2.2.3 Number of government environmental and health officers trained in IRS environmental compliance	Total number of government environmental and health officers trained in IRS environmental compliance using AIRS Project resources	Y1, Y2, Y3	Data source: Project training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender	AIRS	30	27 (20 Male, 7 Female; 26% Female)	30	23 (18 Male, 5 Female; 22% Female)	34	43
2.2.4 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation	Total number of spray personnel who attend a training in environmental compliance and personal safety standards in IRS implementation using AIRS Project resources, includes all staff who received environmental compliance training - spray operators, team leaders, washpersons, and storekeepers.	Y1, Y2, Y3	Data source: Project records – Training reports Reporting frequency: Each spray season	By Spray Campaign By Gender	AIRS	1,120	1,244 ⁹ (932 male, 312 female, 25.1% female)	1,195	1,223 ¹⁰ (934 male, 289 female, 23.6% female)	1,396 ¹¹	1,470 (868 male; 602 female; 41% female)

⁹ Includes 24 (20 male, 4 female) TOT attendees, 1,097 (860 male, 237 female) receiving SOP training, 34 warehouse keepers (31 male, 3 female), 89 washers (21 male, 68 female)

¹⁰ Includes 31 (25 male, 6 female) TOT attendees, 1,097 (866 male, 231 female) receiving SOP training, 25 warehouse keepers (24 male, 1 female), 70 washers (19 male, 51 female)

¹¹ Original target was 1,543 but this had a calculation error. Revised target includes 1,025 spray operators, 171 team leaders, 28 base supervisors, 29 MOH supervisors, 85 washers, 31 storekeepers. The "achieved" quantity includes 1,308 spray operators, team leaders and base supervisors, 43 MOH supervisors, 87 washers, 32 storekeepers.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
2.2.5 Number of health workers receiving insecticide poisoning case management training	Total number of clinical personnel trained in insecticide poisoning case management using AIRS Project resources	Y2, Y3	<i>Data source:</i> Project records – Training reports <i>Reporting frequency:</i> Each spray season	By Spray Campaign By Gender	AIRS	58 ¹²	27 (20 Male, 7 Female; 26% Female)	30	23 (18 Male, 5 Female; 22% Female)	29	24 (100% male)
2.2.6 Number of adverse reactions to pesticide exposure documented	Total number of incidents of pesticide exposure reported that resulted in a referral for medical care	Y1, Y2, Y3	<i>Data source:</i> Incident report forms that are required for each incidence of pesticide exposure <i>Reporting frequency:</i> Each spray season	By Spray Campaign By residential/occupational exposure	AIRS	0	0	0	0	0	5
2.2.7. Number of vehicular accidents reported	Total number of vehicular accidents reported	Y1, Y2, Y3	<i>Data source:</i> Vehicular incident report forms that are required for each accident <i>Reporting frequency:</i> Each spray season	By Spray Campaign	AIRS	0	0	0	2 ¹³	0	0
2.3 Support Entomological Monitoring Activities and Insecticide Resistance Strategies											
2.3.1 Number of sentinel sites supported by the AIRS project	Total number of entomological sentinel sites supported by the AIRS project	Y1, Y2, Y3	<i>Data source:</i> Entomological reports <i>Reporting frequency:</i> Annually	By Spray Campaign	AIRS	14	11	4	4	4	4

¹² Figure is from planning session, not listed in the 2012 Work Plan.

