



U.S. PRESIDENT'S MALARIA INITIATIVE



THE PMI VECTORLINK MADAGASCAR 2019 END OF SPRAY REPORT (EOSR)

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**THE PMI VECTORLINK
MADAGASCAR
2019 END OF SPRAY REPORT (EOSR)**



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I. ACRONYMS

CDC	Centers for Disease Control and Prevention
CFV	Control Flow Valve
DCV	Data Collection Verification
DEC	Data Entry Clerk
ECO	Environmental Compliance Officer
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
MoE	Ministry of Environment
MEP	Monitoring and Evaluation Plan
MSP	Mobile Soak Pit
NMCP	National Malaria Control Program
PMI	U.S. President’s Malaria Initiative
PPE	Personal Protective Equipment
SBC	Social Behavior Change
SEA	Supplemental Environmental Assessment
SOP	Spray Operator
TL	Team Leader
TO	Task Order
TOT	Training of Trainers
USAID	United States Agency for International Development
WHO	World Health Organization

2. EXECUTIVE SUMMARY

One key objective of the U.S. President's Malaria Initiative (PMI) VectorLink 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, PMI VectorLink Madagascar conducted IRS campaigns in the Southwest (Tulear II, Sakaraha, Betioky Sud and Ampanihy) and in Ihorombe (Ihosy) regions of Madagascar using three insecticides: organophosphates (Actellic® 300 CS), clothianidin (SumiShield® 50 WG) and clothianidin & deltamethrin combination (Fludora Fusion, a newly introduced insecticide to the VectorLink Madagascar program in 2019). The 2019 spray campaign was conducted from November 4 to November 30, 2019, during which 265,033 structures were targeted. This target was reduced from the original target of 275,470 structures, after a field assessment revealed that 10,437 structures were in environmentally sensitive areas or were inaccessible. In total, PMI VectorLink Madagascar found 279,746 eligible structures and sprayed 267,874 structures. This effort resulted in an overall coverage rate of 95.8 percent for all five districts while protecting 1,150,922 people from the burden of malaria in 2019.

The followings are key highlights of PMI VectorLink Madagascar's spray campaign in 2019:

- A total of 3,031 people were trained, of whom 1,172 (38.7%) were women. Out of the total number of people trained, there were 830 spray operators (SOPs), of whom 81 (9.8%) were women.
- A total of 30,667 bottles of Actellic® 300 CS were used in Ihosy, Betioky Sud and Ampanihy; 13,430 sachets of SumiShield® 50WG in Tulear II and Sakaraha, and 3,566 sachets of Fludora Fusion in Ihosy. The utilization ratios were: 6.2 structures per Actellic bottle in the Ampanihy and Betioky's districts, 5.3 structures per Sumishield sachet in the Tulear II and Sakaraha districts, and 4.4 structures per bottle of Actellic® 300 CS or sachet of Fludora Fusion in Ihosy district.
- During the first week of the campaign, cone bioassays were conducted to assess the quality of the spray. The results indicated 100 percent mortality for all insecticides sprayed (Actellic 300 CS, Sumishield and Fludora Fusion).
- PMI VectorLink 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. Tyvek suits were used in remote areas as personal protective equipment (PPE).
- The PMI VectorLink Madagascar team implemented two mobile technologies including a mobile performance management tracking (PMT) tool to monitor daily operational results, and an e-Inventory system to monitor the stock of insecticide and spray equipment at all operational sites. PMI VectorLink Madagascar also used the Webex system as a communication tool for daily internal debriefing on IRS progress.
- The VectorLink Madagascar team used the VectorLink Collect database (DHIS2) for the first time this year, which proved to be very useful as the team could closely monitor the spray progress electronically on a daily basis.
- The PMI VectorLink Madagascar team strengthened Information, Education, Communication (IEC) messaging during the campaign in collaboration with the USAID-funded ACCESS project in Betioky and Sakaraha districts.
- The PMI VectorLink Madagascar team organized advocacy meetings in all five districts with traditional leaders and local authorities prior to the spray campaign to minimize refusal rates.

Table 1 below summarizes key results obtained during the IRS 2019 campaign.

Table 1: Summary of the 2019 IRS Campaign Summary Results

	Tulear II	Sakaraha	Ampanihy	Betioky Sud	Ihosy	Total
Insecticide class	Clothianidin	Clothianidin	Organophosphate	Organophosphate	Clothianidin & Deltamethrin/ Organophosphate	
Number of structures targeted by IRS	44,867	24,875	88,020	67,076	40,195	265,033
Number of structures found by IRS teams	50,471	25,461	91,233	68,231	44,350	279,746*
Number of structures sprayed	47,111	24,908	87,772	65,686	42,397	267,874
Spray progress (sprayed/targeted)	105.0%	100.1%	99.7%	97.9%	105.5%	101.1%
Spray coverage (sprayed/found)	93.3%	97.8%	96.2%	96.3%	95.6%	95.8%
Population protected	194,856	102,009	387,049	269,439	197,569	1,150,922
Pregnant women protected	8,294	5,256	21,211	11,863	6,663	53,287
Children under five protected	31,919	15,312	80,498	45,031	32,073	204,833
Number of people receiving training funded by US Government (USG) to conduct IRS	404	214	1,107	766	540	3,031

***The spray teams found more structures during the spray campaign, than those found during enumeration.**

3. COUNTRY BACKGROUND & ACTIVITY SUMMARY

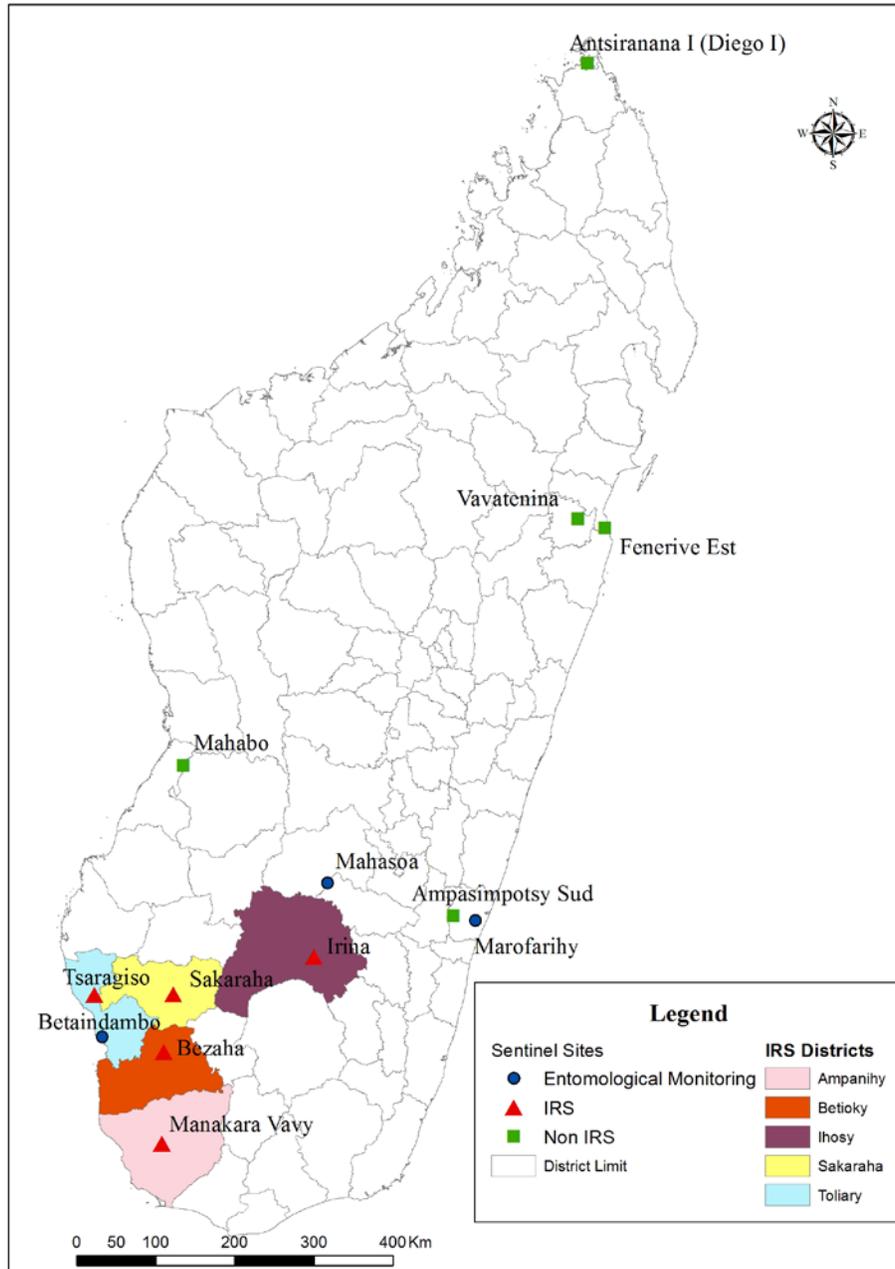
PMI has been supporting IRS in Madagascar since 2008 in line with the National Malaria Control Program Strategic Plan. IRS was initially implemented in 55 districts within the Central Highlands (CHL). Table 2 below shows the list of all PMI supported IRS from 2011.

