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2017 PMI AIRS MADAGASCAR END OF SPRAY REPORT

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**2017 PMI AIRS MADAGASCAR
END OF SPRAY REPORT**

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BCC	Behavior Change Communication
BHC	Basic Health Center
CDC	Centers for Disease Control and Prevention
CHW	Community Health Workers
CFV	Control Flow Valve
DCV	Data Collection Verification
DEC	Data Entry Clerk
DLP	Malaria Control Directorate (<i>Direction de Lutte contre le Paludisme</i>)
ECO	Environmental Compliance Officer
HLC	Human Landing Catch
IEC	Information, Education, and Communication
IRS	Indoor Residual Spraying
LLIN	Long Lasting Insecticide-treated Net
M&E	Monitoring and Evaluation
MoE	Ministry of Environment
MEP	Monitoring and Evaluation Plan
MSP	Mobile Soak Pit
NMCP	National Malaria Control Program
PCV	Peace Corps Volunteers
PMI	U.S. President's Malaria Initiative
PPE	Personal Protective Equipment
PSC	Pyrethrum Spray Catch
SBCC	Social Behavior Change Communication
SEA	Supplemental Environmental Assessment
SM/TL	Sector Manager/Team Leader
SOP	Spray Operator
TO	Task Order
TOT	Training of Trainers
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

The objective of the PMI AIRS Project is to limit exposure to malaria vectors and reduce the incidence and prevalence of malaria through indoor residual spraying (IRS). To achieve this objective, AIRS Madagascar conducted IRS campaigns in the East Coast and the South East with long lasting organophosphates (Actellic CS 300). The first campaign began in the South East, where the project sprayed 284,374 structures in five districts (Farafangana, Vondrozo, Vohipeno, Manakara, and Mananjary) from July 24 to August 21, 2017. The project conducted an IRS campaign in the East Coast in three districts (Brickaville, Tamatave II, and Fénérive Est) from September 4 to September 30, 2017, where 203,262 structures were sprayed. In total, AIRS Madagascar identified 511,645 eligible structures and sprayed 487,636 structures. This effort resulted in an overall coverage rate of 95.3 percent for all eight districts while protecting 2,008,963 people from the burden of malaria in 2017.

The followings are key highlights of AIRS Madagascar's spray campaigns in 2017:

- A total of 203,262 structures were sprayed in the East Coast (53,074 in Brickaville, 83,536 in Fenerive Est and 66,652 in Tamatave II) and 284,374 structures in the South East (84,402 in Farafangana, 45,373 in Vohipeno, 30,549 in Vondrozo, 77,618 in Manakara, and 46,432 in Mananjary). The spray coverage was 95.6 percent in the East Coast and 95.1 percent in the South East. Of the 511,645 structures identified by spray operators (SOPs), a total of 487,636 structures were sprayed, resulting in an overall spray coverage rate of 95.3 percent.
- AIRS Madagascar trained 7,651 people (2,158 people in the East Coast and 5,493 in the South East), 2,408 (31.5%) of whom were women, to implement the 2017 IRS campaign.
- AIRS Madagascar used 76,248 bottles of Actellic® CS 300 with utilization ratios of 5.2 structures per bottle in the East Coast and 7.8 structures per bottle in the South East.
- During the first week of the IRS campaigns in the East Coast and the South East, AIRS Madagascar conducted cone bioassay tests to assess the quality of spraying. The results indicated 100 percent mortality for all of the structures sampled.
- AIRS Madagascar utilized mobile soak pits (MSPs) in remote areas to reduce the travel time of SOPs and safely dispose of IRS liquid waste from the field. The use of Tyvek suits to replace cotton coveralls as personal protective equipment (PPE) was piloted in four communes in the South East and in two communes of the East Coast.
- AIRS Madagascar implemented two mobile technologies: a mobile performance management tracking (PMT) tool to monitor daily operational results, and an e-Inventory system to monitor the current stock of insecticide and spray equipment at all operational sites. AIRS also uses Webex for daily debriefing on IRS progress.
- Information, Education, Communication (IEC) messaging was strengthened during the campaign in collaboration with Peace Corps Volunteers (PCVs), the USAID partner projects Mikolo, and Mahefa Miaraka.
- AIRS Madagascar organized advocacy meetings in all eight districts with traditional leaders (*Ampanjaka* and *Tangalamena*) and local authorities prior to the spray campaign to minimize refusal rates.

Table I below shows the main results obtained during the IRS 2017 campaign.

TABLE 1: SUMMARY OF 2017 IRS CAMPAIGN RESULTS

Result	South East	East Coast	Total
Number of districts covered by PMI-supported IRS	5	3	8
Insecticide class	Organophosphates	Organophosphates	Organophosphates
Number of structures treated with PMI-supported IRS	284,374	203,262	487,636
Number of structures targeted by IRS, with the support of PMI	287,942	198,689	478,686
Spray coverage (sprayed/found)	95.1%	95.6%	95.3%
Population protected by the PMI-supported IRS	1,267,840	741,123	2,008,963
Pregnant women protected by the PMI-supported IRS	51,134	27,358	78,492
Children under five protected by the PMI-supported IRS	215,741	85,912	301,653
Number of people receiving training funded by the US Government (USG) to conduct IRS	5,493	2,158	7,651

I. INTRODUCTION

I.1 BACKGROUND OF IRS IN MADAGASCAR

PMI has been supporting IRS in Madagascar since 2008, in line with the National Malaria Control Strategy (2008-2012 and 2013-2017). IRS was initially implemented in 55 districts within the Central Highlands (CHL). Until 2011, all IRS in Madagascar was categorized as blanket spraying, providing IRS to as close to 100 percent of the eligible structures in targeted districts as possible. This IRS strategy has been successful through collaboration between PMI and the Global Fund, with both donors providing strong support towards IRS spray programs throughout Madagascar.

After the completion of four rounds of blanket spraying in the CHL, IRS shifted to focal spraying in communes that were deemed to have the highest rates of malaria incidence (i.e., according to health management information system (HMIS) data). Entomological surveillance continues in the areas where IRS was discontinued to monitor malaria transmission and vector density. In accordance with the National Strategic Plan, epidemiological trends and available resources, PMI and the National Malaria Control Program (NMCP) agreed to implement blanket IRS in three districts in the East Coast (Brickaville, Fenerive Est and Tamatave II) and five districts in the South East (Vondrozo, Farafangana, Manakara, Mananjary and Vohipeno) during the 2017 IRS campaign.

In 2017, AIRS Madagascar conducted spray operations in the South East from July 24 to August 21 and from September 4 to September 30 in the East Coast.

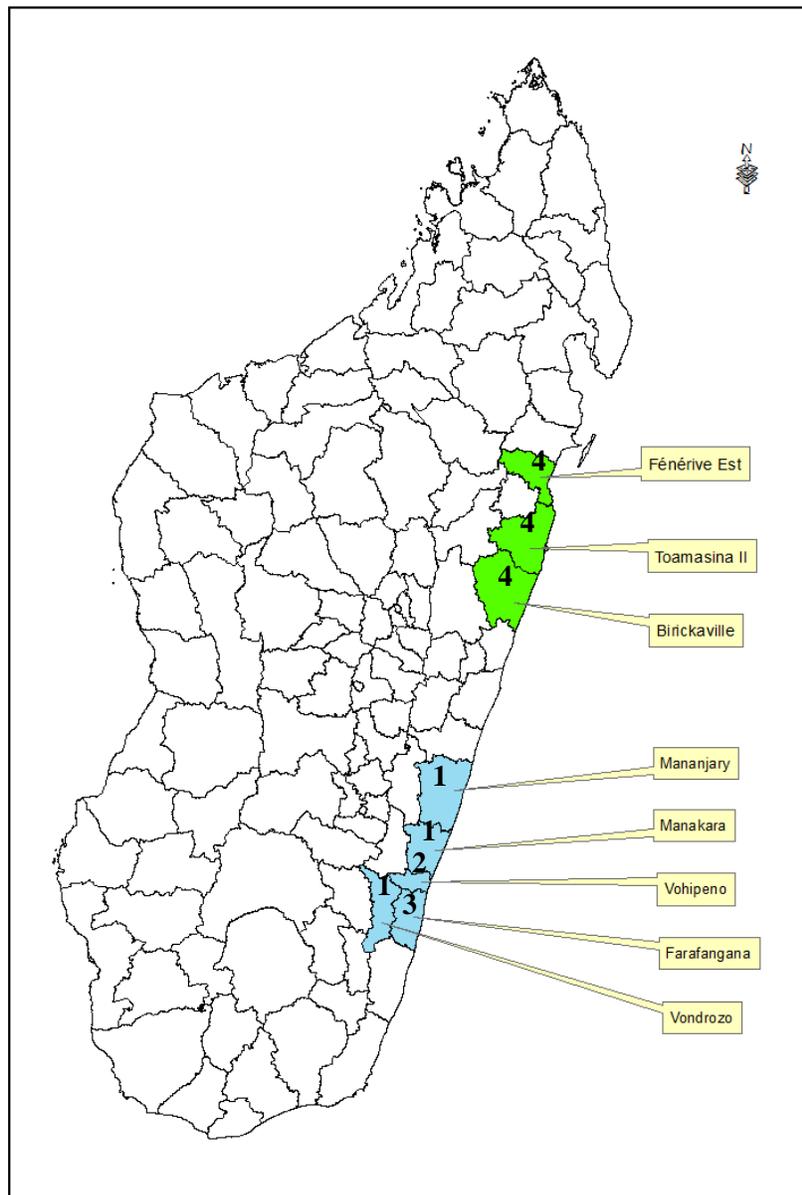
I.2 2017 CAMPAIGN OBJECTIVES

AIRS Madagascar's five main objectives for the 2017 IRS campaign were as follows:

1. Strengthen the capacity of seasonal spray campaign supervisors and government officials in monitoring and supervision of IRS activities
2. Strengthen NMCP/DLP capacity in entomological and environmental compliance monitoring
3. Ensure high quality spraying is carried out on time, before the peak transmission season
4. Collect and analyze epidemiological data in the South East and the East Coast, in partnership with the NMCP/DLP
5. Conduct IRS-related entomological monitoring and surveillance in nine sentinel sites for all the indicators: three in the East, three in the South East, one control site in the East, two control sites in the South East, as well as two sites for susceptibility surveillance in two districts in the South East (Vondrozo and Manakara).

Figure I below shows the areas that were sprayed during the 2017 campaign.

FIGURE 1: LOCATION OF SPRAY AREAS COVERED DURING THE 2017 IRS CAMPAIGN



East Coast districts

South East district

n=number of IRS campaign in the district (1, 2, 3, 4)

2. PRE-SPRAY ACTIVITIES

2.1 IRS CAMPAIGN PLANNING

Listed below are the activities undertaken to plan and organize the 2017 IRS campaign.

2.1.1 DISTRICT AND INSECTICIDE SELECTION

In addition to selecting the insecticide to be used in each district, NMCP, PMI and AIRS Madagascar worked together to select the communes and districts to be sprayed in 2017. After reviewing entomological surveillance data following the 2015-2016 IRS campaign, organophosphates were selected to be the insecticide class used for the 2017 IRS campaign both in the South East and East Coast.

2.1.2 GEOGRAPHICAL RECONNAISSANCE IN VONDROZO-MANAKARA-MANANJARY

AIRS Madagascar conducted geographical reconnaissance in the three new districts in 2017. The purpose of the reconnaissance was to collect information for better quantification and spray planning, to have estimates for the number of structures to be targeted, and to gain a better understanding of cultural realities in these districts.

The results provided AIRS Madagascar with an idea of the zone's accessibility and size and the nature of structures. This activity helped to establish the final list of intervention communes, since some are excluded due to environmental sensitivities (organic products) , and to ensure environmental compliance in all activities.

For proper planning of the campaign, AIRS Madagascar conducted a survey of eligible structures to spray in these new spray districts in the South East. This activity helped to gather information on the types of materials used to construct the structures and the accessibility of each locality.

TABLE 2: LIST OF COMMUNES AND DISTRICTS TARGETED

Region	District	Number of Communes Sprayed/Total Communes in the district
Atsinanana (east coast)	Brickaville	10/18
Analanjirifo (east coast)	Fenerive Est	14/14
Atsinanana (east coast)	Tamatave II	12/19
TOTAL EAST COAST		36/51
South East (Atsimo Atsinanana region)	Farafangana	33/33
South East (Atsimo Atsinanana region)	Vondrozo	15/18

South East (Aatovavy Fito Vinany region)	Vohipeno	21/21
South East (Vatovavy Fito Vinany region)	Manakara	46/47
South East (Vatovavy Fito Vinany region)	Mananjary	18/31
Total South East		133/150
Grand Total		169/201

2.1.3 MICRO-PLANNING

AIRS Madagascar held several internal meetings to plan and organize IRS campaigns in the South East and East Coast. A weekly communication to PMI/Madagascar included a briefing of the spray progress and spray coverage of the campaign. Renewed and increased collaboration with the Government of Madagascar led to a larger involvement of officials from the NMCP/DLP and decentralized services of the Ministry of Public Health. Members were heavily involved throughout the planning and implementation process by providing training and conducting supervision of operations. AIRS Madagascar successfully organized the following trainings:

- Master training in Antsirabe to train trainers to decentralize training of trainers in each operational district, to share IRS best practices on both a theoretical and practical level. This Master training was attended by 40 participants from NMCP with representatives at the national, regional, and district level including AIRS Madagascar staff and IRS project selected district seasonal staff.
- Boot camp training conducted in Antsirabe in June 2017 by AIRS Operations Director and Encompass, to reinforce competencies (theoretical and practical) of NMCP teams, and AIRS technical staff to ensure the same level of IRS understanding. AIRS Madagascar shared many IRS best practices and experiences.