¹³ 1 incident in Milange occurring on Nov 18, 2013 and 1 incident in Mocuba occurring on Oct 18, 2013. Both were reported to PMI in a timely manner.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
2.3.2 Number and percentage of entomological monitoring sentinel sites measuring all five primary PMI entomological indicators	[Numerator: Number of entomological monitoring sites measuring all five primary PMI entomological indicators] [Denominator: Number of entomological monitoring sentinel sites] Calculation: [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	AIRS	6; (6/14= 43%)	4; (4/14 = 28.5%)	3; (3/4=75%)	3; (3/4=75%)	4	4; (4/4=100%)
2.3.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	[Numerator: Number of entomological monitoring sites measuring at least one secondary PMI indicator] [Denominator: Number of entomological monitoring sites] Calculation: [Numerator ÷ Denominator] x 100	Y1, Y2, Y3	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	AIRS	0 out of 0; n.a.%	0 out of 0; n.a.%	0;0%	0 out of 0 planned; n.a.%	0 out of 0 planned; n.a.%	0 out of 0 planned; n.a.%
2.3.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides ¹⁴	[Numerator: Number of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control.]	Y1, Y2, Y3	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign By Type of Insecticide	AIRS	0 out of 0; n.a.% ¹⁵	0 out of 0; n.a.% ¹⁶	4;(4/4=100%) ¹⁷	4;(3/4=75%) ¹⁸	4; (4/4=100%)	4;(2/4=-50%)

¹⁴ Organochlorines class (DDT), organophosphates class (malathion, fenithrothion, pirimiphos-methyl), carbamates class (propoxur, bendiocarb), pyrethroids class (deltamethrin, alpha-cypermethrin).

¹⁵ AIRS Mozambique will not test all 4 classes of insecticide. Plan is to test only carbamates and pyrethroids at all 4 sites.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
recommended for malaria vector control	[Denominator: Number of insecticide resistance testing sites] Calculation: [Numerator ÷ Denominator] x 100										
2.3.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Total number of wall bioassay studies conducted in established sentinel sites to evaluate quality of IRS spraying activities	Y1, Y2, Y3	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	PMI	10 (tests conducted in 10 houses located in the 6 targeted districts)	12 (tests conducted in 12 houses in 3 targeted districts)	12 (test conducted in 12 houses in 3 of 4 target districts, Quelimane not included)	15 test ¹⁹	15 (test conducted in 12 houses in 3 of 4 target districts, Quelimane not included)	30 (test conducted in 30 houses in 4 of 5 target districts, Quelimane not included)
2.3.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Total number of wall bioassay studies conducted at monthly intervals in established sentinel sites to evaluate the rate of insecticide decay on sprayed surfaces	Y1, Y2, Y3	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	PMI	40 (in 10 houses at months 1, 2, 3, 4, etc.)	60 (in 12 houses at months 1, 2, 3, 4 and 5)	60 (in 12 houses at months 1, 2, 3, 4 and 5)	On process ²⁰	75 (in 15 houses at months 1, 2, 3, 4 and 5)	80 (in 30 houses at months 0, 1, 2)

¹⁶ AIRS Mozambique did not test all 4 classes of insecticide. Only pyrethroids were tested at 3 of the 4 sites.

¹⁷ 4 Sites; 100% to test organochlorine, organophosphate, carbamates and pyrethroid classes.

¹⁸ 4 Sites; in 3 out of the 4 sites (75%) tested insecticides belonging to the organochlorine, carbamates, organophosphate and pyrethroid classes of insecticide; in one site (in Milange) only tested insecticide belonging to the pyrethroid class of insecticide.

¹⁹ 1 test per house, 5 houses in each the 3 districts; 3 of 4 target districts used for testing, Quelimane not included.

²⁰ As of January 15, 2014, 30 tests have been completed in 15 houses in months 1 and 2. There are plans to complete the tests in all 15 houses in months 3, 4, 5 and 6 with the overall all goal being 90 total tests.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
2.3.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Total number of vector susceptibility tests conducted to gauge the effectiveness of individual insecticides proposed for use in spray operations	Y1, Y2, Y3	<i>Data source:</i> Entomological reports <i>Reporting frequency:</i> Per spray campaign	By Spray Campaign By Type of Insecticide	PMI	16 (4 sites each testing all 4 classes of insecticide)	5	16; (4 sites each testing all 4 classes)	16; (4 sites, 3 of them tested for all four classes and one tested for one class)	16; (4 sites each testing all 4 classes)	11; (3 sites, 2 testing all 4 classes and 1 tested one insecticide of one class)
2.4 Conduct Communications Activities and Community Mobilization											
2.4.1 Number of radio spots and talk shows aired	Total number of radio spots and talk shows aired in target spray districts to stress the safety and benefits of IRS, ensure successful spray coverage, timely vacating of premises and adherence to IRS safety precautions by community members	Y1, Y2, Y3	<i>Data source:</i> Project records ex: payment receipts <i>Reporting frequency:</i> Semi-annually	By Spray Campaign	AIRS	100 - radio spots ²¹ ; N.A. - talk shows	120 – radio spots 1 – talk show	0	1,650	1,000	958
2.4.2 Number of IRS print materials disseminated	Total number of IRS educational materials developed, printed and distributed to community members in target spray districts using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Project records <i>Reporting frequency:</i> Semi-annually	By Spray Campaign By Type of printed material and message(s)	AIRS	550,000 pamphlets ²²	290,450 pamphlets	N.A. ²³	N.A.	N.A.	56,000 ²⁴