Table 2: PMI Supported IRS in Madagascar: 2011-2019

Year	Geographic Area	IRS Strategy	Insecticide	Number of Structures Sprayed	Population Protected
2011	CHL & Fringe (8 districts)	Blanket	Pyrethroid & Carbamate	222,026	1,324,525
2012	CHL & Fringe (40 communes)	Focal	Pyrethroid & Carbamate	87,081	522,292
2013	CHL and Fringe (~40 communes)	Focal	Pyrethroid and Carbamate	125,125	749,965
2014	East coast (3 districts)	Blanket	Organophosphate	149,408	557,419
2015	East coast (3 districts) and Southeast (1 district)	Blanket	Organophosphate	247,902	1,016,841
2016	East Coast (3 districts) and Southeast (2 districts)	Blanket	Organophosphate	310,426	1,257,036
2017	East Coast (3 districts) and Southeast (5 districts)	Blanket	Organophosphate	487,636	2,008,963
2018	East Coast (3 districts) Southeast (4 districts)	Blanket	Organophosphate	548,775	2,232,097
	Southwest (2 districts)		Neonicotinoid (SumiShield)		
2019	Ihorombe (1 district)	Blanket	Organophosphate & Clothianidin & Deltamethrin (Fludora Fusion)	267,874	1,150,922
	Southwest (4 districts)		Neonicotinoid (SumiShield) & Organophosphate		

In 2019, in accordance with the new 2018-2022 National Malaria Control Strategic Plan, PMI VectorLink Madagascar conducted spray operations in four districts (Tular II, Sakaraha, Betioky Sud and Ampanihy) in the Southwest and in one district (Ihosa) in Ihorombe’s region from November 4 to November 30, 2019.

Figure 1: IRS Districts and Entomological Monitoring Sentinel Sites of PMI VectorLink Madagascar



4. IMPLEMENTATION OF IRS ACTIVITIES

4.1. IRS PLANNING AND PARTNERS' COLLABORATION

The IRS campaign was implemented from November 4 to November 30, 2019 in five districts (Tulear II, Sakaraha, Betioky, Ampanihy and Ihosy). The 2019 IRS launch ceremony, led by the Minister of Health and the USAID Madagascar Mission Director, took place in Ihosy district on November 4, 2019. The Regional Governor, local and traditional authorities, community members, women's and youth groups, and the PMI VectorLink and PMI Madagascar teams also participated in the launch activities. Community members, local and traditional authorities and youth groups animated the crowd and provided IRS and malaria prevention and control messages.

Figure 2: IRS Launching Ceremony in Ihosy on November 4, 2019



Youths Performing at the IRS Launch Ceremony in Ihosy



USAID and Government of Madagascar Officials at the IRS Launch Ceremony in Ihosy



Speech by USAID Mission Director at the IRS Launch in Ihosy



USAID Mission Team with NMCP Director at the Launch Ceremony

The project managed spray operations out of 17 operational sites (four in Ampanihy, four in Betsioky, four in Ihosy, one in Sakaraha, and four in Tuléar II). With the support of local authorities, seasonal workers were recruited from the communities being sprayed. At the operational site and commune level, the operational site coordinator and local authorities jointly conducted seasonal staff recruitment under the supervision of the Health Zone Manager/District Coordinator. SOPs worked in all communes according to the spray plans developed before the campaign and following a daily risk assessment of the security situation in some of the spray areas.

Within each district, the project established operational sites, for a total of 17 operations sites during the 2019 campaign. Each operational site had a warehouse to store spray materials as well as a permanent soak pit to accommodate the spray teams during the end-of-day clean-up. The team built a total of 97 mobile soak pits (MSPs) for use in remote areas and 40 permanent soak pits. Additionally, there were 17 secondary warehouses for the 2019 IRS campaign.

Each morning, breakfast was served to SOPs, Team Leaders (TLs) and Mobilizers (imbedded within the spray teams) before they were deployed to the field to conduct spray operations. Right after the teams were served breakfast, a morning mobilization meeting took place, where the spray teams were brought together for important information-sharing (i.e., performance related aspects, recommendations, etc.).

Vehicles were rented by the project to transport the spray teams to and from the spray sites, operational sites and end-of-day clean-up sites. The team also used vehicles for supervision related purposes and to transport spray equipment and insecticide.

At the end of each day, SOPs handed their completed spray forms to their team leaders, who checked and compiled them before submitting them to their site supervisor. The site supervisor sent spray forms to data entry centers for immediate entry into PMI VectorLink Madagascar's VectorLink Collect database. Table 3 below shows the number of spray teams recruited during the 2019 IRS campaign.

Table 3: Number of Spray Teams Recruited during the 2019 IRS Campaign

Region	Districts	Operation Sites	Number of Team Leaders	Number of SOPs	Number of Mobilizers	Total
Southwest	Ampanihy	Ampanihy	18	90	36	144
		Fotadrevo	12	60	24	96
		Ejeda	12	60	24	96
		Androka	10	50	20	80
	Betioky	Betioky	10	50	20	80
		Bezaha	12	60	24	96
		Soamanonga	8	40	16	64
		Tongobory	7	35	14	56
	Sakaraha	Sakaraha	21	90	42	153
	Tulear II	Andranohinaly	7	33	14	54
		Mitsinjo Betamimena	10	41	20	71
		Ankilimalinike	7	30	14	51
Ankililoaka		13	55	26	94	
Ihorombe	Ihosy	Ambatolahy	5	25	10	40
		Ambia	9	41	18	68
		Ranohira	6	30	12	48
		Ankily	8	40	16	64
Total			175	830	350	1,355

4.2. TRAINING

PMI VectorLink Madagascar organized and hosted training sessions for the seasonal staff. 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 IRS activities. PMI VectorLink Madagascar staff conducted all training sessions in collaboration with the National Malaria Control Program (NMCP) and representatives from the Ministry of Health (MOH) at the national, regional and district levels. The training sessions took

place from September 9, 2019 to November 2, 2019. A total of 3,031 people were trained. In addition, the project incorporated gender awareness and sexual harassment training in all the trainings conducted before the campaigns started. Participants learned about the importance of gender equity and equality for the success of the spray campaign, and for women's empowerment in society. Table 4 below shows the number of training sessions and the number of people trained, disaggregated by spray zone and gender.

Table 4: Number of Training Sessions and People Trained, Disaggregated by Job Title, Spray Zone and Gender.

Training	Ampanihy		Betioky		Ihosy		Sakaraha		Tulear		Central Level		Total		
	Male	Female	Male	Female	Male	Female	Total								
Master Trainers	12	1	11	2	10	1	5	1	10	5	0	0	48	10	58
Enumeration Supervisors	15	10	19	13	14	8	0	0	0	0	0	0	48	31	79
Enumerators*	163	365	223	101	148	47	0	0	0	0	0	0	534	513	1,047
Financial Assistants	0	1	0	1	0	1	0	1	0	1	1	2	1	7	8
Data Entry Clerks (DECs)	7	3	4	2	2	4	2	2	3	4	0	0	18	15	33
Warehouse Keepers	6	4	5	3	2	6	2	2	6	3	0	0	21	18	39
Security Officers	14	0	12	0	10	0	6	0	14	0	0	0	56	0	56
Trainers (Team Leaders)	34	18	25	12	24	4	15	6	24	13	0	0	122	53	175
Spray Operators (SOPs)	237	23	160	25	134	2	74	16	144	15	0	0	749	81	830
Health Workers for Poisoning Case Management	10	15	12	20	15	12	5	13	12	16	0	0	54	76	130
Washers	0	39	0	22	0	22	0	8	0	14	0	0	0	105	105
Mobilizers	61	43	38	36	41	15	30	12	38	36	0	0	208	142	350
Drivers	0	26	0	20	0	18	0	14	0	20	0	23	0	121	121
Total	559	548	509	257	400	140	139	75	251	127	1	25	1859	1,172	3,031
Percentage of women		49%		33%		26%		35%		33%		96%		39%	