2.2 LOGISTICS NEEDS AND PROCUREMENT

Prior to the spray campaign, AIRS Madagascar conducted a logistics assessment in the East Coast and South East based on target structures to be sprayed, previous years experiences and results from the geographical reconnaissance. The logistics assessment helped to review the following:

- Available stock of materials, consumables and equipment
- Transportation arrangements, including vehicle hiring for spray operations and supervision
- Estimation of insecticides, personal protective equipment (PPE) and spray equipment required to meet the needs of spraying
- Mobilization and distribution of equipment, materials, and supplies

AIRS Madagascar used the assessment results for international and local procurements. Most of the PPE and spray pumps used during the last campaign remained in acceptable and usable condition and were available for use in all five districts. AIRS Madagascar recorded the quantities of damaged or non-reusable PPE and developed a list of PPE needed for the spray campaign. The project purchased new Goizper pumps and used them both in the East and the South East.

Overall, AIRS Madagascar made local and international procurements using an open tender process, collecting bids/quotes on commodities to be purchased. The team also established the number and type

of vehicles required for each district's IRS operations based on the intervention approach and accessibility of the areas. AIRS Madagascar conducted a competitive bidding process to lease rental vehicles for IRS operations and selected local companies to supply the transportation.

2.2.1 INTERNATIONAL PROCUREMENT

Please refer to the table in the Annex A for more information on PPE items purchased, used, and remaining in stock after the IRS campaign. In 2017, AIRS Madagascar was among the AIRS countries that benefited from the NgenIRS support in the procurement of insecticide. Through this support, AIRS Madagascar procured Actellic 300CS insecticide at a co-payment price of \$15 per insecticide bottle instead of the market price of \$23.50 per bottle. The PMI AIRS project procured 94,896 bottles of Actellic® 300CS to cover the campaign needs based on available information during the time period in which orders needed to be placed. The project used 76,248 bottles of insecticide in the 2017 IRS campaign.

2.2.2 WAREHOUSES

The project needed two central warehouses as the East Coast (Tamatave) and South East (Farafangana) are separated by around 1,000km. The team used the central warehouses to receive and store all materials and equipment needed for the spray campaign both in South East and East Coast. The packaging of all materials was done at each central warehouse and sent out to the district warehouses.

2.3 HUMAN RESOURCE REQUIREMENTS

2.3.1 RECRUITMENT OF STAFF

HIRING OF SEASONAL STAFF

In collaboration with local government authorities, AIRS Madagascar hired 7,757 seasonal workers for the 2017 IRS campaign (5,592 seasonal workers in the South East, including 4,036 men and 1,556 women, and 2,165 seasonal workers in the East Coast, including 1,385 men and 780 women).

Table 3 shows the distribution of seasonal workers hired for each position, broken down by gender and spray zone.

TABLE 3: NUMBER OF SEASONAL WORKERS HIRED, BY GENDER

Position	South East		East Coast		Total
	Male	Female	Male	Female	
Enumerators	994	408	0	0	1,402
Enumerator supervisors	56	35	0	0	91
Central Operations Assistant	1	0	0	0	1
Central Logistics Assistant	2	0	0	0	2
Central Financial Assistants	1	4	0	0	5
District Financial Assistants	0	5	0	3	8
E-Inventory Developer Assistant	1	0	0	0	1
Environmental Compliance Assistant	2	0	0	0	2
Central M&E Assistant	1	0	0	0	1

M&E Assistant	2	3	3	0	8
District Coordinator Assistant	5	1	3	0	9
Data Entry Clerks (DECs)	12	30	7	14	63
Sector Manager	97	38	27	17	179
District Warehouse Keeper	4	1	1	2	8
Site Warehouse Keeper	57	75	12	29	173
Guardians	182	0	74	0	256
Team Leaders	138	65	92	44	339
Spray Operators	790	193	541	161	1,685
e-Inventory data entry clerk	0	1	0	1	2
Moto courier	50	0	21	0	71
Washers	0	125	0	76	201
Mobilizers	1,436	572	477	433	2,918
Porters	205	0	127	0	332
Total	4,036	1,556	1,385	780	7,757
Percentage of women	27.83%		36.03%		30.11%
TOTAL	5,592		2,165		7,757

2.3.2 PAYMENT OF SEASONAL WORKERS

AIRS Madagascar paid all seasonal staff through a mobile banking system. Several advantages to using the mobile banking system over cash payments include:

- Decreased risk of theft and fraudulent activities
- Time savings (i.e., staff did not have to travel to distribute the money)
- Greater access of women to their wages particularly in male-dominated families
- Increased transparency; all payments are recorded and tracked electronically
- Cost savings (elimination of the need to rent cars, purchase fuel, pay for seasonal finance workers' time, M&IE and lodging per diems to go around and make payments to all appropriate parties);

2.4 TRAINING OF SEASONAL STAFF

AIRS Madagascar organized and hosted training sessions for its seasonal staff both in South East and East Coast. The project designed the training sessions to ensure that all seasonal workers were trained in their roles and had a solid understanding of how to implement all campaign activities. The training sessions also included occupational precautions and emergency measures (such as in case of poisoning with insecticide). AIRS Madagascar staff conducted all training sessions in collaboration with NMCP/DLP and representatives from the Ministry of Health at the national, regional, and district levels. The training sessions in the South East took place from June 27 to July 22, 2017. In the East Coast, the training sessions were held from August 14 to September 2, 2017. AIRS Madagascar trained a total of 7,651 people (5,493 in the South East and 2,158 in the East). Table 4 below shows the number of training session and the number of people trained, disaggregated by spray zone and gender.

TABLE 4: NUMBER OF PEOPLE TRAINED, DISAGGREGATED BY SPRAY ZONE AND GENDER

Training	South East		East Coast	
	Male	Female	Male	Female
Training of SOPs	928	258	633	205
Training of Trainers	97	38	27	17
Training of DECAs and M&E Assistants	14	33	10	14
Training of Warehouse Keepers for all districts, including 2 logistics assistants	63	76	13	31
Training of IEC mobilizers	1,436	572	477	433
Training of Washers	0	125	0	76
Training of Transporters	43	0	43	0
Training of Security Officers	182	0	74	0
Training of health workers for poisoning case management	82	43	70	32
Training of Financial Assistants	1	9	0	3
Enumeration training	1,050	443	0	0
Total M/F	3,896	1,597	1,347	811
Percentage of women	29.07%		37.58%	
Sub Total	5,493		2,158	
TOTAL	7,651			

NB: 10 Peace Corps Volunteers participated in the training on advocacy session in Manakara, Vohipeno, and Brickaville

In addition to the seasonal staff recruited, public health workers also participated in various trainings. This accounts for the difference between the total number of seasonal staff recruited and the total number of people trained.

The trainings covered the following key topics:

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

3. IEC MOBILIZATION

3.1 MOBILIZATION METHODOLOGY

AIRS Madagascar organized awareness-raising events before, during, and after the IRS campaigns. The project team worked with media channels to produce and distribute various IRS promotional materials and directly contacting beneficiaries through door-to-door mobilization to inform them of the IRS campaign schedule and its benefits for malaria control. For mobilization activities every year, AIRS Madagascar worked closely with the NMCP/DLP to conduct IEC activities. The project adopted the following working methodology to conduct mobilization:

- Reviewed key policy documents (National Malaria Control Strategic Plan, PMI Strategy Papers on IRS messages, etc.).
- Discussed and planned IEC/ Social Behavior Change Communication (SBCC) mobilization activities in collaboration with the IEC/SBCC team of NMCP/DLP.
- Conducted meetings with traditional health and administrative authorities.
- Conducted advocacy meetings in each district with local and traditional authorities in the regions, districts, communes, and fokontany leaders in collaboration with 10 Peace Corps Volunteers (PCVs), specifically one Peace Corps Volunteer in Vohipeno, two in Manakara, and seven in Brickaville.
- Trained seasonal staff involved in the implementation of IEC/ SBCC activities (mobilizers and their supervisors).
- Disseminated IEC materials in the intervention communes and *fokontany*.
- Conducted door-to-door mobilization.
- Aired radio messages on all radio stations with a wide geographical coverage.
- Organized radio broadcasts with the participation of IEC officials from the public health system to strengthen advocacy at all levels.
- Provided supervisory training and ensured supervision of field mobilization teams.
- Recruited the chief of fokontany, as a paid IEC mobilizer responsible for community mobilization in their village, working closely with community health workers.

3.2 ADVOCACY

To ensure the involvement of local leaders in the spray campaign, AIRS Madagascar led several advocacy activities. This helped the project to minimize refusals from beneficiaries. The activities included:

- Organizing an advocacy workshop in each district with the participation of all authorities in the project intervention regions and districts (traditional leader, administrative and districts authorities) both in the South East and East Coast. Those authorities conducted local meetings and door to door mobilization based on their advocacy action plan to increase IRS acceptance. PCVs were involved in the advocacy workshops and sensitization together with the IEC mobilizers and local authorities.

- Organizing advocacy actions in the communes and *fokontany* before and during IRS campaigns in the following forms: courtesy visits, meetings with local authorities, information sessions at different levels (communes and *fokontany*) with the involvement of all social actors; and participation in various official meetings in the districts, communes, and *fokontany* to strengthen advocacy and IRS messages and to share information about the spraying program in localities. As local leaders, chiefs of *fokontany* assisted in carrying out IEC mobilization in their villages and working closely with CHWs. Their positions helped ensure easy community mobilization and increase IRS acceptance.

3.3 DOOR-TO-DOOR MOBILIZATION

AIRS Madagascar implemented door-to-door mobilization from July 17 to July 22, 2017 in the South East and from August 28 to September 2, 2017 in the East Coast. Building on lessons learned from the last campaign, IEC Mobilizers worked for 12 days: six days before, three days during, and three days after the campaign, according to the SOP's plan, with the chief of the *fokontany* serving as an IEC team member. Mobilizers worked under the supervision of the Sector Managers supported by the District Coordinators, the IEC Officer and the Operations Manager. With the IEC strategy both in South East and East Coast, AIRS Madagascar was able to conduct more in depth planning for IEC mobilization to ensure that mobilizers reached all households in the *fokontany*. As a result, there was higher acceptance of IRS, because messages delivered by people within the households' communities. For the 2017 IRS campaign, the team worked at the village level with the village chief serving as lead with support from CHWs. After the campaign, CHWs worked to ensure that people did not hang posters or other materials on the wall after the spray. This activity led by the CHWs was conducted one week after the end of the spray in the locality.

Collaboration with others implementing partners like the USAID-funded *Mikolo and Mahefa Miaraka* Projects and PCVs was an added value for the AIRS Madagascar Project.

Mobilizers and their supervisors conducted mobilization activities before spraying, during spraying by accompanying SOPs in the villages on the spray day, and after spraying in reinforcing messages for not putting posters on the walls. The team used banners to reinforce IEC messages. The team used the following five categories of messages during mobilization activities:

- Advocacy messages targeting local authorities and leaders to have their support in advocating for IRS within their communities
- Messages for communities about the advantage and the effect of IRS
- Messages for families on preparing homes
- Messages for SOPs on approaches they should adopt and precautions they should take during and after spraying
- Messages for beneficiaries to not post or paint wall six months after spraying

In close coordination with NMCP/DLP national and regional staff, the team conducted an IEC mobilization activity to address non-acceptance of IRS. The table below summarizes the IEC mobilization results for the East Coast and the South East.

TABLE 5A: MOBILIZATION RESULTS

Area	District	Structures			Population Reached			IRS	
		Found	Sensitized	Not Sensitized	Total	Males	Females	Accepted	Not Accepted
East	Brickaville	27,498	26,802	917	70,481	33,159	37,322	25,994	595
	Fenerive Est	52,840	49,434	3,654	139,075	66,161	72,914	45,930	4,166
	Toamasina II	35,838	33,165	3,216	77,195	36,647	40,548	31,204	3,110
	TOTAL EST	116,176	109,401	7,787	286,751	135,967	150,784	103,128	7,871
SUD EST	Farafangana	81,085	77,812	3,273	241,252	112,162	129,090	74,702	4,889
	Vohipeno	29,807	28,073	1,734	78,190	36,185	42,005	26,819	2,159
	Manakara	74,768	68,580	6,188	153,871	69,957	83,914	65,721	6,664
	Mananjary	33,514	32,635	879	82,700	38,934	43,766	31,921	1,229
	Vondrozo	23,086	21,222	1,864	60,315	28,790	31,525	18,893	1,620
	TOTAL SUD EST	242,260	228,322	13,938	616,328	286,028	330,300	218,056	16,561
TOTAL	385,436	337,723	21,725	903,079	421,995	481,084	321,184	24,432	

3.4 OTHER IEC ACTIVITIES

The team conducted door-to-door mobilization to complement other IEC activities. These activities included mass communication, and the distribution of three types of updated materials that were used during the 2017 campaign (e.g., flyers, banners and informative posters). Prior to the spray campaign, the team reviewed all materials jointly with the NMCP/DLP communication service to match the Malagasy government's requirements and strategy. During mobilization, the project distributed 219,000 flyers in the East Coast, 311,393 flyers in the South East, 5,740 posters in the South East and 2,305 posters in the East Coast. In addition, AIRS Madagascar fashioned and distributed 5,400 tee-shirts and 5,370 caps for mobilizers and partners. The team set up 197 banners throughout all communes of the eight districts (Table 5B). The project also aired radio messages in local languages in collaboration with local radio stations targeting broad geographic coverage in the project's intervention regions and districts to strengthen IRS messages and disseminate the spraying schedules. AIRS Madagascar developed and aired specific pre-spray and spray period messages. The team aired 525 radio spots in the South East and 315 spots in the East Coast, for a total of 840 radio spots.