²¹ From 2012 Work Plan budget.

²² 300,000 pamphlets in stock and budgeted for 250,000 pamphlets in 2012 Work Plan budget.

²³ AIRS Mozambique will not be distributing IRS printed materials as part of the IEC/BCC outreach in 2012.

²⁴ These pamphlets were printed in year one.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
2.4.3 Number of people reached with IRS messages via door-to-door mobilization	Total number of adults reached with IRS message during pre-spray community, door-to-door mobilization	Y1, Y2, Y3	Data source: Project records Reporting frequency: Monthly	By Spray Campaign By Gender	AIRS	889,318 (50% of target population 1,778,635)	2,118,280	N.A. ²⁵	N.A.	N.A.	N.A.
2.5 Spray Targeted Structures According to Technical Specifications											
2.5.1 Number of structures targeted for spraying ²⁶	Total number of structures found in targeted districts by Spray Operators	Y1, Y2, Y3	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	PMI	608,344	585,299	458,218 ²⁷	464,295	503,299	477,930
2.5.2 Number of structures sprayed with IRS ²⁸	Total number of structures sprayed in targeted districts	Y1, Y2, Y3	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	PMI	517,092 (85% of 608,344)	536,558	389,458 (85% of 458,218)	414,232	427,804 (85% of 503,299)	445,118
2.5.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	[Numerator: Total number of structures sprayed in targeted districts] [Denominator: Total number of structures in targeted areas found by spray operators] Calculation: [Numerator ÷ Denominator] × 100	Y1, Y2, Y3	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	PMI	85%	92%	85%	89.2%	85%	93.1%

²⁵In 2013, the MOH will be taking the lead on mobilization efforts through the IEC Coordinators. AIRS Mozambique will not be leading any door-to-door mobilization efforts.

²⁶ The yearly targets for this indicator are from the applicable work plan, in this way the variation in targeted spray areas from year-to-year can be taken into account. The yearly results are the number of structures found by spray operators during the spray campaign.

²⁷ Note that this target is different from that approved in the Work Plan 2013 due to the addition of several bases post micro-planning meeting.

²⁸ The target per year for this indicator is based on 85% of the number of structures to be targeted as noted in indicator 2.5.1.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
2.5.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Total number of people residing in structures sprayed (Actual numbers are collected during spray operations; population estimates are not used.)	Y1, Y2, Y3	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign By Number of pregnant women By Number of children <5 years old	PMI	1,778,635	2,716,176; including 174,370 pregnant women and 501,522 children under 5	1,814,881	2,181,896; including 139,499 pregnant women and 379,982 children under 5	2,496,939	2,327,815 159,830 404,707
Component 3: Provide ongoing monitoring and evaluation and quality control measures											
3.1 Submit Monitoring and Evaluation Plan (MEP) to PMI- Mozambique	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: Project records Reporting frequency: Semi-annual		AIRS	Completed	Completed	Completed	Completed	Completed	Completed
3.2 Submit a post-spray data quality audit (PSDQA) report to the AIRS M&E specialist in the home office within 60-180 days of completion of spray operations	Milestone: (Completed/Not Completed)	Y1, Y2, Y3	Data source: Spray operations reports Reporting frequency: Per spray campaign	By Spray Campaign	AIRS	N.A. ²⁹	N.A.	N.A. ³⁰	N.A.	Completed	Canceled due to flooding
3.3 Submit a country-specific Eligible Structure Definition Document	Milestone: (Completed/Not Completed)	Y1	Data source: Project records Reporting frequency:		AIRS	Completed	Completed	N.A.	N.A.	N.A.	N.A.