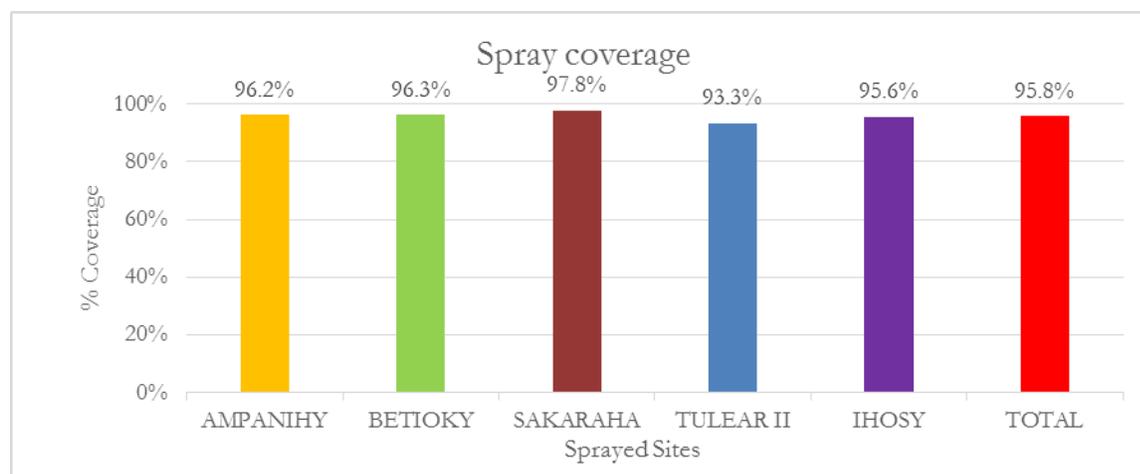
*Note that the enumeration activity and the related training took place in March 2019 in the districts of Ampanihy, Betioky Sud and Ihosy.

4.3. SPRAY OPERATIONS & SUPERVISION

Number of Eligible Structures Found and Spray Coverage

SOPs found a total of 279,746 structures (235,396 in the Southwest and 44,350 in Ihorombe's Region) and sprayed 267,874 (225,477 in the South West and 42,397 in Ihorombe's region). In the Southwest, SOPs sprayed 95.9 percent of all structures identified, and 95.6 percent of all structures in Ihorombe's region. The overall coverage rate achieved for all five districts was 95.8 percent as indicated in Figure 3 below.

Figure 3: 2019 IRS Spray Coverage (Number of Structures Sprayed / Number of Structures Found)



4.3.1 NUMBER OF PEOPLE HIRED TO SUPPORT CAMPAIGN BY CADRE & SEX

In collaboration with local government authorities (District Health Director, Mayor and Basic Health Center Chief), PMI VectorLink Madagascar hired 2,818 seasonal workers (2,303 seasonal workers in the Southwest, including 1,433 men and 870 women; 503 seasonal workers in the Ihorombe's region, including 391 men and 112 women, and 12 other seasonal workers at the central level including seven men and five women (Table 5).

Table 5: Distribution of Seasonal Workers Hired for Each Position by Gender and Spray Zone

	Ampanihy		Betioky		Ihosy		Sakaraha		Tulear		Central		TOTAL		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Enumeration Supervisors	15	10	19	13	14	8	0	0	0	0	0	0	48	31	79
Enumerators/ Supervisors	163	365	223	101	148	47	0	0	0	0	0	0	534	513	1,047
Assistant Health zone Manager	1	0	1	0	1	0	1	0	0	1	0	0	4	1	5
Central Logistics Assistant	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Central Information Technology Assistant	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Central Financial Assistants	0	0	0	0	0	0	0	0	0	0	1	2	1	2	3
District Financial Assistants	0	1	0	1	0	1	0	1	0	1	0	0	0	5	5
E-Inventory Developer Assistant	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Environmental Compliance Assistant	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2
Central Monitoring and Evaluation Assistant	0	0	0	0	0	0	0	0	0	0	1	2	1	2	3
Operational site Coordinator	4	0	4	0	3	1	2	0	4	0	0	0	17	1	18
Site supervisor	8	1	7	2	7	1	3	1	3	7	0	0	28	12	40
Data Entry Clerks (DECs)	7	3	4	2	2	4	2	2	3	3	0	0	18	14	32
e-Inventory data entry clerk	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Assistant Logistic District	1	0	1	0	1	0	1	0	1	0	0	0	5	0	5
Warehouse manager	6	4	5	3	2	6	2	2	5	4	0	0	20	19	39
Guardians	14	0	12	0	10	0	6	0	14	0	0	0	56	0	56
Team Leaders	34	18	25	12	24	4	15	6	24	13	0	0	122	53	175
Spray Operators	237	23	160	25	134	2	74	16	144	15	0	0	749	81	830
Moto courier	4	0	4	0	4	0	0	0	3	0	0	0	15	0	15
Washers	0	39	0	22	0	22	0	8	0	14	0	0	0	105	105
Mobilizers	61	43	38	36	41	15	30	12	38	36	0	0	208	142	350
Janitors	0	1	0	1	0	1	0	1	0	1	0	0	0	5	5
Total	555	508	503	218	391	112	136	49	239	95	7	5	1,831	987	2,818
Percentage of women	48%		30%		22%		26%		28%		42%		35%		

4.3.2 OPERATIONS SITES

Table 6: Operational Sites and Communes in Each District

Districts	Operations Sites (# Communes)	Commune Names	Excluded Environmentally Sensitive Communes
Ampanihy	Ampanihy (8)	Ampanihy, Amboropotsy, Maniry, Ankilizato, Antaly, Beara, Ankilimivory, Ankiliabo	
	Fotadrevo (4)	Fotadrevo, Beroy Sud, Anavoaha, Vohitany	
	Ejeda (4)	Ejeda, Gogogogo, Beahitse, Belafika Haut	
	Androka (3)	Androka, Itampolo, Androipano	
Betioky	Betioky (7)	Betioky, Beantake, Ambatry, Maroarivo, Masiaboay, Ankazomanga Ouest, Antohabato	Vohimary; Savazy II
	Bezaha (11)	Bezaha, Manalobe, Andranomangatsiaka, Ankilivalo, Fenoandala, Salobe, Belamoty, Tanambao Befamoty, Antsavoa (Ambatofotsy), Montifeno	
	Soamanonga (6)	Soamanonga, Soaserana, Marosavoa Bas, Lazarivo, Sakamasay, Beora	
	Tongobory (5)	Tongobory, Vatolatsaka, Tameantsoa, Besely, Beavoha	
Ihosy	Ambatolahy (4)	Ambatolahy, Satrokala, Andiolava, Soamatasy	Menamaty Iloto; Antsoha;
	Ambia (5)	Ambia, Zazafotsy, Sahambano, Analavoka, Sakalalina	
	Ranohira (3)	Ranohira, Ilakaka, Andohan'Ilakaka	
	Ankily (6)	Ankily, Irina, Analaliry, Tolohomiady, Mahasoa, Ihosy	
Sakaraha	Sakaraha (9)	Sakaraha, Miary Lamatihy, Ambinany Besakoa, Miary Taheza, AmboronaboBereketa, Mahaboboka, Andamasiny Vineta, Mihavatsy	Mikoboka; Mitsinjo
Tuléar II	Andranohinaly (5)	Andranohinaly, Andranovory, Ambohimahavelona, Manorofify, Antanimena	Behompy
	Mitsinjo Betanimena (5)	Miary, Behompy, Mitsinjo Betanimena, Betsinjaka, Ambolofoty	
	Ankilimalinike (4)	Manombo, Marofoty, Tsianisiha, Ankilimalinike	
	Ankiloaka (4)	Ankiloaka, Milenaka, Soahazo, Analamisampy	

4.3.3 KEY OPERATIONAL DETAILS

This year, the team used a mobile payment system through three Mobile Money Operators (Telma, Orange and Airtel) for the payment of seasonal workers. The mobile payment system has proven to be very effective as it allowed the project to make payments remotely in a timely, cost efficient and secure manner. In terms of cost efficiency, the project paid a small transfer fee per transaction and did not have to incur the additional expenses (perdiems, fuel, car rental costs, security forces presence, etc.) associated with in-person payments by the project staff.

4.4 INSECTICIDE

As seen below in Table 7, PMI VectorLink Madagascar used 30,667 bottles of Actellic (24,540 in the Southwest, 6,127 in the Ihorombe's region), 13,430 sachets of SumiShield® in the Southwest, and 3,566 sachets of Fludora Fusion in Ihosy district. One sachet of insecticide sprayed 5.3 structures in Tulear II and Sakaraha, while spray operators in Betioky Sud and Ampanihy sprayed 6.2 structures per bottle. In Ihosy, one sachet or bottle sprayed 4.4 structures. At the end of the spray campaign, the project had 3,761 sachets of Sumishield 50WG left set to expire in January 2022, as well as 6,574 sachets of Fludora Fusion set to expire in April 2021.