TABLE 5B : ITEMS DISTRIBUTED DURING 2017 SPRAY CAMPAIGN

Area	District	Flyers	Posters	Tee-shirts	Caps	Banners
East	Brickaville	26,879	1,170	420	420	11
	Fenerive Est	48,223	2110	632	632	15
	Toamasina II	33,127	1330	451	451	13
	TOTAL EST	108,229	4,610	1,503	1,503	39
Sud Est	Farafangana	74,911	3,120	859	859	34
	Vohipeno	28,679	1,360	458	458	22
	Manakara	67,077	3,000	814	814	45
	Mananjary	32,207	2,600	755	755	29
	Vondrozo	18,469	1,400	481	481	17

Lancement			530	500	11
TOTAL SUD EST	221,343	11,480	3,897	3,867	158
TOTAL	329,572	16,090	5,400	5,370	197

4. IRS IMPLEMENTATION

4.1 IRS CAMPAIGN SCHEDULE

Once the team completed SOP training sessions, IRS implementation began immediately. AIRS Madagascar implemented the spray campaign in the South East, Manakara, Mananjary, Vondrozo, Farafangana and Vohipeno districts from July 24 to August 21, 2017. In the East Coast, the team sprayed the districts of Tamatave II, Brickaville and Fenerive Est from September 4 to September 30, 2017.

The 2017 IRS launching ceremony lead by the Minister of Health and the USAID Madagascar Health, Population and Nutrition (HPN) Office Director, took place in Ampasimanjeva at Manakara District in August 3, 2017. This event benefited from the participation of parliamentarians, senators, local and traditional authorities, and the USAID/ PMI Madagascar team.

FIGURE 2: HOSTESS AND OFFICIALS AT THE LAUNCHING OF THE 2017 IRS CAMPAIGN



4.2 ORGANIZATION OF THE IRS CAMPAIGN

AIRS Madagascar adopted “Communalization” as the IRS technical approach for the campaign. Seasonal workers were recruited in their communities with the support of local authorities. At the district and commune level, the district coordinator and local authorities jointly made seasonal staff recruitment. . SOPs continued to work in their communes or in neighboring areas. The team conducted a risk assessment and provided the team with the ability to assess local circumstances. This highly cost effective approach adapted to local settings is called “communalization.”

AIRS Madagascar grouped SOPs in each commune in two to three operational sites depending on the size of the district. Each operational site had a soak pit and a warehouse large enough to serve several spray teams. The team built a total of 190 mobile soak pits (MSPs), 120 for the South East and 70 for the East Coast, for use in remote areas. Additionally, there were 91 permanent soak pits and warehouses (61 in the South East and 30 in the East Coast) for the 2017 IRS campaign.

Each morning, every District Coordinator organized breakfast for SOPs and Team Leaders (TLs) before they went to work. Breakfast was an opportunity for the team supervisors and sector manager to communicate recommendations and instructions based on information from the daily debriefing the day before.

Vehicles were available to support operations implementation, including the transportation of insecticide and equipment. The team also used the vehicles to transport SOPs to the spray sites and back to the operational sites at the end of the day, where spray teams conducted the end of the day cleanup. At the end of each day, SOPs handed their completed spray forms to their TLs, who checked and compiled them before submitting them to their Sector Manager. The team then sent spray forms to data entry centers for immediate entry into AIRS Madagascar’s database. Table 6 below shows the number of spray teams and SOPs employed during the 2017 IRS campaign.

TABLE 6: NUMBER OF SPRAY TEAMS PER DISTRICT

Region	District	Number of spray teams	Number of SOPs
South East	Farafangana	61	293
	Vondrozo	20	109
	Manakara	44	216
	Mananjary	41	192
	Vohipeno	37	173
	Total South East	203	983
East Coast	Brickaville	33	181
	Fenerive Est	60	300
	Tamatave II	43	221
	Total East Coast	136	702
TOTAL		339	1,685

5. POST-SPRAY ACTIVITIES

5.1 IRS MATERIALS AND EQUIPMENT

After completion of the IRS campaign, SOPs, washers, team leaders, sector managers, couriers, and district coordinators brought back all PPE, used bottles of insecticide and all the other IRS products to their assigned storage rooms. All the items were inspected and recorded on the final stock records. Then, District Coordinators, District Storekeepers, the Logistics Manager and Logistics Assistant worked together to bring back all PPE, solid wastes and other materials from all storage rooms to the district warehouses and then to the central warehouses in Farafangana and Toamasina. Trucks, boats, and pick-up trucks were used for that operation and a given supervisor (Storekeeper, Logistics team, District Coordinator) was assigned to monitor the transportation until the items were received and recorded in the central warehouse.

5.2 POST-SEASON INVENTORY

Prior to the spray campaign, AIRS Madagascar had no bottles of organophosphate in stock. AIRS Madagascar procured 94,896 additional bottles of Actellic® 300CS to cover the spray campaign both in the South East and the East Coast. The team used 3,727 bottles in Vondrozo, 8,487 bottles in Manakara, 6,829 bottles in Mananjary, 6,456 bottles in Vohipeno, 11,792 in Farafangana, 12,993 in Tamatave II, 9,955 in Brickaville and 16,009 in Fenerive Est. In 2017, AIRS Madagascar used a total of 76,248 bottles of Actellic® 300CS with a remaining stock of 18,648 bottles at the end of the spray campaign.

The remaining insecticide stock of 18,648 bottles with an expiration date of May 2019 will be used for the 2018 spray campaign with 15,357 bottles in Farafangana's central warehouse and 3,291 bottles in Tamatave's central warehouse.

Adonis, a local firm, will recycle the used empty bottles of insecticide. Adonis has the capability and the MoE authorization to do so. The same local firm will incinerate or recycle other materials and equipment out of use.

6. ENVIRONMENTAL COMPLIANCE

6.1 ENVIRONMENTAL COMPLIANCE

AIRS Madagascar operated under a supplemental environmental assessment (SEA) approved by USAID in September 2013. The assessment authorizes the use of three classes of pesticides (pyrethroids, organophosphates, and carbamates) nationwide for the 2013-2018 period. AIRS Madagascar submitted a Letter Report, which outlined planned changes (i.e. the addition of the Mananjary, Manakara, and Vondrozo districts) and environmental considerations in operations from previous campaigns.

6.2 CHALLENGES AND PRECAUTIONS

In 2017, the project added three districts in the South East. As this was the first campaign in Vondrozo, Manakara, and Mananjary, AIRS Madagascar's Environmental Compliance Officer (ECO) conducted an environmental geographical reconnaissance in these areas from February 13 to March 18, 2017 to identify the proper siting of storerooms, the safest method of SOP transport with insecticide, and environmental measures required to safeguard communities during spray.

The reconnaissance uncovered a protected area in the district of Vondrozo managed by World Wide Fund (WWF). Concerning Manakara, two communes are accessible only by train and three communes by walking (about 1 to 3 km depending on the commune). Structures within one kilometer of the Vondrozo protected area were not sprayed and after completing a risk analysis, AIRS Madagascar opted for traveling to each of these communes in Manakara by foot.

The main economic activities of the districts include the following:

- Cash crops (pepper, coffee, cloves, lychee, vanilla)
- Beekeeping and sale of honey in some rural communities
- Certified organic honey in certain communes

These activities required strict compliance with Best Management Practices (BMPs) for sensitive areas. The team took specific measures to avoid all contamination when spraying the following areas:

- Structures within 1 km of protected areas were not sprayed
- Minimum distance of 30 meters observed between the structure to be sprayed and beehive or *Ravintsara* culture
- Minimum distance of 3 km observed between the structure and the organic apiaries (requirement of the ECOCERT specifications: authority in charge of organic certification)
- Some communes have sources of income on the sale of vanilla in Mananjary district (13 communes). Because IRS campaign will be at the time of vanilla harvesting and the fact that households store the vanilla in their houses that are close to the vanilla plantation so these communes have been removed from the list of communes to be sprayed.
- All harvested crops were removed from structures before spraying
- Close supervision in these areas was conducted during spraying

- Information meetings were held with beekeepers to go over the nature of the spray and the implications with their activities.
- In addition to the measures taken for sensitive areas, the team communicated information and guidelines on spraying methods regarding sensitive areas to District Coordinators and Sector Managers.

The eastern region included two organic farming areas, a palm tree plantation in Fanandrana (Tamatave II) and a curcuma plantation in all localities in the communes of Anivorano Est and Razanaka (Brickaville). The project granted these organic farming areas the same consideration as other protected areas. As a result, the project did not spray these areas this year as in previous years.

Like the East Coast, in the South East, there are numerous streams and rivers to cross to reach the communes to be sprayed. Due to the substantial risk of insecticide spillage in the rivers at these crossings, AIRS Madagascar implemented measures as detailed in the PMI BMP Manual to prevent negative impacts on the environment:

- Full and empty insecticide bottles were packed in blue and waterproof plastic barrels
- Equipment was covered with waterproof tarpaulins
- The raft or canoe carrying insecticides and IRS equipment did not carry other people or other goods at the same time, except the person who piloted them
- The water crossing was done under the supervision of the ECO or another AIRS staff member briefed by ECO

TABLE 7 : LIST OF COMMUNES THAT REQUIRED RIVER NAVIGATION

District	Operation Site	Commune	Duration	Observation
Farafangana	Evato	Beretra Bevoay	1h	Calm water
Farafangana	Maheriraty	Ambalavato Nord	3h	Calm water
Mananjary	Mahela	Mahela	3h	Calm water
Vohipeno*	Sahalava	Sahalava	45min	Calm water
Toamasina II	Toamasina II	Amboditandroho	3h	Calm water
Toamasina II	Antetezambaro	Tanambao Nosibe	2h	Calm water
Fenerive Est	Vohipeno	Vohipeno	2h + walk for 1 hour	River with rapids
Fenerive Est	Antsiatsiaka	Antsiatsiaka	3h	Calm water
Fenerive Est	Ambanja	Ambanja	2h	Calm water
Brickaville	Andovoranto	Andovoranto	1h	Calm water
Brickaville	Ambinaninony	Ambinaninony	3h	Calm water

*Sahalava in Vohipeno is also accessible by road/car or by foot, in addition to river navigation.

6.3 PRE-SEASON ENVIRONMENTAL COMPLIANCE ASSESSMENTS

AIRS Madagascar conducted a pre-season environmental assessment in the South East (Farafangana, Vohipeno, Vondrozo, Mananjary and Manakara) and in the East Coast (Toamasina II, Brickaville and Fenerive) prior to the spray campaigns. The team conducted the pre-season assessment using smartphones with PMI standard environmental compliance checklists. The checklist contained questions to ensure that operational sites, with special emphasis on soak pits and warehouses, were properly set up before spraying. They also guided AIRS Madagascar's staff in checking that all PPE and insecticides were delivered and safely stored in warehouses and that seasonal staff working in the warehouses or with soak pits had received appropriate training. The team also used smartphones to collect data on the geographical information of each operational site visited in the geographic information system and to take photos of soak pits and warehouses to show what repairs were needed, or if the site was ready. The ECO found that numerous sites needed to be repaired to meet the standards required for IRS. Please see Annex B for the full list of repairs performed. In Farafangana, because of the proximity of the ground water (less than 50 cm below ground), AIRS Madagascar had to install a soak pit 1 km away from the warehouse.

For Ampasimadinika and Ampasimbe Onibe, district of Toamasina II, due to the non-existence of storeroom in accordance with the required standards, AIRS Madagascar set-up two prefabricated stores which were taken apart at the end of the spraying campaign.

FIGURE 3: PREFABRICATED STOREROOM



AIRS Madagascar translated all documents (Material Safety Data Sheet, guide to first aid, recommendation in case of spill, warning sign) into Malagasy. Also, before the campaign, all seasonal staff underwent medical checkups and women were required to pass a pregnancy test.

6.4 ENVIRONMENTAL COMPLIANCE ACTIVITIES DURING THE CAMPAIGN

AIRS Madagascar's staff conducted inspections to ensure that spray operations met environmental compliance standards as specified in the BMPs. These inspections included monitoring the use of PPE, progressive rinsing of spray pumps, vehicles used to transport spray teams and insecticides, storage conditions of PPE, and insecticides and warehouses displaying warning signs. The staff also monitored whether IRS waste was managed and stored properly, that stock cards at warehouses were accurate, and that the SOPs were using the proper spray techniques. In addition, the staff checked that

beneficiaries had received clear information about the IRS campaign and knew how to prepare their structure for spraying. AIRS Madagascar continued to check the condition of fixed and mobile soak pits, specifically for their flow and drainage. Overall, AIRS Madagascar's staff found that spray operations were satisfactory. However, the staff identified a few environmental compliance issues.

During previous spray campaigns, the team found that around mid-day, the SOPs' visors were becoming blurry due to the insecticide stains and needed to be cleaned; therefore, AIRS Madagascar equipped the SOPs with wipes to clean these visors throughout the day as needed. SOPs were satisfied with the wipes as they improved their visibility. Team leaders collect the contaminated wipes at the end of the day and classified them as waste to be treated.

6.4.1 MOBILE SOAK PITS

AIRS Madagascar built on previous success and expanded the use of MSPs for the 2017 IRS campaign (see Figure 4). The total number of MSPs was 190 (120 in South East and 70 in East Coast).

FIGURE 4: MOBILE SOAK PIT



6.5 TYVEK SUIT PILOT

In 2017, AIRS Madagascar piloted the use of Tyvek suits for SOPs who used MSPs. The advantages of using Tyvek suits instead of cotton coveralls include the following:

- Lightweight
- Can be used for several days by simply cleaning them with wipes.

Points for Improvement:

- The yellow Tyvek is impermeable from the outside and the inside and can be very hot.

6.6 POST-SEASON ENVIRONMENTAL COMPLIANCE ACTIVITIES

Post-season environmental inspections took place from August 18 to October 19, 2017 in the South East, and from October 2 to October 20, 2017 in the East Coast. The main objective of the inspections was to ensure that all soak pits and warehouses had been properly decontaminated and closed out. All the warehouses were emptied of materials and equipment used during spraying. After these items and insecticides had been removed, warehouses were decontaminated with water mixed with bleach and

soap. The prefabricated storeroom was returned to the central warehouse. The decontamination process was performed before handing the premises back to the owners. All soak pits were covered with a concrete lid to prevent people from accessing materials and from interfering with the insecticide-waste degradation process.