²⁹ AIRS Mozambique has been chosen to carry out the PSDQA in Year 2.

³⁰ Originally AIRS Mozambique had planned to carry out the PSDQA in Year 2. However, due to the dismissal of the M&E Manager and Database Manager, the project was short staffed for this activity and requested from PMI that it be carried out in Year 3 should continuing program funds allow.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
to local PMI advisors and NMCP			Semi-annually								
3.4 Supply chain review conducted by RTT	Milestone: (Completed/Not Completed)	Y1, Y2	<i>Data source:</i> RTT supply chain review reports <i>Reporting frequency:</i> Semi-annually	By Spray Campaign	AIRS	Completed	Completed	N.A.	N.A.	N.A.	N.A.
Component 4: Contribute to Global IRS Policy-Setting and Country-Level Policy Development of Evidence-Based IRS; Disseminate Experiences and Best Practices											
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Total number of implementation guidelines, process checklists and program tools related to IRS operations developed or refined using the technical and/or financial resources of the AIRS Project	Y1, Y2, Y3	<i>Data source:</i> Project records – Activity reports <i>Reporting frequency:</i> Semi-annually	By Guideline/ checklist/ tool	AIRS	4 ³¹	6 ³²	9 ³³	12 ³⁴	N.A.	N.A.

³¹ 3 Environmental Compliance Officer checklists, 1 supervisory checklist.

³² 4 Environmental Compliance Officer checklists, 2 supervisory checklists

³³ 4 Environmental Compliance Officer checklists, 2 supervisory checklists, 3 M&E supervisory forms

³⁴ 7 Environmental Compliance Officer checklists - PSECA Report, End-of-Day Cleanup, Homeowner Preparation, Morning Mobilization, Storekeeper Performance, Transport Vehicle Inspection, and Post-IRS Inspection; 1 Operations tool- Storekeeper pocket guide; 4 M&E supervisory forms – AIRS Mozambique-specific Error Eliminator, Data Collection Verification Form, Data Entry Verification form and Data Center Supervisory form.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
4.2 Number of best practice presentations given at national/regional/international workshops and conferences	Total number of project-related oral and poster presentations delivered in national, regional and/or international meetings related to IRS.	Y2, Y3	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By IRS Technical Area	AIRS	N.A.	1 ³⁵	0	1 ³⁶	TBD	0

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

5.1 Capacity Building³⁷ (Gender Inclusion)

5.1.1 Number of people trained in IRS implementation	Total number of personnel trained in IRS implementation using AIRS Project resources. This figure only includes spray personnel such as spray operators, team leaders, supervisors, clinicians; it excludes data clerks, IEC mobilizers, drivers, washers, porters, pump technicians, security guards, etc.	Y1, Y2, Y3	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender Percentage of Women Trained	PMI	1,120	1,097; 860 Male; 237 Female; 22% Female	1,113 67% Male 33% Female	1,128; 891 Male; 237 Female; 21% Female	1,252 ³⁸	1,354 (839 male; 515 female; 38% female)
5.1.2 Number of	Total number of people	Y1, Y2, Y3	Data source: Project	By Spray	AIRS	2,093	1,953;	1,368	1,368;	1,598 ³⁹	1,677

³⁵ AIRS Mozambique – Country Lessons Presentation at AIRS Annual Conference in Durban, South Africa on December 4, 2012, Pedro Muianga), AIRS Mozambique Operations Manager.

³⁶ Presentation by Chief of Party, Cathy Clarence on the AIRS Mozambique program to the MOP team on May 3rd, 2013. The purpose of the presentation was to provide the NMPC and PMI a summary of AIRS progress to date, including lessons learned and best practices.

³⁷ See Annex B for the breakdowns of the training targets as presented in the 2012 AIRS Mozambique work plan.