Table 7: Average Number of Structures Sprayed by Bottle or Sachet of Insecticide, by District, Madagascar IRS campaign, 2019

Region	District	No. Structures Sprayed	No. of Bottles or Sachets of Insecticide			Average number of Structures Sprayed per Bottle or Sachet of Insecticide	Insecticide Type
			Bottle	Sachet	Total		
Southwest	Tulear II	47,111		8,632	8,632	5.5	SumiShield® 50WG
	Sakaraha	24,908		4,798	4,798	5.2	SumiShield® 50WG
	Betioky	65,686	11,524		11,524	5.7	Actellic® 300 CS
	Ampanihy	87,772	13,016		13,016	6.7	Actellic® 300 CS
Ihorombe	Ihosy	42,397	6,127	3,566	9,693	4.4	Fludora Fusion & Actellic® 300 CS
Total		267,874	30,667	16,996	47,663	5.5	

4.5 IEC/SBC ACTIVITIES & OUTCOMES

Mobilization Methodology

PMI VectorLink Madagascar organized awareness-raising events before, during, and after the IRS campaigns. During the 2019 IRS campaign, mobilizers were integrated within the spray teams. Each spray team had two mobilizers who accompanied them during the spray days.

The project team worked with media channels to radio broadcast spots and inform communities of the IRS campaign schedule and its benefits for malaria control.

PMI VectorLink Madagascar worked closely with the NMCP to conduct IEC during mobilization activities. The project adopted the following working methodologies to conduct mobilization:

- Reviewed key policy documents (National Malaria Control Strategic Plan, PMI Strategy documents on IRS messages, etc.).
- Discussed and planned IEC/social behavior change (SBC) activities in collaboration with the NMCP's SBCC team.

- Conducted meetings with traditional, health and administrative authorities.
- Conducted advocacy meetings in each district with local and traditional authorities in the region, districts, communes, and fokontany leaders.
- Worked with the ACCESS project in Betioky Sud and Sakaraha districts to hold advocacy meetings and sensitization campaigns in close coordination with community health workers.
- Trained seasonal staff involved in the implementation of SBCC activities (spray team and mobilizers).
- 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 in all five targeted districts.
- 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.
- Collaborated with a committee at the commune level and with the chief of fokontany for community mobilization in their commune and village.

Advocacy and Door-to-Door Mobilization

To ensure the involvement of local leaders in the spray campaign and to help the project minimize refusals from beneficiaries, PMI VectorLink Madagascar launched a contest: “The Best District” for the 2019 IRS campaign. Activities included:

- Organizing an advocacy workshop in each district, with targeted and limited participants (a maximum of 15 people) in the project intervention regions and districts. The health, administrative and traditional authorities, and representatives of churches, education, and the Ministry of Population took part in the workshops. The PMI VectorLink project announced the contest at the district level. The “Best District” represented the one with a minimum coverage rate of 95%. Sakaraha won the contest with the highest coverage rate of 97.8%. This contest created competition between the districts, which in turn increased SOP motivation and performance.
- Organizing advocacy actions in the communes and fokontany before and during IRS campaign. The PMI VectorLink project collaborated with a communal committee through courtesy visits, meetings with local authorities, and 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 spray program. As local leaders, chiefs of fokontany supported the project in setting up banners and posters and carrying out IEC mobilization in their villages and announcing the planning of IRS in close collaboration with the mobilizers. Their positions helped to ensure easy community mobilization and increased IRS acceptance.
- Mobilizers who accompanied spray teams informed communities a few days before the spray in each fokontany with the support of communal committees and the chief of fokontany. They used megaphones and drums.
- Mobilizers and the communal committee conducted mobilization activities before and during the spray campaign by accompanying SOPs in the villages on the spray day. The team used the following five categories of messages during mobilization activities:

- Advocacy messages targeting local authorities and leaders to gain their support in advocating for IRS within their communities
- Messages to communities about the benefits of IRS
- Messages to families on household preparation
- Messages to SOPs on approaches they should adopt and precautions they should take during and after spraying
- Messages to beneficiaries to not post or wipe or paint treated walls for six months after spraying

Other activities

The PMI VectorLink project used mass communication (radio, tam tam, community meetings, advocacy meetings, launching ceremony), and distributed 116 banners and 8,127 informative posters during the 2019 spray campaign. The team reviewed all materials jointly with the NMCP communication staff in order to comply with the Malagasy government’s requirements and strategy.

The project also aired radio messages in local dialects in collaboration with radio stations targeting broad geographic coverage in the project’s intervention regions and districts to strengthen IRS messages and disseminate the spray schedules. The team aired two types of radio spots: a radio spot announcing the arrival of IRS in the district and a radio spot to educate people to not paint or hang posters on the wall for six months after spraying. There were 630 broadcasts announcing the arrival dates of the spray teams, and 270 broadcasts about not painting or hanging posters after completion of the spray, totaling 900 radio broadcasts overall.

On November 4, 2019, PMI VectorLink Madagascar organized an official IRS launching ceremony in Ihosy district to sensitize the population to IRS, and kick off IRS activities. This event benefited from the participation of the Director General of Preventive Diseases in the Ministry of Health, NMCP representatives, Southwest region’s governor, local and traditional authorities, community members, women’s groups, youths, the United States Agency for International Development’s Mission Director, PMI Madagascar team, and the PMI VectorLink team. Schools were mobilized during this event and students performed through a lively carnival. This event helped improve IRS acceptance in the area.

Table 8 below shows the list of IEC items distributed during the 2019 spray campaign.

Table 8: List of IEC Items Distributed during the 2019 Spray Campaign

Districts	T-Shirts	Caps	Banners	Posters
Betioky	861	861	31	1,925
Ampanihy	978	978	20	3,001
Ihosy	1196	1196	26	1,065
Tulear II	786	786	27	1,570
Sakaraha	330	330	12	566
TOTAL	4,151	4,151	116	8,127

4.6 NATIONAL CAPACITY BUILDING AND COLLABORATION EFFORTS

As in previous years, one reason for the success of the 2019 IRS campaign has been the effective collaboration between the NMCP, the Regional Directorates of Health, the District Public Health Services and the PMI VectorLink Madagascar project team.

This collaboration took the form of mutual capacity building throughout the entire 2019 IRS campaign process. The success of the campaign also stems from the effective participation of the local community, represented by the local authorities, traditional leaders and fokontany chiefs.

As part of the capacity building component of the program, the VectorLink team included one national level and two regional level staff from the NMCP in the master training session in Tulear. The NMCP team also participated in the joint planning of the campaign, the various trainings, workshops or advocacy sessions for a successful IRS campaign. Two NMCP entomology staff from the national level also joined the VectorLink team entomology team in conducting entomological monitoring activities during the spray campaign. Furthermore, the project provided NMCP with entomology equipment and supplies for capacity building.

During the campaign, a joint team comprised of members from both NMCP and VectorLink was established to monitor IRS activities on a daily basis. 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.

The NMCP has managers working in tandem with PMI VectorLink Madagascar to cover areas ranging from environmental compliance, entomological monitoring, social mobilization, training, logistics management, supervision and coordination of field operations.

4.7 GENDER MAINSTREAMING

During the 2019 campaign, the VectorLink Madagascar project employed 35 percent women. This was slightly higher than in 2018 (31.1 percent) despite the security challenges in Ihosy and Sakaraha.

To improve gender mainstreaming, the project sensitized all stakeholders on the importance of recruiting women for IRS campaigns. Recruiters gave priority to women who met all eligibility requirements. As part of the spray campaign requirements, all female workers took a pregnancy test before the start of the campaign. To make women comfortable in their work, the project:

- Ensured every woman received the appropriate size for coveralls and boots
- Provided disposable and reusable sanitary pads for use while in the field
- Constructed separate restrooms for male and female workers, properly labeled and well separated for privacy
- Encouraged women to report any sexual harassment
- Paid all seasonal workers via mobile money so women could have control of their own funds

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

During the campaign, gender awareness and sexual harassment guidelines were posted at all operations sites. A one-page addendum code of ethics was added to the contracts and was signed by every seasonal worker. No complaints or incidents related to sexual harassment were reported to the project gender focal point person during the spray campaign.