At the end of the campaign, the team returned all MSP materials to the warehouse. Undamaged containers, buckets, and sponges were decontaminated and stored for reuse. Damaged materials were classified as IRS waste. Screens were removed and considered as waste to be treated. The AIRS Madagascar Environmental Compliance Officer supervised decontamination activities with a representative of the NMCP/DLP staff. As part of his capacity building process, the DLP representative benefited from practical training during the pre, per and post spraying activities.

FIGURE 5: SEALING A SOAK PIT



6.6.1 IRS CAMPAIGN WASTE DISPOSAL

The following MSP items were decontaminated and will be reused if not damaged (see details in annex I):

- 25 L white plastic buckets used to manufacture the MSPs
- Sponges
- Plastic sheets

AIRS Madagascar will work with Adonis to recycle eligible items including plastics and metal. Adonis operates an incinerator in Tamatave and Antananarivo and has the necessary equipment in Antananarivo. AIRS Madagascar began treating waste on September 25, 2017 at Adonis in Antananarivo.

After use in the spray campaigns, the gloves and boots contain greater than 1 percent chlorine. If incinerated, they can create dangerous persistent organic pollutants (POPs). After decontamination (washing them with soap and water), AIRS Madagascar will dispose of such materials by donating them to the appropriate facility.

7. MONITORING AND EVALUATION

7.1 M&E OBJECTIVES AND METHODOLOGY

AIRS Madagascar identified a number of lessons learned from the 2016 campaign. Based on these lessons, the project introduced improvements to the M&E system for the 2017 campaign in accordance with the 2017 work plan with the goal of:

- Ensuring the accuracy of data collected and entered through training and supervision at all levels
- Streamlining and standardizing data processing to minimize errors
- Ensuring data security according to established protocols

The M&E Officer and the Database Manager led the M&E activities.

7.2 DATA MANAGEMENT AND PROCESSING

7.2.1 DATA COLLECTION

Data collection followed the protocols described in the 2017 work plan. The data collection forms were developed to ensure the collection of all PMI-requested indicators. Before the beginning of each mobilization and spraying operation, the project trained those involved in data collection on the data collection process and in completing all appropriate forms. Mobilizers who conducted door-to-door visits collected mobilization data and data on the spray by SOPs. Data collection forms went through several checks before being entered into the database.

7.2.2 DATA ENTRY

AIRS Madagascar employed a total of 63 DEC's (42 in the South East and 21 in the East). Each district had its own data entry center. Each DEC entered the data from the forms into the project's database. At the end of each day, DEC's sent a copy of the database in the "cloud" (online DropBox server) to forward the most recent data. DEC's entered spray data first by the summarized totals per SOP form, for quick insight into the spray campaign. Then, DEC's entered the "details", entering data line by line to ensure accuracy of the data entered. The DEC's completed data entry within two weeks after the end of the campaign.

7.2.3 STORAGE OF DATA

The DEC's stored all data collection forms in filing cabinets. They were filed by district, commune, and *fokontany*, and finally by date. At the end of the campaign, the forms were transferred and stored at the central warehouses (in Farafangana and Tamatave) in a secure location with controlled access.

At the end of each day, all the files in the database were stored electronically in two different ways:

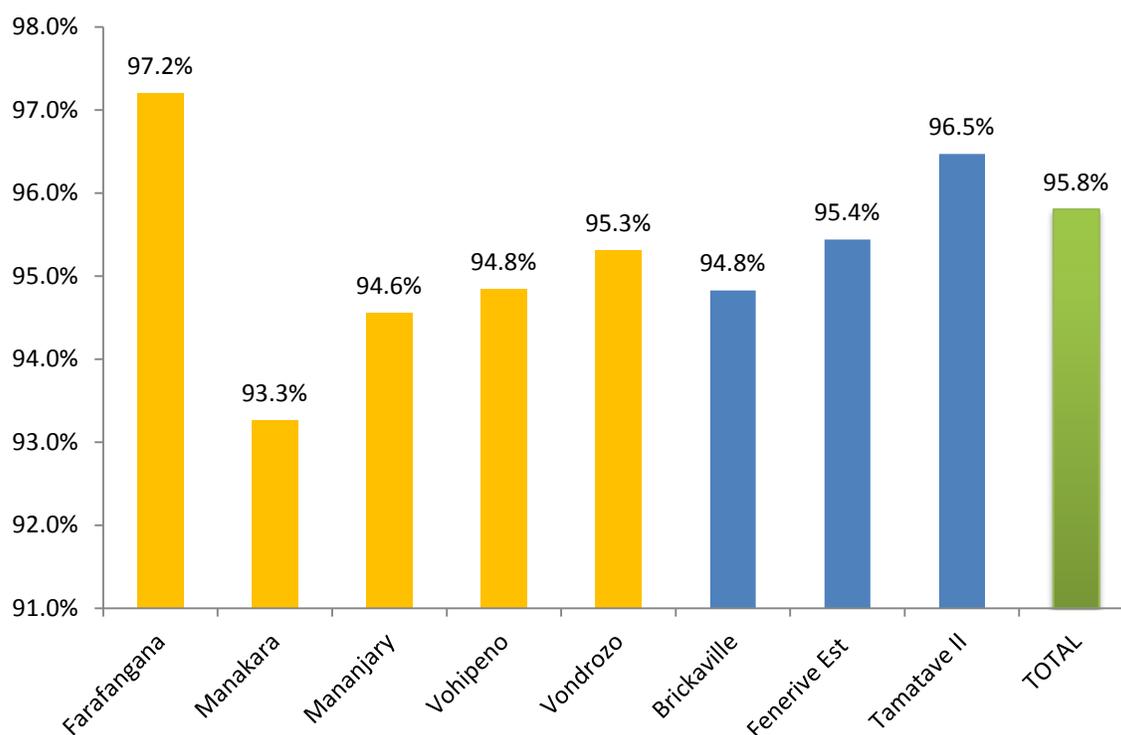
- In the "Back-up" folder available on the DEC's computer
- On the online Dropbox server

7.3 RESULTS

7.3.1 NUMBER OF ELIGIBLE STRUCTURES FOUND AND SPRAY COVERAGE

SOPs identified a total of 511,645 structures (299,056 in the South East and 212,589 in the East) and sprayed 487,636 (284,374 in the South East and 203,262 in the East Coast). In the South East, SOPs sprayed 95.1 percent of all structures identified, and 95.6 percent of all structures in the East Coast. The overall coverage rate achieved was 95.3 percent as indicated in Table 6.

FIGURE 6: IRS 2017 SPRAY COVERAGE



7.3.2 USE OF INSECTICIDE AND PERFORMANCE OF SPRAY OPERATORS

AIRS Madagascar used 76,248 bottles of organophosphates (37,291 in the South East and 38,957 in the East). On average, each SOP sprayed 13.8 structures per day in the South East and 13.9 structures in the East. One bottle of organophosphate sprayed 7.7 structures in the South East, while operators in the East sprayed 5.2 structures per bottle. The difference is due to the smaller average size of structures in the South East.

Table 9 shows the average number of structures covered by a bottle of insecticide, by district.

TABLE 8: INSECTICIDE USED PER DISTRICT AND SOP PERFORMANCE

Area	District	Structures Sprayed	Insecticide Used	Average number of structures sprayed per SOP per Day
SOUTH EAST	Farafangana	84,402	11,768	13.6
	Manakara	77,618	8,469	16.6
	Mananjary	46,432	6,584	11.4
	Vohipeno	45,373	6,458	13.1
	Vondrozo	30,549	3,734	14.2
	TOTAL SOUTH EAST	284,374	37,013	13.8
EAST	Brickaville	53,074	9,966	13.5
	Fenerive Est	83,536	15,972	13.9
	Tamatave II	66,652	12,993	14.2
	TOTAL EAST	203,262	38,931	13.9
TOTAL IRS 2017		487,636	75,944	13.8

7.4 DATA QUALITY ASSURANCE

AIRS Madagascar implemented data quality assurance activities for data collection and data entry verification, using the project supervision tools and standard database audit control. The project found that these tools formalized self-audits of the IRS campaign data for better data quality and reduced the number of errors encountered in the operators' everyday forms as well as in the M&E database. Table II below shows the number of forms used for each data quality assurance tool and the percentage of forms audited.

TABLE 9: NUMBER OF SUPERVISORY TOOLS USED

Supervision tools for M&E	Number of forms used	Percentage checked
Error Eliminator (mandatory usage)	28,421	100% of the spray forms
Data Collection Verification	398	0.1% of structures found
Data Entry Verification	3,825	10.2% of structures found

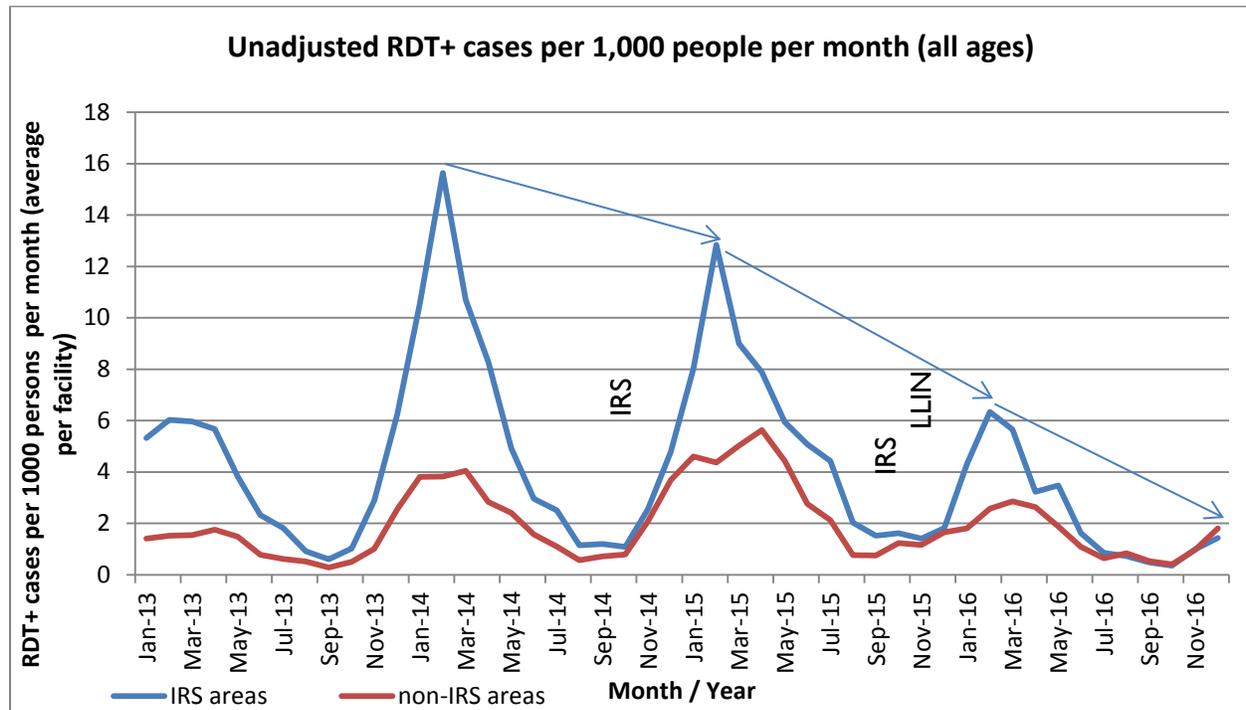
Starting this year, each supervisor used the electronic version of the Data Collection Verification (DCV) tool to interview households to verify spray coverage data. Staff visited and interviewed residents from 398 structures (0.1% of structures found) during the campaign. Areas where the DCV was implemented were chosen based on the spray coverage rate as reported by SMS data.

At the end of every week, the M&E Assistant met with the District Coordinator and Sector Managers to discuss the spray progress and the errors found using the data quality assurance tools. Furthermore, the AIRS Madagascar M&E Manager and Database Manager provided feedback regarding errors found on SOP cards and gave recommendations to the AIRS Madagascar Operations Team to minimize future errors on the SOP cards.

7.5 EPIDEMIOLOGICAL DATA COLLECTION

AIRS Madagascar collected epidemiological data in five districts of the East Coast (three IRS and two control districts). The AIRS Madagascar team collected the data at the national level (NMCP/DLP) and analyzed the rate of confirmed malaria cases over the total district population in our spray districts (Brickaville, Fenerive Est, and Tamatave II), and in our comparison districts (Soanierana Ivongo, Vavantenina). AIRS Madagascar conducted a regression analysis which showed a 10 percent decrease in RDT+ cases for children under age 5 as the contribution of IRS (see Figure 7).

FIGURE 7: UNADJUSTED RDT+ CASES PER PERSON PER MONTH (ALL AGES)



8. ENTOMOLOGY

Under the supervision of the AIRS Madagascar's Technical Director, the project's four entomological surveillance teams (each consisting of an entomologist and two assistants) performed all entomological surveillance activities. Given that the entomological surveillance is currently ongoing, and the project will submit a final entomological report no later than August 2018, this section presents a brief summary of some entomological surveillance results conducted in 2017. It covers entomological monitoring activities performed from June 2017 to September 2017 in the South East and from August 2017 to September 2017 in the East.