³⁸ Original target was 1,426 but this had a calculation error. Revised target includes 1,025 spray operators, 171 team leaders, 28 base supervisors, and 28 MOH supervisors. "Achieved" quantity includes 1,308 spray operators, team leaders and base supervisors and 22 MOH supervisors.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
people trained to deliver or support IRS in target districts	trained using AIRS Project resources to implement/support elements of IRS in target districts. This figure includes all cadre that serve a role in IRS.		records – Training reports <i>Reporting frequency:</i> Semi-annually	Campaign By Gender By Role (e.g., spray operator, storekeeper) Percentage of women trained			1,357 Male; 596 Female; 31% Female		1065 Male; 303 Female; 22% Female		
5.1.3 Number of personnel trained as IRS implementation trainers	Total number of personnel trained in Training of Trainers (TOT) for IRS delivery	Y1, Y2, Y3	<i>Data source:</i> Project records – Training reports <i>Reporting frequency:</i> Semi-annually	By Spray Campaign By Gender Percentage of women trained	AIRS	31	24	30	31; 25 Male, 6 Female; 19% Female	28	22 (19 male; 3 female; 14% female)
5.1.4 Number of government environmental and/or health officials trained in IRS oversight	Total number of national and sub-national/district government environmental and/or health officials who are trained in oversight of IRS implementation using AIRS Project resources	Y1, Y2, Y3	<i>Data source:</i> Project records – Training reports <i>Reporting frequency:</i> Semi-annually	By Spray Campaign By Gender Percentage of Women Trained Type of	AIRS	30	27 (20 Male, 7 Female; 26% Female)	30	23 (18 Male, 5 Female; 22% Female)	62 ⁴⁰	74

³⁹ Original target was 1,770, but this had a calculation error related to team leaders. Revised target includes 28 MOH TOT, 5 IEC Coordinators, 1,025 SOPs, 171 Team Leaders, 28 Base Supervisors, 29 Health Workers Trained in Poison Management, 15 District Health Staff trained in Environmental Compliance, 31 Storekeepers, 26 Pump Technicians, 85 Washers, 53 Guards, 54 Drivers, 2 Database Coordinators, 5 M&E Assistants, 41 Data Entry Clerks. "Achieved" includes 22 MOH TOT, 5 IEC Coordinators, 1,308 SOPs, Team Leaders, and Base Supervisors, 24 Health Workers Trained in Poison Management, 43 District Health Staff trained in Environmental Compliance, 32 Storekeepers, 24 Pump Technicians, 87 Washers, 50 Guards, 34 Drivers, 2 Database Coordinators, 5 M&E Assistants, 48 Data Entry Clerks.

⁴⁰Target includes 28 SDSMAS Supervisors, 27 DPS/MICOA/MINAG staff, 2, NMCP staff, 5 IEC Coordinators. "Achieved" includes 54 SDSMAS Supervisors, 19 DPS/MICOA/MINAG staff, 1 NMCP staff, 5 IEC Coordinators.

Performance Indicator	Indicator Definition	Project Year(s) Reporting	Data Source(s) and Reporting Frequency	Disaggregate	PMI/ AIRS Indicator	Annual Targets and Results					
						Year 1		Year 2		Year 3	
						Target ⁴	Results ⁵	Target ⁶	Results	Target	Results
				government official (e.g. environmental/ health)							
5.1.5 AIRS conducted a capacity assessment	AIRS Mozambique program conducted an assessment of IRS capacity among national and sub-national/district government health officials	Y1, Y2	<i>Data source:</i> Project records – Capacity assessment reports <i>Reporting frequency:</i> Semi-annually		AIRS	Completed	Completed	Completed	Completed; Pending NMCP Approval	Completed	Completed
5.1.6 Number of capacity-building MOUs signed by AIRS, NMCP and partners/ institutions	Total number of Memoranda of Understanding (MOU) on provision of local capacity building finalized and signed between AIRS, the National Malaria Control Program, and other local partners and institutions	Y1, Y2, Y3	<i>Data source:</i> Project records – MOUs <i>Reporting frequency:</i> Semi-annually	By Spray Campaign	AIRS	1 MOU with MOH	Not Completed	1 MOU with MOH	1 MOU with MOH completed	N.A.	N.A.