4.8 OVERVIEW & RESULTS OF MESTO SPRAYER EVALUATION

Mesto Sprayers in Germany announced the launch of its new 7.5-liter and 10-liter stainless steel compression sprayers, approved by WHOPES in October 2018. The new sprayers were certified by IPARC/Harper Adams University UK - the official WHO Collaboration Centre. Mesto approached the PMI VectorLink Project to facilitate a small pilot to gauge the equipment's compliance with the operational quality standards of PMI. The team piloted the use of the seven sprayers (given free of charge) during the first day and second day of the spray campaign in the village of Ankiliberengy in Madagascar, where all members of a spray team

were assigned the new sprayers. However, the spray operators ran into a number of challenges with the equipment, including:

- The fill tank is almost exactly 7.5 liters with no extra volume. This made mixing of insecticide a challenge since there was hardly an air pocket to ensure complete dissolution when shaking and agitating.
- The tight volume of the tank also resulted in more frequent spillage than normally experienced with other types of sprayers. Matters were made worse by the fact that the insecticide used in the sprayers typically produces a considerable amount of foam during mixing.
- The absence of fill filters and the small size of tank, made mixing burdensome (the spray operators were accustomed to using IK VC Super sprayers that come with a fill filter as standard).
- Pressurization of the tanks was observed to be very physically challenging and difficult. Some of the spray operators had to depend on assistance from colleagues to be able to achieve the required pressure threshold.
- During spraying, six out of the seven sprayers experienced clogging and blockages especially in the control flow valves (CFVs) and nozzles. The trouble-shooting led to a significant amount of downtime for the entire team.
- The spray operators experienced a lot of discomfort from the way the equipment rested on their backs as they were working.
- At the end of day one, the project team made a decision to repair and service all of the Metso sprayers and deploy them for one more day to confirm that the day's experience was not a one-off, or just a reflection of "IRS day-one blues".
- During the second day of the spray campaign, two of the sprayers broke down and were found to be irreparable in the field. Similar challenges were experienced the second day. The team was beginning to fall behind their targets and would not have been able to catch up if they continued working with the Mesto sprayers. After a quick consultation, the team decided to terminate the pilot study.

5. ENTOMOLOGY

5.1 IRS SUSCEPTIBILITY

At the time of the development of this report, susceptibility tests were not yet completed. Thus, the results will be reported in the next entomological report.

5.2. RESIDUAL EFFICACY

IRS quality assurance and decay rate were monitored in sites in all five districts: Irina (Ihosalotra district), Andasy (Sakaraha district), Tsaragiso (Tulear II district), Besakoa/Bezaha (Betioky district) and Manakaravavy (Ampanihy district). Fumigant bioassays were also carried out in each tested house where Actellic was sprayed to determine the airborne effects of pirimiphos-methyl.

Monthly cone bioassay tests are conducted, using the World Health Organization (WHO) procedure to assess the residual effectiveness of insecticides sprayed during the 2019 IRS campaign. Since the transport of larvae or adult insecticide susceptible mosquitoes (Kisumu strain) is challenging, all cone bioassay tests were performed with wild adult mosquitoes, reared from local field-collected larvae and pupae. The mosquitoes were exposed to the sprayed surfaces with all three insecticides (Fludora Fusion, Actellic 300CS and Sumishield 50WG) 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 for pirimiphos-methyl; delayed mortality of Sumishield® 50 WG was supposed to be recorded for seven days. But in most cases, 100 percent mortality was achieved within a 48-hour holding period. When control mortality was between five percent and 20 percent, test mortality was corrected using Abbott's formula.

The residual life of pirimiphos-methyl (Actellic 300CS®, an organophosphate) was tested in the sentinel sites of Manakaravavy and Besakoa/Bezaha. SumiShield® 50 WG® (a neonicotinoid) was tested in Tsaragiso and Andasy, and Fludora® Fusion in Irina.

In the IRS districts where these sentinel sites are located ((Southwest: Manakaravavy, Besakoa/Bezaha, Andasy, Tsaragiso; and Ihorombe regions: Irina), most of the structures are made of mud or concrete brick; however, tests were also performed on the wooden doors of each house tested to assess the efficacy of the insecticide on wood. In each site, four houses with mud surfaces and four wood surfaces (doors) sprayed with insecticides were randomly sampled and used for the test. During the first week of IRS campaigns, PMI VectorLink Madagascar conducted cone bioassay tests to assess whether the quality of the spray was satisfactory. The results indicated that the spray quality was good with mortality being 100 percent for all the structures sampled. One month after spraying (T1- November 2019), pirimiphos-methyl (Actellic® 300 CS), clothianidin (SumiShield® 50 WG®) and Fludora Fusion showed 100 percent mortality on all wall types (mud and wood) (Figure 4). The residual efficacy of each insecticide will be monitored until the mortality drops below 80 percent for two consecutive months.

Figure 4: Residual Effectiveness Observed for Actellic® 300 CS in Besakoa/Bezaha and Manakaravavy

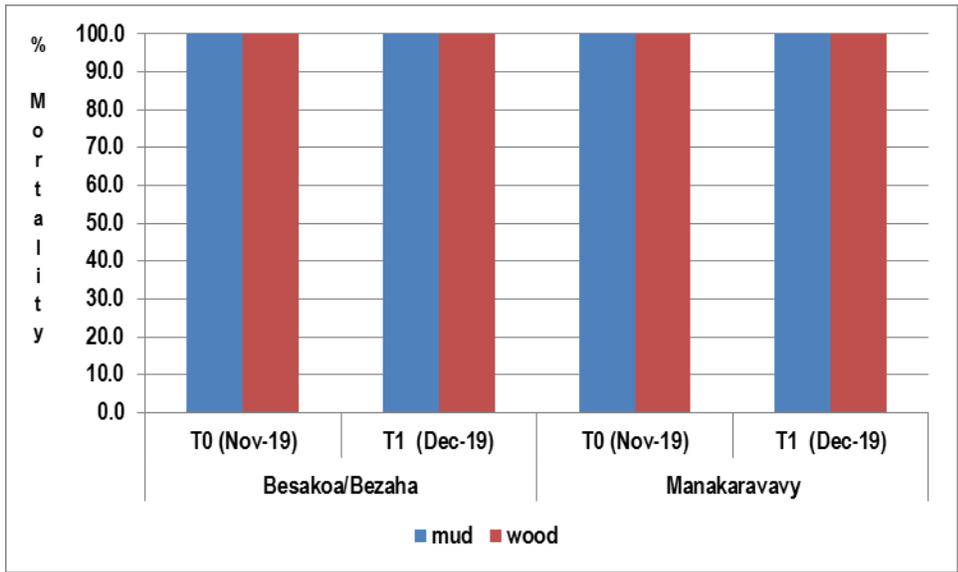


Figure 5: Residual Effectiveness Observed for Sumishield® 50 WG in Tsaragiso and Andasy

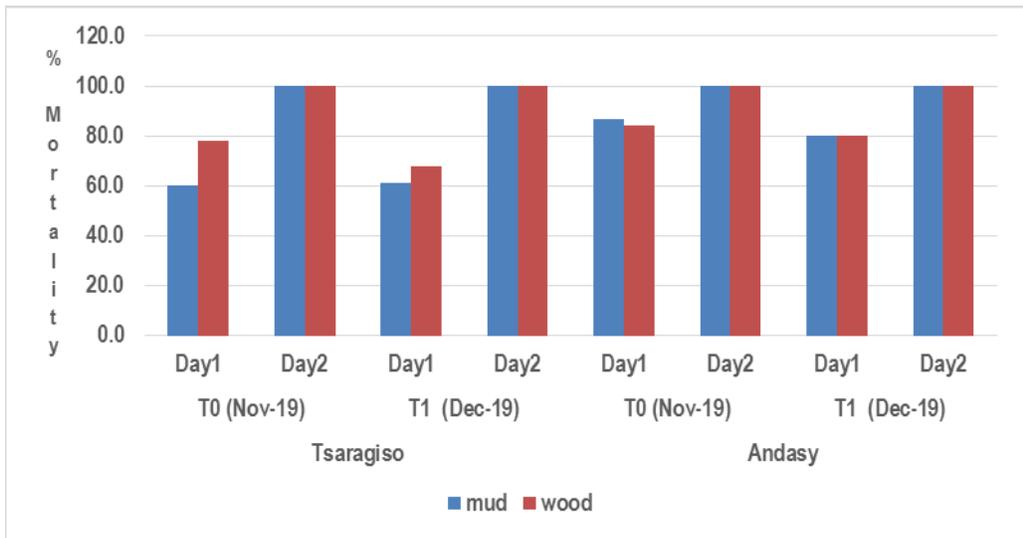
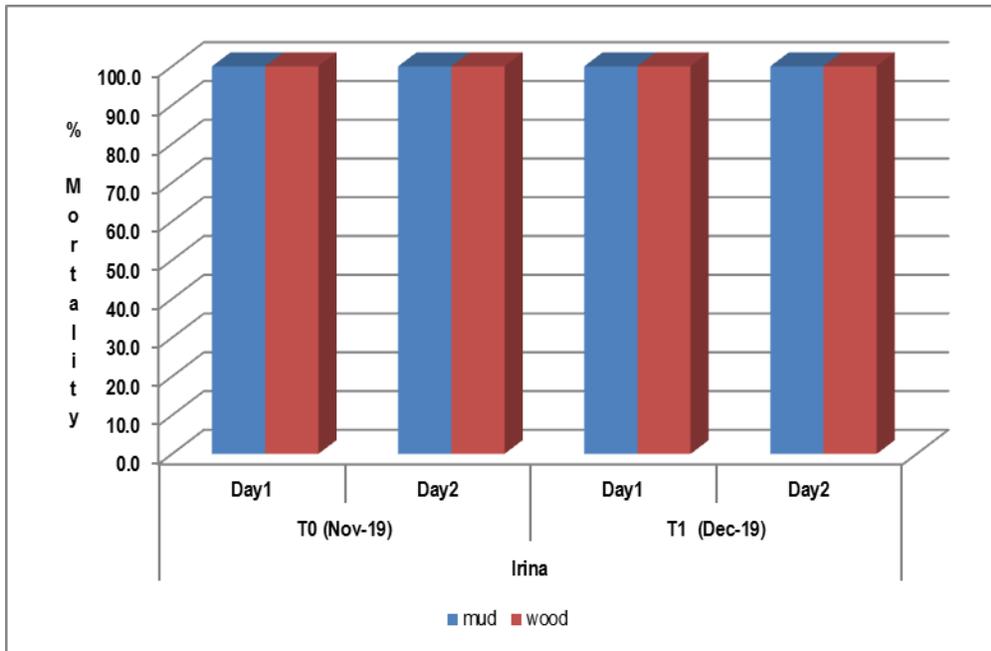