8.1. CONE BIOASSAY TEST RESULTS

AIRS Madagascar conducted monthly cone bioassay tests using the World Health Organization (WHO) procedure to assess the residual effectiveness of insecticides sprayed during the 2017 IRS campaign. The team conducted tests in the following sentinel sites: Ambodifaho (district of Brickaville), Vohitrambato (district of Toamasina II), and Mahambo (district of Fenerive Est) in the East Coast; Manambotra Sud (district of Farafangana) Lanivo/Anosy (district of Vohipeno) and Mananjary in the South East. Since the transport of larvae or adult susceptible mosquito colony (Kisumu strain) is impossible, all cone bioassay tests were performed with local wild adult mosquitoes reared from field-collected larvae and pupae. The mosquitoes were exposed to the sprayed surfaces for 30 minutes and the "knock-down" rate was recorded at 30 minutes and 60 minutes post exposure. The vector mortality was observed after a 24-hour recovery period. The residual life of pirimiphos-methyl Actellic® 300CS (an organophosphate) was tested in the sentinel sites of Brickaville, Vohitrambato and Mahambo, in the East and Manambotra Sud, Lanivo/Anosy and Mananjary, in the South East.

At the East Coast sites (Ambodifaho, Brickaville; Vohitrambato, Toamasina II; Mahambo, Fenerive Est) and the South East sites (Manambotra Sud, Farafangana; Lanivo/Anosy, Vohipeno, Ambohimiarina II, Mananjary), most houses have a wall made up of wood or *falafa* (branches of traveler's palm).

During the first week of IRS campaigns in the East Coast and in the South East, AIRS Madagascar conducted cone bioassay tests to assess whether the quality of the spraying was satisfactory. The results indicated that the spray quality, both in the East Coast and in the South East, was good with mortality being 100 percent for all the structures sampled. In the South East, four months after spraying (T4 November 2017), pirimiphos-methyl (Actellic 300 CS) retained 91.5 to 95.8 percent effectiveness in all types of wall and in the East coast 100 per cent effectiveness after two months. (Fig.8 and Fig.9).

FIGURE 8: RESIDUAL EFFECTIVENESS OBSERVED FOR PIRIMIPHOS-METHYL CS 300 (ORGANOPHOSPHATES) IN THE EAST COAST

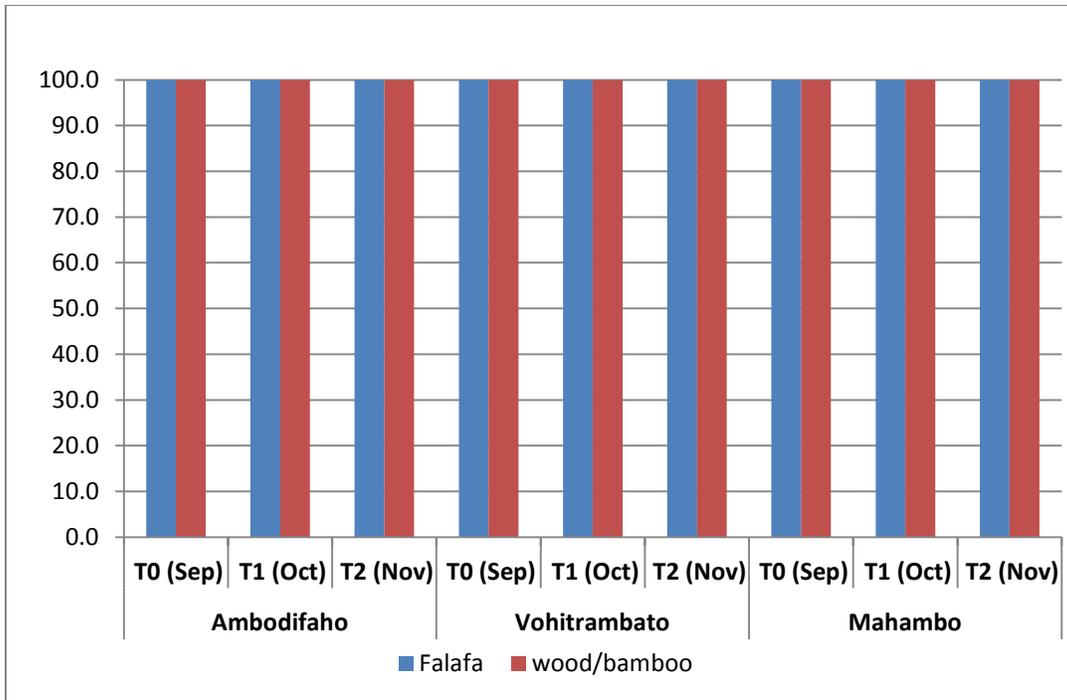
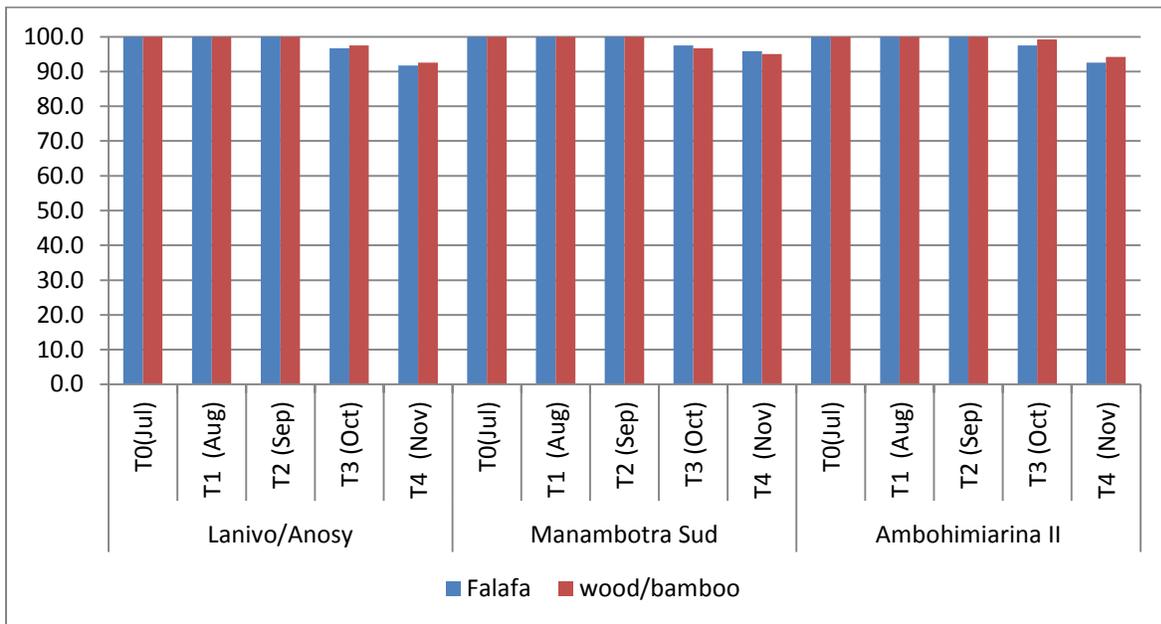


FIGURE 9: RESIDUAL EFFECTIVENESS OBSERVED FOR PIRIMIPHOS-METHYL CS 300 (ORGANOPHOSPHATES) IN THE SOUTH EAST



8.2. INSECTICIDE SUSCEPTIBILITY TESTS

Susceptibility testing with all classes of insecticides recommended by WHO, synergists tests and determination of resistance intensity will be performed and partial results will be available at end of November 2017.

Insecticide susceptibility tests were carried out at eleven sentinel sites selected from IRS targeted areas. The sites were: Ambodifaho (Brickaville district), Vohitrambato (Toamasina II), Mahambo (Fenerive Est), Vavatenina, Lanivo/ Anosy (Vohipeno), Manambotra Sud (Farafangana), Lopary (Vangaindrano), Ambohimiarina II and Tsaravary (Mananjary), Marofarihy (Manakara) and Vondrozo. The insecticides tested are: Deltamethrin (PY), Permethrin (PY), Alphacypermethrin (PY), Lambdacyhalothrin (PY), DDT (OC), Bendiocarb (C) and Pirimiphos-methyl (OP).

These partial results show

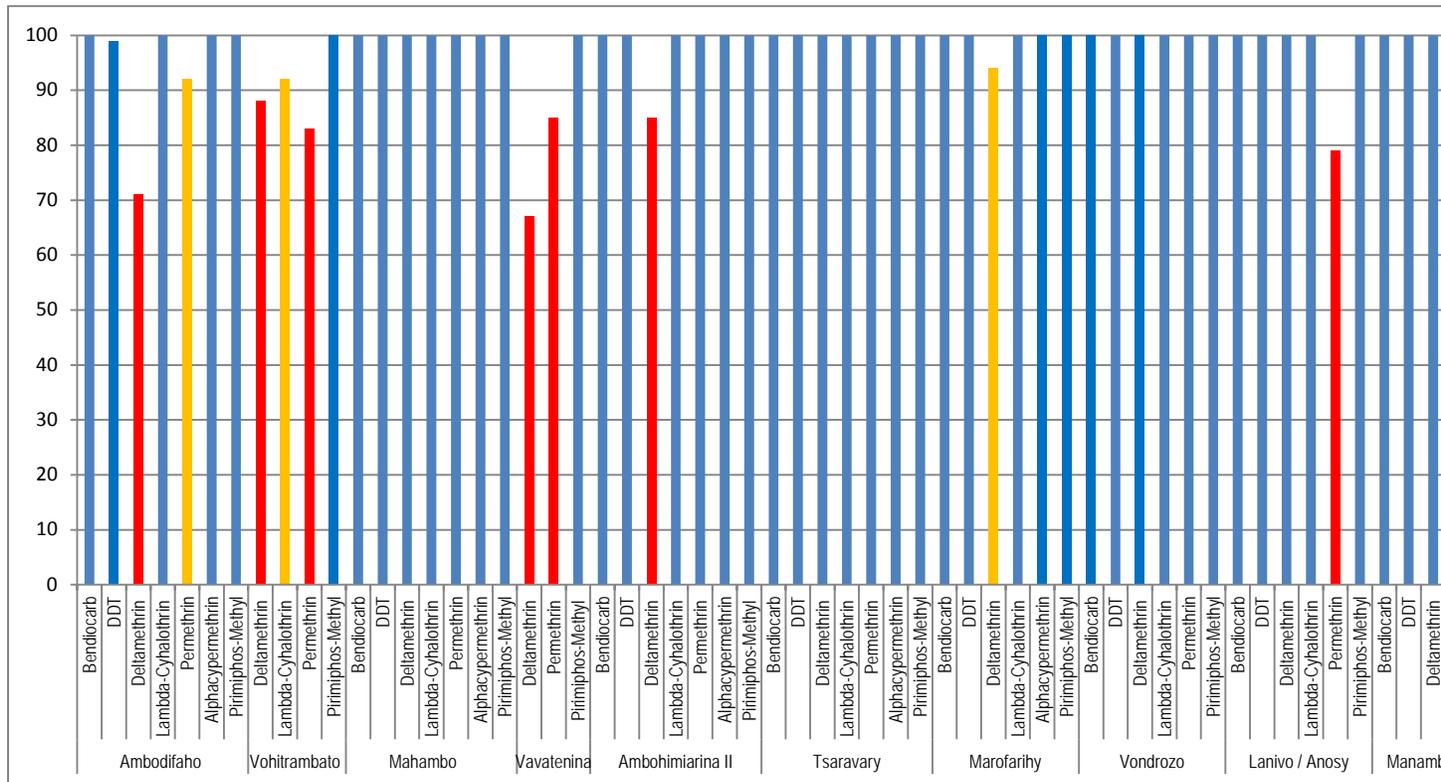
- Full susceptibility of *An. gambiae* s.l. to alphacypermethrin, bendiocarb, pirimiphos-methyl and DDT in all the study sites.
- Possible resistance of *An. gambiae* s.l. to permethrin, deltamethrin and lambdacyhalothrin, in Ambodifaho (Brickaville), Marofarihy (Manakara), and Vohitrambato (Toamasina II) respectively.

Resistance of *An. gambiae* s.l. to deltamethrin in Abodifaho (Brickaville), Vohitrambato (Toamasina II), Vavatenina, Ambohimiarina II (Mananjary) and to permethrin in Vohitrambato (Toamasina II), in Vavatenina, and Lanivo / Anosy (Vohipeno).

TABLE 10 . RESULTS OF AN. GAMBIAE S.L. SUSCEPTIBILITY TESTS

	Permethrin		DDT		Deltamethrin		Lambda-cyhalothrin		Alpha-cypermethrin		Pirimiphos-methyl		Bendiocarb	
	% mort	# tested	% mort	# tested	% mort	# tested	% mort	# tested	% mort	# tested	% mort	# tested	% mort	# tested
Ambodifaho	92 P	100.0	99 S	100.0	71 R	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Mahambo	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Vohitrambato	83 R	100.0			88 R	100.0	92 P	100.0			100 S	100.0		
Vavatenina	85 R	100.0			67 R	100.0					100 S	100.0		
Vohipeno	79 R	100.0	100 S	100.0	100 S	100.0	100 S	100.0			100 S	100.0	100 S	100.0
Vondrozo	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0			100 S	100.0	100 S	100.0
Ambohimiarina II	100 S	100.0	100 S	100.0	85 R	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Tsaravary	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Marofarihy		100.0	100 S	100.0	94 P	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Manambotra Sud	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0
Lopary	100 S	100.0	100 S	100.0	100 S	100.0	100 S	100.0		100.0	100 S	100.0	100 S	100.0

FIGURE 10. RESULTS OF INSECTICIDE SUSCEPTIBILITY TESTS USING THE WHO TUBE TEST



Additional tests, including susceptibility of other vectors, synergists and resistance intensity are ongoing.

9. GENDER

AIRS Madagascar emphasized increasing the number of women hired during the 2017 IRS campaign, especially in supervisory roles. The team met and spoke with local authorities about the key role of women for the project and communities. During the recruitment process, women candidates were prioritized if they met the job requirements. Goizper pumps, which are lighter to carry compared to Hudson pumps, were deployed to the spray sites. The project ordered new overalls and boots which correctly fit most of Malagasy women's sizes.

Before the campaign began, the gender focal point trained all staff on gender awareness and sexual harassment. The same training was given during the training of trainers for seasonal staff.