Figure 6: Residual Effectiveness Observed for Fludora® Fusion in Irina.



6. ENVIRONMENTAL COMPLIANCE

6.1 IRS CAMPAIGN ASSESSMENTS

Environmental Compliance

The PMI VectorLink Madagascar project operated under a supplemental environmental assessment (SEA) approved by USAID in 2019, and authorizes the use of pyrethroids, organophosphates, carbamates, neonicotinoids, pyrrole (chlorfenapyr) (when listed by WHO PQ) and clothianidin/deltamethrin combination.

Challenges and Considerations

In 2019, the project intervened in four districts in the Southwest Region (Ampanihy, Betioky, Tulear II and Sakaraha) and in one district in the Ihorombe Region (Ihoso). As this was the first campaign in Ampanihy, Betioky and Ihoso, PMI VectorLink Madagascar's Environmental Compliance Officer (ECO) conducted an environmental geographical reconnaissance in these areas from October 15 to November 05, 2018 and from April 03 to April 24, 2019 to identify the appropriate sites for storerooms, the safest method of SOP transport with insecticide, and environmental measures required to protect communities during the spray.

The geographical reconnaissance uncovered a lot of protected areas in the district of Tulear II, Sakaraha, Betioky and Ampanihy. Three organizations are involved in the management of these protected areas: Madagascar National Parks (MNP), World Wildlife Fund (WWF), and Missouri Botanical Gardens (MBG). Structures within 500 meters of a protected area were not sprayed. In Ihoso district, the Tozzi Green Company has an important plantation of organic farming (eucalyptus and geranium); thus, the regulation of not spraying within 500 meters of Tozzi Green plantation was respected by the project.

In addition of implementing the project's Environmental Mitigation and Monitoring Plan (EMMP) and the Madagascar Climate Risk Management Plan (CRMP), the team took specific measures to avoid contamination when spraying the following areas:

- Structures within 500 meters of protected areas were not sprayed
- Minimum distance of 3 km observed between the structure and the organic farming
- Close supervision in these areas was conducted during spraying
- Information meetings were held with the Ministry of Agriculture and Livestock to communicate the nature of the spray and the implications on their activities.
- In addition to the measures taken for sensitive areas, the team communicated information and guidelines on spraying methods regarding sensitive areas to the project and spray teams.

Figure 7: Bio Plantation of Tozzi Green Company



BIOLOGICAL PLANTATION

Pre-Season Environmental Compliance Assessments

The PMI VectorLink Madagascar team conducted two pre-spray environmental compliance assessments (PSECA) in all districts prior to the spray campaigns, 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 PMI VectorLink Madagascar's staff to ensure 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. All necessary repairs were made to soak pits prior to the launch of the spray campaign based on the outcome of the inspections.

PMI VectorLink Madagascar translated all documents (i.e. Material Safety Data Sheet, guide to first aid, recommendations in case of spillage, warning signs) into Malagasy. Also, before the campaign, all seasonal staff underwent medical checkups, as well as pregnancy tests for women.

Environmental Compliance Activities during the Campaign

PMI VectorLink 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 insecticide, as well as warehouses displaying warning signs. The staff also closely monitored the proper management and storage of IRS waste, accuracy of the stock cards at the warehouse level and use of proper spray techniques by SOPs. In addition, the staff checked that beneficiaries had received clear information about the IRS campaign and knew how to prepare their structures for spraying. PMI VectorLink Madagascar monitored the condition of fixed and mobile soak pits on a regular basis to ensure proper flow and drainage.

PMI VectorLink Madagascar equipped the SOPs with wipes to clean their visors throughout the day as needed. SOPs were satisfied with the wipes as they improved their visibility. New visors were provided as replacement whenever necessary. Team leaders collected the contaminated wipes at the end of the day and classified them as waste to be treated.

New Design of Mobile Soakpit (MSPII)

In some of the operational sites, PMI VectorLink Madagascar used a new concept for the mobile soak pit (larger capacity than the original mobile soak pit) to accommodate large spray teams that could not rely on the existing permanent soak pits.

Post-Spray Environmental Compliance Activities

Post-spray environmental inspections took place from December 1 to December 19, 2019. 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 the spray campaign. After these items and the insecticide had been removed, warehouses were decontaminated with water mixed with bleach and soap. 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.

Figure 8: Mobile Soak Pit in Use in Remote Areas



At the end of the campaign, the team returned all mobile soak pit materials to the warehouse. Undamaged containers, buckets, and sponges were decontaminated and stored for reuse. Damaged materials were classified as IRS waste (see below). The PMI VectorLink Madagascar Environmental Compliance Officer supervised decontamination activities.

6.2 INCIDENT REPORTS

Despite the fact that all the necessary trainings were given and precautions were taken, the project experienced some incidents, which were managed in a timely manner. The table below summarizes the incidents that were communicated to PMI within 48 hours of the incident:

Table 9: Incidents during the 2019 IRS Campaign

	Incidents	Location	Date
1.	Incident related to spillage of insecticide as a result of a malfunction of the control flow valve (CFV) on the spray pump	Ihoso District	November 05, 2019
2.	Incident related to one of the project's rental vehicles that sustained damages after a rock was thrown at it by an individual	Betioky District	November 16, 2019
3.	Incident involving a spray operator who was exposed to insecticide due to a spray pump malfunction	Sakaraha District	November 22, 2019
4.	Car accident involving a seasonal finance assistant and a rental car driver who took the rental car outside of business hours without prior permission	Tulear District	November 23, 2019
5.	Car accident involving a rental truck (carrying Actellic insecticide at the end of the spray campaign) due to mechanical failure of its brake system.	Ihoso District	November 11, 2019

6.3 DEMOBILIZATION & WASTE MANAGEMENT

Table 10 below shows the list of waste generated from the 2019 IRS campaign.

Table 10: List of Waste Generated from the 2019 Spray Campaign

Designation	Typ	Disposal Method	Estimation Date of Transfer to Disposal Site
Empty bottles	HDPE	Recycle	February 2020
Plastic materials	Plastic	Recycle	February 2020
Sponges	Sponges	Recycle	February 2020
Empty boxes	Paper	Incineration	February 2020
Cotton materials	Cotton	Incineration	February 2020
Empty sachets	Paper-based	Incineration	February 2020
Others (garbage bag, absorbent paper)		Incineration	February 2020

Adonis, a local firm, will recycle the used empty bottles of Actellic® 300CS and incinerate empty sachets of SumiShield® 50 WG and Fludora Fusion®. Adonis has the capability and the Ministry of Environment's (MoE) authorization to do so. Adonis will also incinerate or recycle other materials (plastics, metal, etc.) and equipment out of use.

Gloves and boots used during the spray campaign contain greater than 1 percent chlorine. If incinerated, they can create dangerous persistent organic pollutants (POPs). After decontamination (washing them with soap and water), the project team will dispose of such materials, that are deemed no longer suitable for IRS campaigns, by donating them.

7. MONITORING AND EVALUATION

7.1 DATA COLLECTION/ENTRY/QUALITY ASSURANCE

Data collection

Data collection followed the protocols described in the 2019 work plan. The data collection forms were developed to ensure the collection of all PMI-requested indicators. Before the beginning of each spray campaign, the project trained those involved in data collection on the data collection process and in completing all appropriate forms. Spray data were collected by SOPs. Data collection forms went through several checks before being entered into the database.

Figure 9: A Spray Operator Filling Out a Spray Form



Vectorlink Collect database

In 2019, PMI VectorLink Madagascar transitioned from the Microsoft Access database to the new VectorLink Collect (VLC) database.

The database was developed using the District Health Information Software 2 (DHIS-2) system, for spray data entry, cleaning, and reporting. The new system had multiple advantages, including the ability to have real time view of data entry progress, development of powerful dashboards, and pivot tables to track performance and remote interaction with the system from any location. The project granted access to the VectorLink Collect database to relevant parties within the NMCP and PMI Mission office.

Before the start of the campaign, the M&E and operations teams worked together to gather the needed metadata that would enable the roll out of the database (i.e., geographical information to the fokontany level, personnel codes which uniquely identify the seasonal staff in the program, and spray targets to sub location level). These were then set up into the system prior to the start of the campaign to enable entry and reporting.

The PMI VectorLink Madagascar project employed a total of 32 data entry clerks (DECs). Each district had its own data entry center. Each DEC entered the data from the forms into the project's VectorLink Collect database. DECs entered spray data first by the summarized totals per SOP form, for quick insight into the

spray campaign. Then, DECAs entered the "details" line by line to ensure accuracy of the data entered. The DECAs completed data cleaning within two weeks after the end of the campaign.

Data quality assurance and verification

PMI VectorLink 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 on the spray operators' daily forms as well as in the VectorLink Collect (VLC) database.

Table 11 below shows the number of forms used for each data quality assurance tool and the percentage of forms audited.

Table 11: Number of Supervisory Tools Used

Supervision Tools for M&E	Number of Forms Used	Percentage Checked
Data Collection Verification (DCV)	1,987	0.7% of structures found
Data Entry Verification	3,909	1.4% of structures found

Staff visited and interviewed residents from 1,987 structures (0.7 percent 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 Operations Site Coordinator and Site Supervisors to discuss the spray progress and the errors found using the data quality assurance tools. Furthermore, the PMI VectorLink Madagascar M&E Manager and Database Manager provided feedback regarding errors found on SOP forms and gave recommendations to the PMI VectorLink Madagascar operations team to minimize future errors on the SOP forms.

Figure 10: M&E Assistant Conducting a DCV



7.2 MHEALTH

Commcare Applications

In 2019, the project continued to employ the use of m-Health applications to support quick decision making across different components of the program, and to complement the CommCare tools used across the project. The complementary m-Health tools were designed in Open Data Kit (ODK), which is open source.

Supervision Forms

Digitized checklists were designed and used for supervision across the program. These included (a) morning mobilization and transport vehicle inspections to assess compliance before teams depart for fieldwork in the morning; (b) homeowner preparation and SOP performance to assess the passing of key messages and observe spraying at the structure level; (c) storekeeper performance checks to ensure compliance with storage requirements and record keeping at the stores; and (d) the end of day clean-up inspections were to check compliance at the wash area.

All project supervisors at different levels were issued smartphones to support supervision. For any gaps noted during supervision, the digitalized checklists would generate daily alerts (red flags) to all supervisors and

decision makers who would then take the necessary action. During the first few days of the campaign, it was noted that some supervisors were not carefully reading the questions in the checklists before responding. This resulted in a number of false red flags. On-the-job training and immediate feedback was provided to supervisors directly, via WhatsApp fora, morning mobilization meetings, and during the daily debrief meetings.

Performance Management Tracker (PMT)

Daily submission of key operations data via PMT SMS provided key indicators on campaign progress and performance through automated email reports. Each site supervisor received a mobile phone to submit the daily reports to CommCare HQ via Telerivet. After data verification with the SOPs, TLs, and site supervisors, the site supervisors submitted the data as summarized on the TL forms to the CommCare HQ platform. The same data was updated on the performance tracking sheet posted at every site. The key indicators reported in this system included: the number of SOPs that worked for the day, number of structures found, number of structures sprayed and the number of insecticide bottles/sachets used during the campaign.

Job aid messages

The M&E manager and the technical team designed messages sent as alerts to the different cadres of seasonal staff. These messages sent out via SMS spanned different aspects of the project, including IEC/BCC, operations, M&E, environmental compliance, and gender. The main objective was to reinforce and enhance compliance during the campaign. Messages were sent out in Malagasy language.

Other complementary m-health applications

E-inventory tracker: Storekeepers submitted a daily SMS with the required store indicators. The Logistic Coordinator aggregated these data in an e-inventory database and used that information to make prompt decisions on replenishment. For each store, storekeepers tracked insecticide distribution and usage by reporting on bottles issued to SOPs and bottles returned at the end of the day (returned and emptied).

8. RESULTS

Key Spray Results

The M&E plan tracks performance and progress across the different components of the project on the following key objectives: implementation of vector control interventions, entomological and epidemiological data to drive decision-making, support the delivery and storage of IRS and other vector control products, and innovation. The M&E plan (Annex A) indicator matrix shows how PMI VectorLink Madagascar has performed against these indicators.

To monitor performance during the campaign, the key indicators tracked throughout the campaign included structures targeted, structures found, and the proportion of structures sprayed out of those targeted (spray progress) and those found (spray coverage). During spraying, the project collected population details to establish the populations protected. This included the total population disaggregated by gender and special groups, such as pregnant women and children under five. Table 12 provides a summary of key results.

Table 12: Summary of the 2019 Key IRS Results

District	Structures Found by SOPs	Structures Sprayed	Structures not Sprayed	Spray coverage	Population Found	Population Protected	Pregnant Women Protected	Children <5 years old Protected	Population not Protected	Pregnant Women not Protected	Children under 5 years old not Protected
Ampanihy	91,233	87,772	3,461	96.20%	401,575	387,049	21,211	80,498	14,526	817	2,961
Betioky Sud	68,231	65,686	2,545	96.30%	279,307	269,439	11,863	45,031	9,868	382	1,551
Ihosy	44,350	42,397	1,953	95.60%	205,550	197,569	6,663	32,073	7,981	273	1,294
Sakaraha	25,461	24,908	553	97.80%	104,239	102,009	5,256	15,312	2,230	85	343
Tuléar II	50,471	47,111	3,360	93.30%	208,471	194,856	8,294	31,919	13,615	412	2,305
TOTAL	279,746	267,874	11,872	95.80%	1,199,142	1,150,922	53,287	204,833	48,220	1,969	8,454

Insecticide Usage and SOP Performance

SOPs were given a daily target of 12 structures per day at the start of the campaign. Spray operations started in remote areas, progressively moving inwards towards the more centrally located operations sites in the field. The project used a total of 47,663 insecticide bottles/sachets to spray 267,874 structures (Table 13).

Table 13: 2019 IRS Results by District

District	Structures Sprayed	Spray Coverage (%)	Number of Insecticide Bottles/Sachets Used	Average Number of Structures per Bottle	Average Number of Structures Sprayed per SOP per day
Ampanihy	87,772	96.2	13,016	6.7	17.2
Betioky Sud	65,686	96.3	11,524	5.7	16.0
Ihosal	42,397	95.6	9,693	4.4	13.7
Sakaraha	24,908	97.8	4,798	5.2	13.3
Tuléar II	47,111	93.3	8,632	5.5	13.5
Total	267,874	95.8	47,663	5.6	14.7

At the end of the spray campaign, the project had 3,761 sachets of Sumishield 50WG left set to expire in January 2022, as well as 6,574 sachets of Fludora Fusion set to expire in April 2021.

Reasons for non-spray

During the 2019 IRS campaign, VectorLink Madagascar did not spray 11,842 found structures (4.2 percent of all targeted and found structures, compared to 7.2 percent in 2018). The key reason for non-sprayed structures was refusal (1.5 percent, 4,367 structures) followed closely by locked structures (no occupants home at the time of spray) (1.1 percent, 3,031 structures).

Table 14 below gives the breakdown for the reasons for non-sprayed structures by district.

Table 14: Reasons for Non-Spray by District

Reasons for Non-Spray	Ampanihy	Betioky Sud	Ihosal	Sakaraha	Tuléar II	TOTAL
Locked structures	994 (29%)	501 (20%)	650 (33%)	127 (23%)	759 (23%)	3,031 (26%)
Refusal	1,162 (34%)	869 (34%)	582 (30%)	283 (51%)	1,471 (44%)	4,367 (37%)
Sick	427(12%)	576 (23%)	241 (12%)	98 (18%)	536 (16%)	1,878 (16%)
Family/local event	125 (3%)	65 (3%)	48 (2%)	19 (3%)	105 (3%)	362 (3%)
Insecticide smell	539 (16%)	303 (12%)	290 (15%)	4 (1%)	72 (2%)	1,208 (10%)
Others	204 (6%)	227 (9%)	139 (7%)	22 (4%)	404 (12%)	996 (8%)
TOTAL	3,451	2,541	1,950	553	3,347	11,842

9. CHALLENGES, LESSONS LEARNED AND KEY RECOMMENDATIONS

While the spray campaign was successfully implemented, the team faced some challenges in the field, including:

- Fuel shortage: difficulty in getting fuel at the district level because of national stock out was a major challenge for the team to conduct IRS activities. The team had to either travel long distances to other districts for fuel or purchase fuel in bulk whenever available to avoid stock out during spray operations.
- Lack and quality of water: the project experienced a major lack of water at the district level, mainly in Sakaraha, Ihosy and Tulear. Therefore, the spray teams had to carry water with them in the spray vehicles as water was not always available for insecticide mixing at the household level. In addition, the quality of the water was not good, which caused the pumps to be clogged often with debris found in the water.