The project conducted a survey on a group of seasonal staff before the start of the campaign and then again at the end. This was done in compliance with Institutional Review Board requirements to measure the effects of altering the work place with messages to employees regarding gender equality.

During the campaign, gender awareness and sexual harassment guidelines (see Annex) were posted in each warehouse. In addition, the project sent a SMS reminder to each team leader and sector manager on gender awareness and sexual harassment. To date, there have not been complaints regarding sexual harassment reported to the project gender focal point.

TABLE 11: COMPARISON OF PROPORTIONS OF WOMEN IN SUPERVISORY ROLE BETWEEN IRS CAMPAIGNS IN 2014, 2015, 2016 AND 2017 BY GENDER (PERCENTAGE OF WOMEN)

Position	IRS Campaign 2014	Proportion	IRS Campaign 2015	Proportion	IRS Campaign 2016	Proportion	IRS Campaign 2017	Proportion
M&E Assistant	0/8	0.0%	3/4	75.0%	3/5	60.0%	3/8	37.5%
Distict Coordinator Assistant	N/A		N/A		N/A		1/8	12.5%
Finance Assistant	8/8	100.0%	3/4	75.0%	5/6	83.3%	8/8	100.0%
Sector Manager	3/46	6.5%	20/65	30.8%	29/98	29.6%	55/179	30.7%
Team Leader	22/111	19.8%	99/198	50.0%	110/222	49.5%	109/339	32.2%
TOTAL	33/173	19.1%	125/271	46.1%	147/331	44.4%	176/542	32.5%

TABLE 12: COMPARISON OF PROPORTIONS OF WOMEN IN SPRAY TEAM BETWEEN IRS CAMPAIGNS IN 2014, 2015, 2016 AND 2017 BY GENDER (PERCENTAGE OF WOMEN)

Position	IRS Campaign 2014	Proportion	IRS Campaign 2015	Proportion	IRS Campaign 2016	Proportion	IRS Campaign 2017	Proportion
Sector Manager	3/46	6.5%	20/65	30.8%	29/98	29.6%	55/179	30.7%
Team Leader	22/111	19.8%	99/198	50.0%	110/222	49.5%	109/339	32.2%
Spray Operators	25/559	4.5%	197/960	20.5%	203/1,112	18.3%	354/1,685	21.0%
TOTAL	50/716	7.0%	316/1,223	25.8%	342/1,432	23.9%	518/2,203	23.5%

This decrease in the overall percentage of women working with AIRS Madagascar during the 2017 IRS campaign was due to the lack of candidates for the team leader position who met the job requirements (e.g., literacy, etc.). However, the total number of women overall increased in all positions (i.e., sector managers, SOPs).

10. NATIONAL CAPACITY BUILDING

One reason for the success of the 2017 IRS campaign has been the effective collaboration between the Malaria Control Directorate (DLP), the Regional Directorates of Health, the District Public Health Services involved and the PMI AIRS project team. This level of collaboration and commitment will ensure that malaria is no longer a public health problem in Madagascar.

This collaboration took the form of mutual capacity buildings throughout the whole 2017 IRS campaign process. The success of the campaign also stems from the effective participation of the local community, represented by the kings (Ampanjaka/Tanganamana) and chief of Fokontany (village). In the preparatory phase, eight members of the DLP team participated in the master training session in Antsirabe with practical session on the use of a new Goizer pump for spraying. More than 45 NMCP decentralized structures staff participated in a two-week boot camp training in Antsirabe on the best practices in IRS with both theoretical and practical sessions. The DLP team also participated in the joint planning of the campaign, the various trainings, workshops or advocacy sessions for a successful IRS campaign.

During the campaign, a joint team of DLP-Abt Associates was established to monitor IRS activities. Every day, the team supervised each district using a smartphone to facilitate and standardize supervision.

At the end of each day, the team organized a "daily debriefing" via WebEx with the supervision team to analyze the results of the day as well as strengths and areas for improvement.

Moreover, DLP benefited from an insectarium and laboratory equipment to strengthen its entomological monitoring and to analyze and monitor the technical quality of spraying. Today, the DLP and the PMI AIRS team can take pride in having developed a collaboration that can be presented as a national capacity building model.

DLP has managers working in tandem with those of the AIRS project to cover areas ranging from environmental compliance, entomological monitoring through social mobilization, training, logistics management, supervision and field operations' coordination.

As part of this collaboration, the DLP will benefit very soon (in November 2017) from direct technical support from the AIRS technical team for its focalized spray campaign in Central Highlands and other regions funded by Global Fund.

II. CHALLENGES AND LESSONS LEARNED

AIRS Madagascar encountered several challenges which varied according to the location of the campaign. Below are the lessons learned and recommendations:

Lessons learned

- ❖ The involvement of the chief Fokontany in IEC mobilization and collaboration with PCV, and other Implementing Partners like Mikolo and Mahefa Miraka has strongly contributed to the improvement of the IRS acceptance.
- ❖ Communalization as an intervention approach made it possible to protect more populations (22,611 additional structures treated) compared to 2016 in three districts of the East Coast and two districts of the South-East). It is therefore necessary to continue with this communalization strategy and optimize the logistics and transport resources available to the spray teams.
- ❖ Improving the involvement and commitment of traditional, local, health and administrative authorities for IRS has greatly contributed to the good results and success of the 2017 IRS campaign. Advocacy has been very helpful in this regard.
- ❖ Enhanced collaboration with the DLP in the preparation, implementation, and supervision of the IRS 2017 through the establishment of teams at the district level, capacity building through training of DLP cadres and the district health system is a model of transfer of competence and open collaboration.
- ❖ The campaign was well planned and its period did not coincide with other local campaigns in either the South East or the East Coast.
- ❖ The involvement of women in the operations teams and in supervisory positions has enhanced the performance of SOPs and the contribution of women to malaria control.
- ❖ The e-Inventory for insecticide and other products tracking has proven to be a very important tool for inventory management and deserves to be refined and scaled up.
- ❖ mHealth implementation has improved significantly and facilitated daily monitoring of SOP performance and the organization of supervision.
- ❖ The use of the Goizper pump has improved the quality of the spray and the performance of the sprayers (light and easy to maintain). This was a great source of satisfaction for the spray teams as for the coordination of the project.

- ❖ Assistant District Coordinators, Operations Assistant and Assistant to M&E positions, and district storekeepers have been of great help in the implementation of IRS especially in the new district and remote areas.
- ❖ The supervision of the management of the material and financial resources made available to the district coordination teams must be strengthened. The procedures for the commitment and justification of funds and for the use of operations vehicles must be reviewed.

Recommendations

- ❖ Continue communalization as an intervention approach, scaling up the "Fokontanisation" of the IEC, advocacy with traditional authorities at the district level, and collaboration with other implementing partners for synergy
- ❖ Elaborate, under the leadership of the DLP, a plan to withdraw IRS from three East Coast districts (Brickaville, Fenerive Est and Tamatave II), which have already benefited from four rounds of IRS campaign.
- ❖ Continue collaboration with the DLP in a gradual transfer of skills in all areas.

ANNEX A:

ITEMS PROCURED INTERNATIONALLY

TABLE 13: ITEMS PROCURED INTERNATIONALLY

	Stock before the campaign	Quantities purchased	Quantity used	Quantity in stock after the campaign
Goizper pumps	600	1,848	2,114	2,448
Gloves for Spray Operators	694	2,088	2,114	2,782
Respirator Masks	16,680	56,040	51,472	21,248
Rubber Boots	1,240	3,792	3,640	5,032
Coveralls	3,085	7,900	7,211	10,986
Helmets	1,943	816	2,508	2,735
Face shield	1,363	2,500	2,320	3,826
Face Brackets	4,289	2,500	2,320	6,759
Tyvek	372	525	105	897
Lens Cleaning Wipes	30	624	141	513
Yellow Apron for Washer	80	201	226	281
Yellow gloves for Washer	100	144	226	300
First Aid Kit	244	138	380	382
Actellic® 300CS insecticide		94,896	76,248	18,648

ANNEX B: SITE REPAIRS

TABLE 14: SITE REPAIRS

Area	District	Operational sites	# of permanent soak pit	# of store rooms	Repairs made
East	Fenerive Est	Ambatoharanana	1	1	Old soakpit re-use Fence repaired
		Vohilengo	1	1	Old soakpit re-use Fence repaired
		Ampasimbe Manantsatrana	1	1	New construction
		Ampasina Maningory	2	1	Old soakpit re-use Fence repaired
		Mahambo	2	1	New construction
		Mahanoro	2	1	Old soakpit re-use Fence repaired
		Antsiatsiaka	1	1	Old soakpit re-use Fence repaired
		Vohipeno	1	1	Old soakpit re-use Fence repaired
		Fenerive Centre	2	1	Old soakpit re-use Fence repaired
	Toamasina II	Antetezambaro	1	1	New construction
		Foulpointe	1	1	Old soakpit re-use Fence repaired
		Ambalamanasy	1	1	New construction
		Sahambala	1	1	New construction
		Ampasimadinika	1	1	New construction
		Ambodilazana	1	1	Old soakpit re-use Fence repaired
		Amboditandroho	1	1	Old soakpit re-use Fence repaired
		Andranobolahy	1	1	New construction
		Ampasimbe Onibe	1	1	New construction
		Andondabe	1	1	Old soakpit re-use Fence repaired
	Brickaville	Brickaville centre	1	1	Old soakpit re-use Fence repaired
		Anjahamana	1	1	Old soakpit re-use Fence repaired
		Mahatsara	1	1	New construction
		Ambalarondra	1	1	Old soakpit re-use Fence repaired
		Andovoranto	1	1	Old soakpit re-use Fence repaired
		Ambinaninony	1	1	New construction
		Ranomafana	1	1	Old soakpit re-use Fence repaired
	Vohipeno	Vohipeno	1	1	New construction

South East

	Mahazoarivo			New construction
	Anoloka (replaced Vohilany)			New construction
	Ilakatra			New construction
	Zafindrafady			New construction
	Andemaka			Old soakpit re-use Fence repaired
	Vohindava			Old soakpit re-use Fence repaired
	Ifatsy			New construction
	Nato			New construction
	Vohitrindry			Old soakpit re-use Fence repaired
	Vohilany			New construction
Farafangana	Farafangana			Old construction
	Evato			Old soakpit re-use
	Anosy Tsararafa			New construction
	Ambalatany			Old soakpit re-use Fence repaired
	Mahabo mananivo			Old construction
	Ihorombe			New construction
	Vohilengo			Old construction
	Etrotroka			New construction
	Maheriraty			New construction
	labohazo			Old soakpit re-use Fence repaired
	Efatsy			New construction
	Ankarana			Old soakpit re-use Fence repaired
	Vondrozo	Vondrozo		
Antokonala				New construction
Karianga				New construction
Andakana				New construction
Mahatsinjo				New construction
Manambidala				New construction
Iamonta				New construction
Vohiboreka				New construction
Vohimary				New construction
Anandravy				New construction
Manakara	Ampasimanjeva			New construction
	Analavory			New construction
	Lokomby			New construction
	Ambahive			New construction
	Bekatra			New construction
	Fenomby			New construction

	Marofarihy			New construction
	Anteza			New construction
	Ambalavero			New construction
	Vohimasy			New construction
	Sahasinaka			New construction
	Anorombato			New construction
	Sahanambohitra			New construction
	Tataho			New construction
Mananjary	Sandrohy			New construction
	Mananjary			New construction
	Andranomavo			New construction
	Marosangy			New construction
	Antaretra			New construction
	Morafeno			New construction
	Mahavoky Nord			New construction
	Andonabe			New construction
	Ambohimiharina II			New construction
	Anosimparihy			New construction
	Namorona			New construction
	Manakana Nord			New construction
	Mahela			New construction

ANNEX C: NUMBER OF PEOPLE TRAINED

TABLE 15: NUMBER OF PEOPLE TRAINED, DISAGGREGATED BY GENDER

South EAST																						
Categories of People Trained	Training on IRS Delivery								Other Trainings													
	Training of Trainers: Spray Ops		Spray Operations		Data Entry		Logistics		IEC Mobilisation		Public Health Training		PPEs Washing		Financial training		Enumeration training		Security		Transportation	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Logistics Assistant							2	0														
Financial Assistant															1	9						
M&E Assistant					2	3																
Data Entry Clerk					12	30																
Sector Manager	97	38																				
Store Keeper							61	76														
Team Leader			138	65																		
Spray Operator			790	193																		
Guardian																		182	0			

Washer														0	125								
IEC Mobilizer									1,436	572													
Driver																					43	0	
Public Health Agent											82	43											
Enumerator																	994	408					
Supervisor of Enumeration																	56	35					
TOTAL M/F	97	38	928	258	14	33	63	76	1,436	572	82	43	0	125	1	9	1,050	443	182	0	43	0	
TOTAL/ training	135		1,186		47		139		2,008		125		125		10		1,493		182		43		
Grand TOTAL	5,493																						
Total Number of Women trained in the SOUTH EAST	1,597																						
Total Number of men trained in the SOUTH EAST	3,896																						
EAST																							
Categories of People Trained	Training on IRS Delivery								Other Trainings														
	Training of Trainers: Spray Ops		Spray Operations		Data Entry		Logistics		IEC Mobilization		Public Health Training		PPEs Washing		Financial training		Enumeration training		Security		Transportation		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Logistics Assistant																							
Financial Assistant																0	3						

ANNEX D: GENDER AWARENESS AND SEXUAL HARASSMENT GUIDELINES

TOROLALANA MOMBA NY ADY AMIN'NY FANARARAOTANA ARA-NOFO ETO ANIVON'NY TETIKASA PMI AIRS MADAGASCAR



NY FANARARAOTANA ARA-NOFO DIA MITERAKA TONTOLON' NY ASA MIKOROTANA, MAMPIHOROHORO, MAMPATAHOTRA NA MANALA BARAKA HO AN'NY MPIASA REHETRA NA LEHILAHY NA VEHIVAVY. FADIO !

- PMI AIRS MADAGASCAR DIA MIEZAKA HATRANY NY HAMETRAKA TOERA-PIASANA MIRINDRA SY MILAMINA HO AN'NY MPIASA REHETRA
- NY FIHETSIKA FANERENA AN-KOLAKA FILANA ARA-NOFO DIA MISO FIANTRAIKY RATSY EO AMIN'NY FIZOTRAN'NY ASA
- MITERAKA KORONTANA ETO ANIVON'NY TOERA-PIASANA NY FANARARAOTANA ARA-NOFO
- IREO FIHETSIKA MIENDRIKA FANERENA AN-KOLAKA FILANA ARA-NOFO TSY NIRIANA (NINIANA NA TSY NINIANA NATAO) DIA TSY HO EKENA MIHITSY
- FADIO IREO FITENY MANAMBANY, MANOMPA, MANDAINGA NA FOMBA FJERY MIBA
- FADIO NY MIKASI-TANANA NA MANAO FIHETSIKA MANAMBANA @ OLONA KA MAMPISY FIANTRAIKANY RATSY EO AMIN'NY FIZOTRAN'NY ASA
- FADIO NY MAMPISEHO SARY NA RAKI-TSARIMIHETSIKA MAMOAFADY
- TSY EKENA MIHITSY NY FAMPITAHORANA MPIASA MAMETRAKA FITARAINANA MOMBA NY FANARARAOTANA ARA-NOFO

APETRAHO ATO NY FITARAINANAO: ABT HELPLINE 001-888-928-4231 na WWW.INTEGRITY-HELPLINE.COM/ABTASSOC.JSP

TSY HANANANA INDRAFO NY FANARARAOTANA ARA-NOFO



ANNEX E: AIRS MADAGASCAR MONITORING AND EVALUATION PLAN INDICATOR MATRIX

TABLE 16: AIRS MADAGASCAR MONITORING AND EVALUATION PLAN INDICATOR MATRIX
LAST UPDATED: 23/10/2017

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component I: Establish cost-effective supply chain mechanisms and execute logistical plans								
I.1 Procurement								
I.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1;100%	1;100%	1;100%	1; 100%	1;100%

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
1.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1;100%	1;100%	1:100%	1:100%	2; 50%
1.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1;100%	1; 100%	1:100%	1; 100%	1;100%
1.1.4 Number and percentage of local procurements for PPE delivered 14 days before the start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1; 100%	1;100%	1:100%	1:100%	1;100%
1.1.5 Successfully completed spray operations without an insecticide stock-out	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
1.2 In-Country Exemption and Custom Clearance Process								
1.2.1 Complete exemption and clearance process within the minimum 2 weeks	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
I.3 In-Country Logistics, Warehousing, and Training								
1.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<i>Data source:</i> Training records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign By Gender	109;100% M : 50% F: 50%	72;100% M:19 F: 53	94; 100% M:50% F:50%	95:100% M: 23 F: 72 (75.8%)	151; 100% M:40% F:60%	183;100% M: 76 F: 107
1.3.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	108;100%	10;100% South East:3 East Coast: 7	93; 100%	53:100% South East: 24 East Coast: 29	151; 100%	172;100% South East: 133 East Coast: 39
1.3.3 Submit up-to-date inventory records 30 days after the end of each spray campaign	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	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 PMI AIRS country work plan developed and submitted on time	<i>Data source:</i> Project records <i>Reporting frequency:</i> Annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
2.1.2 Percentage reduction in project operational expenses per structure from the previous year,excluding insecticide costs .	<i>Data source:</i> Project financial records <i>Reporting frequency:</i> Annually	By Spray Campaign	5%	TBD	5%	5%	5%	TBD

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations								
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the PMI COR team	Data source: Project records – submitted SEAs/ letter reports Reporting frequency: Each spray campaign	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation ¹	Data source: Project records – Training reports Reporting frequency: Each spray season	By Spray Campaign By Gender	1,219 M: 853 F: 366	1,223 M: 907 F: 316	1,447	1,433 M: 1,091 F: 342	2,024 M: 1,124 F: 352	2,214 M: 1,695 F: 519
2.2.3 Number of health workers receiving insecticide poisoning case management training	Data source: Project records – Training reports Reporting frequency: Each spray season	By Spray Campaign By Gender	114	95 M:42 F: 53	102	139 M: 53 F: 86	139	227 M: 152 F: 75
2.2.4 Number of adverse reactions to pesticide exposure documented	Data source: Incident report forms Reporting frequency: Each spray campaign	By Spray Campaign By Residential/ occupational exposure	0	0	0	0	0	0
2.2.5 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	Data source: Project records – Reports submitted by district environmental officers Reporting frequency: Each spray season	By Spray Campaign By Soak Pit By Storehouse	100%	23;100%	11;100%	53;100%	151;100%	453;100%
				Soak Pit: 13 Warehouse:10	SoakPit: 17 Warehouse:93	Soakpit: 53 Warehouse:53	Soakpit: 151 Warehouse: 151	Soakpit: 91 Warehouse: 172

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
						Mobile soak pit :107	Mobile SoakPit: 53	Mobile SoakPit: 190

2.3 Conduct Communications Activities and Community Mobilization

2.3.1 Number of radio spots and talk shows aired	Data source: Project records Reporting frequency: Per spray campaign	By Spray Campaign	342	162 East Coast:108 South East: 54	1,620	438 East Coast: 333 South East: 105	528	840 East coast: 315 South East: 525
2.3.2 Number of IRS print materials disseminated	Data source: Project records Reporting frequency: Semi-annually	By Spray Campaign By Type of printed material and message(s)	263,738 Leaflet : 256 000 Booklet : 138 Poster : 7600	204,631 Leaflet: 197,031 Poster: 7,600	370,500 Leaflet: 361,000 Poster 9,500	231,591 Leaflet: 225,995 Poster: 5,500 Banners: 96	493,911 Leaflet: 480,676 Poster: 13,090 Banners: 145	538,635 Leaflet: 530,393 Poster: 8,045 Banners: 197
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	Data source: Mobilization Data Collection Forms Reporting frequency: Daily per mobilization conducted	By Spray Campaign By Gender	949,961	416,634 M:185,634 F:231,270	485,475	562,327 M: 261,871 F: 300,456	579,197	903,079 M: 421,995 F: 481,084

2.4 Spray Targeted Structures According to Technical Specifications

2.4.1 Number of structures targeted for spraying	Data source: Previous spray campaign data, enumeration data (targets); Daily Spray Operator Forms (results)	By Spray Campaign	230,126	268,829	308,565	329,395	436,978	511,645
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Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	Reporting frequency: Daily per spray campaign		South East: 72,120 EAST: 158,006	South East: 81,941 East Coast: 186,888	South East: 119,751 East Coast: 188,814	East Coast: 198,689 South East: 130,706		East Coast: 198,689 South East: 287,942
2.4.2 Number of structures sprayed with IRS	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	195,607 (85 % of 230,126)	247,902 South East: 75,782 East Coast: 172,120	262,281 (85% of 308,565)	310,426 South East: 119,959 East Coast: 190,467	371,431	487,636 South East: 284,374 East Coast: 203,262
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	85%	92.2%	85%	94.2%	85%	95.3%
2.4.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign By Gender By pregnant women By children <5 years old	807,467 (85 % of 949,961)	1,016,841 M: 510,854 F: 505,987 Pregnant Women: 36,241 Children<5: 147,682	1,031,633 (85% of 1,213,687)	1,257,036 M:631,154 F: 625,882 Pregnant Women: 47,508 Children<5: 184,927	2,097,494	2,008,963 M:1,002,736 F: 1,006,227 Pregnant Women: 78,492 Children<5: 301,653

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
COMPONENT 3: ONGOING MONITORING AND EVALUATION AND QUALITY CONTROL MEASURES								
3.1 Submit AIRS COUNTRY M&E Plan to PMI for approval	Data source: Project records Reporting frequency: Semi-annual	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	Data source: Spray operations reports Reporting frequency: Per spray campaign	By Spray Campaign	Completed	N.A	N.A	N.A	Completed	TBD
COMPONENT 4: CONTRIBUTE TO GLOBAL AND COUNTRY-LEVEL IRS POLICY SETTING AND DEVELOP AND DISSEMINATE EXPERIENCES AND BEST PRACTICES								
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By guideline/checklist/tool	1 Gender awareness guidelines	1 Gender awareness guidelines	1 Gender awareness guidelines	2 Gender awareness guidelines Team leader supervisory forms	1 Gender Awareness guidelines	1 Gender Awareness guidelines
4.2 Number of articles/best practices documents published	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	1	1 Operations	1	1 Operations	1 Operations	3 Entomology M&E Operations
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	1	1 Operations	1	1 Operations	1 Operations	2 Entomology Operations

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

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

5.1 Support entomological monitoring activities and insecticide resistance strategies

5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location)	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	6	6	6	6	9	9
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	6; 54.5%	6; 54.5%	6; 54.5%	6; 54.5%	9; 81.8%	9; 81.8%
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	6; 54.5%	6; 54.5%	6; 54.5%	6; 54.5%	9; 81.8%	9; 81.8%

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign By Insecticide class	11: 100%	11: 100%	11:100%	11: 100%	11; 100%	11; 100%
			Organophosphate Organochlorine Carbamate Pyrethroid	Organophosphate Organochlorine Carbamate Pyrethroid	Organophosphate Organochlorine Carbamate Pyrethroid	Organophosphate Organochlorine Carbamate Pyrethroid	Organophosphate Organochlorine Carbamate Pyrethroid	Organophosphate Organochlorine Carbamate Pyrethroid
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	4 sentinel sites: 36.4% of the sites; 32 tests	4 sentinel sites: 36.4% of the sites; 32 tests/month/site	4 sentinel sites: 36.4% of the sites; 32 tests/month/site	4 sentinel sites: 36.4% of the sites; 32 tests/month/site	6 sentinel sites: 54.5% of the sites 32 tests per site/ 192tests	TBD
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	4 sentinel sites: 36.4% of the sites 32 tests per site/month=128 tests/month	4 sentinel sites: 36.4% of the sites 32 tests per site/month=128 tests/month	4 sentinel sites: 36.4% of the sites 32 tests per site/month=128 tests/month	4 sentinel sites: 36.4% of the sites 32 tests per site/month=128 tests/month	6 sentinel sites: 54.5% of the sites 32 tests per site/ per month/=192tests/month	TBD
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	396 WHO tube tests* 396 CDC bottles assay	432 WHO tube tests: 6 tests per insecticides x 11 sites.	TBD			
5.2.1 Collect routine epidemiological data	Data source: <i>Project Reports</i> Reporting Frequency: Annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI AIRS Project	Data source: Epidemiological reports Reporting frequency: Annually	By Spray Campaign	110	110	110	110	110	111
Component 6 (Cross-cutting): Capacity Building, Knowledge Transfer, Gender Inclusion								
6.1 Increasing the Role of Women and Addressing Gender Barriers								
6.1.1 Number of people trained to deliver IRS in target districts	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Spray Campaign By Gender Percentage of Women Trained	1326	1,319 South East:521 East: 798 M:950 F:369 38.8%	1,447	1,572 South East: 652 East Coast: 920 M:1,144 F: 428 27.2%	2,019 30%	2,457 South East: 1,507 East Coast: 950 M: 1,785 F: 672 27.4%
6.1.2 Total number of people trained to support IRS in target districts	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Spray Campaign By Gender	3,185	3,302 South East:1,073 East: 2,229 M:1,965 F:1,337	3,654	4,134 South East: 2,092 East Coast: 2,042 M: 2,777 F: 1,357	5,975	5,194 South East: 3,986 East Coast: 1,208 M: 3,458 F: 1,736

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
		Percentage of women trained		40.5%	F: 42%	32.8%		33.4%
6.1.3 Number and percentage of women recruited (i.e. number/percentage of women on the selection list) for IRS employment	Data source: Project records – Recruitment reports reports Reporting frequency: Semi-annually	By Country	909 30%	1,337 40.5%	1,560 42%	1,357 32.8%	1,793 35%	2,336 30.1%
6.1.4 Number of people trained as IRS Training of Trainers	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign	65	66	101	100	152	179
		By Gender	F: 26	M: 46 F: 20	F:50	M:71 F: 29		M:124 F: 55
		Percentage of women trained	40%	30.3%	49.5%	30%	35%	30.7%
6.1.5 Total number of people hired to support IRS in target districts	Data source: Project records – Contracts signed Reporting frequency: Semi-annually	By Spray Campaign	3,123	3,237 South East: 1074 East: 2,163	3,714	4,134 South East: 2,092 East Coast: 2,042	5,975	7,757 South East: 5,592 East: 2,165
		By Gender	F:1200	M:1904 F:1333		M: 2,777 F: 1,357		M: 5,421 F: 2,336
		Percentage of women hired	39%	41.2%	42%	32.8%		30.1%
6.1.6 Number of women hired in supervisory roles in target	Data source: Project records – Contracts signed	By Spray Campaign	447	195 50%	338	147	480	176

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
districts (this number includes site supervisors, team leaders, M&E assistants and others who supervise seasonal staff) ¹	Reporting frequency: Semi-annually	Percentage of women hired By role	179 40%	Finance Assistant: 4 M&E Assistant: 3 Supervisor of mobilization: 69 Sector manager: 20 Team leader: 99	50%	District Finance Assistant: 5 District M&E Assistant: 3 Sector Manager: 29 Team Leader: 110	45 %	32.5% District Finance Assistant: 8 M&E Assistant: 3 Sector Manager: 55 Team Leader: 109 District Coordinator Assistant : 1
6.1.7 Number of staff (permanent and seasonal) who have completed gender awareness training	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender Percentage of women	TBD	84 M: 57 F: 27 32.1%	111	128 M: 92 F: 36 28.1%	180	479 M: 261 F: 218 45.5%

¹Sector Manager , Team leader, Spray Operators

¹ Team Leader, Sector Manager, M&E Assistant, Finance Assistant

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
6.2 Capacity Building								
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender Percentage of Women	16	20	24	23	23	43
				M: 9 F: 11	F: 20	M: 3 F: 19	M:3 F:19	M: 29 F: 14
				55%	83%	82.6%		32.6%
6.2.2 Implement all activities outlined in their yearly Capacity Building Action Plan	Data source: Project records – Capacity assessment reports Reporting frequency: Semi-annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed
6.2.3 Madagascar government implements at least one aspect of the IRS program independently.	Data source: Project records – MOUs Reporting frequency: Semi-annually	By Spray Campaign	Completed	Completed	Completed	Completed	Completed	Completed

ANNEX F: IEC MESSAGES

IRS MESSAGES CONVEYED BY IEC/BCC MOBILIZERS

I. OBJECTIVE: Households prepare for IRS and agree to receive SOPs and let them inside their homes.

II. MESSAGES

Messages for Advocacy (to community leaders)

- Inform the public in advance of the schedule and goal of IRS.
- Get involved in mobilization
- Facilitate the operation with the community (programming, consultation, etc.)

IEC messages:

-To families:

- **Prepare for spraying:**
 - ✓ Prepare 10 liters of water for preparing the product.
 - ✓ Remove food, clothing, cooking utensils, drinking water, furniture, etc..
 - ✓ Keep animals in a safe place and far enough away from home.
 - ✓ Remove anything that is hanging on the walls.
 - ✓ Put heavy furniture in the middle of the house.
 - ✓ Leave a space in the house to all SOPs to spray all the walls.
- **Receive SOPs:**
 - ✓ Give water to the SOPs.
 - ✓ Show SOPs the rooms to be sprayed.
 - ✓ Let SOPs work unhindered.
 - ✓ Stay out of the house.
- **After spraying:**
 - ✓ Do not wash the walls after spraying.
 - ✓ Close all doors for 2 hours before opening.
 - ✓ Leave the doors open for 30 minutes to allow air to flow.
 - ✓ Clean the house.
 - ✓ Throw in the latrines or bury dead mosquitoes or other insects, as well as dust.
 - ✓ Wash hands with soap.
 - ✓ Wait 6-9 months to paint the walls depending on the insecticides used.
 - ✓ In case of allergy: itching skin, wash with soap and water

IRS MESSAGES CONVEYED BY IEC/BCC MOBILIZERS

-To the community:

- IRS is free.
- IRS protects the family and the entire region.
- IRS reduces mortality of pregnant women and children under 5 years.
- IRS protects the house for 3 to 6 months.
- IRS is safe for people and pets if all conditions are met.
- IRS is very effective if all structures are sprayed.
- IRS is funded by the American people

Messages to SOPs:

- Facilitate the process by working with the community.
- Wear personal protective equipment (PPE).
- Ensure the effectiveness and quality of spraying.
- Do not cover the walls after spraying and for at least 6 months.

ANNEX G: ENVIRONMENTAL MITIGATION AND MONITORING REPORT

TABLE 17: ENVIRONMENTAL MITIGATION AND MONITORING REPORT MADAGASCAR 2017

Mitigation Measure	Status of Mitigation Measures	Outstanding issues relating to required conditions	Remarks
Ia. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	Pre-contract inspection and certification of vehicles was conducted on the 17 th of July, 2017 for the South East and from the 28 th of August, 2017 for the East		For the South East, AIRS Madagascar contracted 43 vehicles and 20 vehicles for the East.
Ib. Driver training	Driver training was conducted on July 17. About 46 drivers were trained for the 2017 spray campaign in 8 districts.		17 vehicles and drivers who worked in the South East continued to work in the East.
Ic. Cell phone, personal protective equipment (PPE) and spill kits on board during pesticide transportation.	All drivers had cell phones as a pre-requisite for hiring and were provided with PPE and spill kits after being trained. IRS Madagascar conducted 85 supervisions for the morning mobilization vehicle inspection. For 16 of these inspections, some kits were missing.		The reason was: the spray operators needed to go far away from the vehicles to spray and they took the kit along.
Id. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	Initial pregnancy tests were conducted before hiring Spray Operators, Washers and Store Assistants from July 10 to 22, 2017 for the South East and from August 21 to September 3, 2017 for the East		
Ie. Health fitness testing for all seasonal staff	Medical examinations were conducted for potential candidates as one of the benchmarks for selection of Spray Operators from July 17 to July 23, 2017 for the South East and from August 28 to September 3, 2017 for the East across the targeted IRS districts.		
72 If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	Both International and local procurement were carried out successfully prior to all trainings.		

1g. Training on mixing pesticides and the proper use and maintenance of spray pumps.	The correct mixing procedure for pesticides, including triple rinse of the bottles, was included in all trainings. The Supervisors were trained together with the Team Leader as pump mechanics for the maintenance of the pumps.		339 Team Leaders (203 in the South East, 136 in East Coast) and 1685 Spray Operators (983 in the South East and 702 in East Coast) were trained. Team Leaders were also trained in the maintenance of spray pumps.
1h. Provision of adequate facilities and supplies for end-of-day cleanup,	Most of the storage facilities were donated to the project by the District Assemblies of the various districts. However, the end-of-day cleanup was solely the responsibility of the site managers and supported by the field supervisors at each operations site. AIRS Madagascar conducted 202 supervisions for the end of day cleanup.		At the end of the campaign, each storeroom was decontaminated by washing with water and soap mixed with bleach.
1i. Enforce clean-up procedures.	The clean-up procedure for the pumps was done in the designated wash areas and supervised by the site managers.		
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	AIRS Madagascar conducted sensitization campaigns and information before spraying. IEC materials were distributed among households.		530,393 flyers, 8,045 posters, 5,400 T-shirts, 5,370 caps, and 397 banners were distributed.
2b. Prohibition of spraying houses that are not properly prepared.	579 supervisions were made and found 12 cases where the resident was not informed of spraying protocol and was not well prepared		The resident was immediately informed of the measures to be taken and helped to prepare their houses properly before spraying
2c. Two-hour exclusion from house after spraying	579 supervisions were made and found 1 case where the resident was not informed of post spray requirement		Recommendations and instructions are shared with the resident.
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside.	579 supervisions were made and found 6 cases where the resident was not informed of exposure protocol		The information was given immediately to the beneficiaries so that they could know the steps to follow in the event of an accident
3a. Indoor spraying only.	AIRS Madagascar conducted 579 supervisions regarding the homeowner preparation and spray operator performance.		

3b. Training on proper spray technique	Team Leader and Spray Operator training was conducted in the South East from July 17 to July 23, 2017 and from August 28 to September 3, 2017 in the East Coast.		
3c. Maintenance of pumps	12 cases of leaking pumps were observed during the 579 supervision inspections.		The SOPs were immediately instructed to stop spraying and contact the Team Leader for the repair or replacement of the pump.
4a. Choose sites for disposal of liquid wastes , including mobile soak pit sites according to PMI BMPs.	The selection of sites was done by the ECO and supervised by the COP according to the PMI BMPs. A lot of rounds of Pre-Season Environmental Compliance Assessment were conducted. For the South East 164 PSECA's were conducted (from May 16 to July 25, 2017) and for the East 42 PSECA's (from May 12 to September 8).		
4b. Construct fixed and mobile soak pits with charcoal to adsorb pesticide from rinse water.	All the soak pits were constructed as per directions in the BMP. During the PSECA, the ECO supervised the construction of all new soak pits. When the sprayers use the mobile soak pit, the sector manager informs the ECO or his assistants who will supervise the place of installation and use. Otherwise, written instructions were given to the team leaders to select installation locations and methods of use according to BMP		AIRS Madagascar use 89 soak pits (59 in the South East and 30 in the East). 190 mobile soak pits were built (120 for South East and 70 for East)
4c. Maintain soak pits as necessary during season.	All soak pits were cleared of vegetation and serve as a filter during the spray campaigns. These soak pits were functional during the campaign and did not require any repairs.		
4d. Inspection and certification of solid waste disposal sites before spray campaign.	All solid waste generated will be incinerated at a waste management and recycling company, Adonis Madagascar.		

4e. Monitoring waste storage and management during campaign.	302 inspections regarding storekeeper performance were conducted.		
4f. Monitoring disposal procedures post-campaign.	The ECO will monitor the post-spray campaign solid waste procedure and disposal from the district level to the central warehouse and to the final designation for proper disposal at Adonis.		Since September 25, the treatment of waste IRS 2017 was started in the site of Adonis Ambatomirahavavy Antananarivo (incineration and recycling)
4g. Installed prefabricated storerooms	2 pre-fabricated storerooms were installed. These stores are set up with appropriate wash areas and showers at very close proximity of the storeroom. They were set up with adequate aeration systems with air circulating from the top/higher part of the wall		
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	Records of all pesticide receipts from central stores, issuances and returns of empties were kept on the stock cards with backups in ledger books at regional and district level, as well as the sub-districts warehouses. 302 controls were made regarding the documents of stock.		
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	On average, one bottle is needed to spray 6.5 structures		In the South East: 7.8 structures were sprayed per bottle and in the East 5.2 structures were sprayed per bottle.
5c. Visual examination of houses sprayed to confirm pesticide application.	Visual examination of houses sprayed was conducted by observing the traces of the sprayed chemical of the walls, ceilings, and eaves. IRS technical staff and government supervisors conducted 579 examinations.		
5d. Perform physical inventory counts during the spray season.	The ECO and Logistics ensured physical inventory taking during and after the spray season. 302 inspections were made.		

ANNEX H: REASONS FOR NON-SPRAY, 2015 & 2016 & 2017

TABLE 18: REASONS FOR NON-SPRAY, 2015 & 2016 & 2017 OF ALL ELIGIBLE STRUCTURES FOUND

	Closed structures			Refusal			Sickness			Family event			Insecticide smell			Other			Total			
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	
BRICKAVILLE	598	386	573	923	422	632	1,074	765	967	167	104	168	-	339	638	670	159	248	3,432	2,175	3,226	
	1.2%	0.7%	1.0%	1.9%	0.7%	1.1%	2.2%	1.3%	1.7%	0.3%	0.2%	0.3%		0.6%	1.1%	1.4%	0.3%	0.4%	7.0%	3.8%	5.8%	
FENERIVE EST	2,023	683	479	1,687	639	907	2,088	1,464	1,333	594	249	249	-	1,239	1,123	885	-	-	7,277	4,274	4,091	
	2.3%	0.6%	0.6%	1.9%	0.6%	1.0%	2.4%	1.4%	1.5%	0.7%	0.2%	0.3%		1.2%	1.3%	1.0%	0.0%	0.0%	8.2%	4.0%	4.7%	
TAMATAVE II	1,317	489	328	2,237	633	575	980	1,049	767	644	146	128	-	773	637	167	149	96	5,345	3,239	2,531	
	2.2%	0.7%	0.5%	3.7%	0.9%	0.8%	1.6%	1.5%	1.1%	1.1%	0.2%	0.2%		1.1%	0.9%	0.3%	0.2%	0.1%	8.8%	4.6%	3.7%	
TOTAL EAST COAST	3,938	1,558	1,380	4,847	1,694	2,114	4,142	3,278	3,067	1,405	499	545	-	2,351	2,398	1,722	308	344	16,054	9,688	9,848	
	2.0%	0.7%	0.7%	2.4%	0.8%	1.0%	2.1%	1.6%	1.4%	0.7%	0.2%	0.3%		1.1%	1.1%	0.9%	0.1%	0.2%	8.1%	4.6%	4.6%	
FARAFANGANA	1,533	366	101	5,320	874	472	1,310	1,471	889	665	373	164	-	1,828	1,045	1,527	-	-	10,355	4,912	2,671	
	1.1%	0.4%	0.1%	3.9%	0.9%	0.5%	0.9%	1.5%	1.0%	0.5%	0.4%	0.2%	-	2.1%	1.2%	1.1%	0.0%	-	7.5%	5.0%	3.1%	
MANAKARA	-	-	1,222	-	-	2,629	-	-	1,262	-	-	290	-	-	589	-	824	-	-	-	-	5,992
	-	-	1.5%	-	-	3.2%	-	-	1.5%	-	-	0.3%	-	-	0.7%	-	-	0.0%	-	-	-	7.2%
MANANJARY	-	-	580	-	-	670	-	-	281	-	-	381	-	-	321	-	-	474	-	-	2,707	
	-	-	1.2%	-	-	1.4%	-	-	0.6%	-	-	0.8%	-	-	0.7%	-	-	1.0%	-	-	-	5.5%
VOHIPENO	-	1,555	381	-	1,801	508	-	984	751	-	1,205	243	-	737	644	-	580	177	-	6,862	2,704	
	-	3.20%	0.8%	-	3.7%	1.1%	-	2.0%	1.6%	-	2.5%	0.5%	-	1.5%	1.3%	-	1.2%	0.4%	-	14.0%	5.7%	
VONDROZO	-	-	447	-	-	477	-	-	242	-	-	56	-	-	238	-	-	127	-	-	1,587	
	-	-	1.4%	-	-	1.5%	-	-	0.8%	-	-	0.2%	-	-	0.7%	-	-	0.4%	-	-	-	5.0%
TOTAL SOUTH EAST	1,533	1,921	2,731	5,320	2,675	4,756	1,310	2,455	3,425	665	1,578	1,134	-	2,565	2,837	1,527	580	778	10,355	11,774	15,661	
	1.2%	1.3%	0.9%	4.0%	1.9%	1.6%	1.0%	1.7%	1.1%	0.5%	1.1%	0.4%		1.8%	0.9%	1.2%	0.4%	0.3%	7.8%	8.2%	5.2%	