Recommendations

- During this year's spray campaign, the team used the approach of imbedding mobilizers into the spray teams for the first time, which contributed to a reduction in refusal rates. The project will continue with this approach for future campaigns.
- In addition, the diversification of multiple mobile payment providers allowed the project to efficiently pay all seasonal workers no matter where they were based; thus, this approach will be adopted again for future campaigns.
- Continue to reinforce the use of DHIS2 for the data entry clerks since this was highly efficient and effective in monitoring spray progress and coverage in near real-time.
- Assess the availability of fuel and water shortages at the district level to ensure proper planning (bulk purchase of fuel, storage of clean water, etc.) prior to the start of the spray campaign.

ANNEX A: MONITORING & EVALUATION (M&E) PLAN

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
Objective 1: Implementation of Malaria Vector Control (VC) Interventions														
1.1	Successfully Execute IRS and Other Integrated Malaria VC Activities													
1.1.1	Number and percentage of completed annual country work plans developed and submitted on-time	X	Project records Annually	Country										
1.1.2	Number of eligible structures targeted for spraying		Project records Annually	Country	578,563	586,768	265,033							
1.1.3	Number of eligible structures sprayed with IRS ¹		Project records Annually	Country	491,778	548,789	234,150	267,874						
1.1.4	Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)		Project records Annually	Country	85%	93.5%	85%	95.8%						
11.5	Number of people protected by IRS		Project records Annually	Country Sex Pregnant women Children <5	2,213,003	2,232,097 M: 1,113,088 F: 1,119,009 Pregnant Women: 85,821 Children <5: 328,092	1,343,431	1,150,926 M: 87,766 F: 563,160 Pregnant Women: 53,287 Children<5: 204,833						

¹ Target based on 85% of estimated eligible structures in indicator 1.1.2

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results										
					Year 1		Year 2		Year 3		Year 4		Year 5		
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result	
1.1.6	Number and percentage of vector control project country programs submitting an EOSR within 45 days after the end of spray (including completing MEP and EMMR)	X	Project Annually	Country											
1.1.7	Number and percentage of IRS country programs that conduct a Post-Spray Data Quality Audit within 90 days of spray completion	X	Data Collection Forms Annually	Country											
1.1.8	Number of Insecticide Treated Nets (ITNs) distributed, by channel		Project Records Annually	Country Channel	N/A	N/A	N/A	N/A							
1.1.9	Number and percentage of countries completing ITN durability monitoring data collection as planned in a given project year	X	Project Records Annually	Country											
1.1.10	Number and percentage of PMI-funded durability monitoring surveys with reports submitted within 90 days of the end of data collection	X	Project Records Annually	Country											
1.2	Strengthen Capacity of NMCPs, VC Personnel, and Other Institutions to Implement and Manage IRS and Other VC Activities														
1.2.1	Total number of people trained to support VC in target areas		Project Training Records Annually	Country VC Intervention Sex Job Function	3,360	2,511 M: 1,953 (77.8%) F: 558 (22.2%) VC Intervention: IRS	1,295	1,663 ² M: 1,232 (74.1%) F: 431 (25.9%) VC Intervention: IRS							

² 5 health zone manager assistants, 1 Central Logistics Assistant, 1 E-Inventory Developer Assistant, 2 Environmental Compliance Assistants, 3 Central M&E Assistants, 18 Operational site Coordinators, 40 Site supervisors, 32 DEC's, 1 e-Inventory DEC, 5 Assistant Logistic District, 39 Warehouse managers, 56 Guardians, 175 Team Leaders, 830 SOPs, 105 Washers, and 350 Mobilizers.

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.2.2	Total number of people trained to support VC in target areas with USG funds ³		Project Training Records Annually	Country VC Intervention Sex Job Function	3,360	2,511 M: 1,953 (77.8%) F: 558 (22.2%) VC Intervention: IRS		1,063 ⁴ M: 916 (86.2%) F: 147 (13.8%) VC Intervention: IRS						
1.2.3	Number of people trained during the Master (National) Training and/or IRS Training of Trainers.		Project Training Records Annually	Country Sex Type of Training	260	187 M: 121 (64.7%) F: 66 (35.3%) Training of Trainers	40	233 M: 170 (73.0%) F: 63 (27.0%) Master Training, Training of Trainers						
1.2.4	Total number of people hired to support VC in target areas.		Project Records Annually	Country VC Intervention Sex Job Function	3,360	7,642 M: 5,267 (68.9%) F: 2,375 (31.1%) Enumerators/ Supervisors (718)	2,468	2,818 ⁵ M: 1,831 (65.0%) 987 (35.0%) VC Intervention: IRS						

³ For IRS programs, this includes spray operators, team leaders, and supervisors.

⁴ 18 Operations site Coordinators, 40 Site supervisors, 175 Team Leaders, 830 Spray Operators

⁵ 1,126 Enumerators/ Supervisors, 5 Assistant Health zone Managers, 1 Central Logistics Assistant, 1 Central Information Technology Assistant, 3 Central Financial Assistants, 5 District Financial Assistants, 1 E-Inventory Developer Assistant, 2 Environmental Compliance Assistants, 3 Central M&E Assistants, 18 Operational site Coordinators, 40 Site supervisors, 32 DECs, 1 e-Inventory DEC, 5 Logistic District Assistants, 39 Warehouse managers, 56 Guardians, 175 Team Leaders, 830 Spray Operators, 15 Moto couriers, 105 Washers, 350 Mobilizers, 5 Janitors.

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results										
					Year 1		Year 2		Year 3		Year 4		Year 5		
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result	
						Team Leaders (390) Spray Operators (1934) e-Inventory data entry clerk (3) Moto courier (66) Washers (236) Mobilizers (3116) Porters (313) VC Intervention Type: IRS									
1.2.5	Number of VC project training workshops targeting NMCP and other host country staff		Project Training Records Annually	Country Technical Area Job Function	N/A	N/A	N/A	N/A							
1.2.6	Number of NMCP and other vector control host country staff who have logged into VectorLink Collect		DHIS2 Logs Annually	Country Job Function	N/A	N/A	1	1							
1.2.7	Number and percentage of technical assistance requests to support ITN distribution planning and/or implementation completed on time as planned in a given project year	X	Project Records Annually	Country Technical Area Channel											
1.2.8	Number and percentage of technical assistance requests to support operational routine monitoring systems for continuous ITN distribution completed on time as planned in a given project year	X	Project Records Annually	Country Channel											

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.3	Environmental Compliance and Safety													
1.3.1	Number of seasonal vector control personnel trained in environmental compliance and personal safety standards in vector control implementation		Project Training Records Annually	Country Sex (# and %) Job Function	3,372	3,342 M: 2,425 (72.6%) F: 917 (27.4%) Central Operations Assistant (4) Central Logistics Assistant (2) Environmental Compliance Assistant (3) District Coordinator Assistant (10) Sector Manager (187) District Warehouse Keeper (10) Commune Warehouse Keeper (187) Team Leaders (390) Spray Operators (1934) Moto courier (66) Washers (236) Porters (313)	1,942	1,630 ⁶						

⁶ 5 Health zone Manager Assistants, 1 Central Logistics Assistant, 2 Environmental Compliance Assistants, 3 Central M&E Assistants, 18 Operational site Coordinators, 40 Site supervisors, 1 e-Inventory DEC, 5 Logistic District Assistants, 39 Warehouse managers, 56 Guardians, 175 Team Leaders, 830 Spray Operators, 105 Washers, 350 Mobilizers

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.3.2	Number of health workers receiving insecticide poisoning case management training		Project Training Records Annually	Country Sex (# and %)	289	280 M: 133 (47.5%) F: 147 (52.5%)	108	130 M: 54 (41.5%) F: 76 (58.5%)						
1.3.3	Number of adverse reactions to pesticide exposure documented that resulted in a referral for medical care		Incident Report Forms Annually	Country Type of Exposure	0	0	0	0						
1.3.4	Number of SEAs and Letter Reports submitted at least 60 days prior to the commencement of VC campaigns	X	Project Records Annually	Country										
1.3.5	Number and percentage of permanent and mobile soak pits inspected and approved prior to IRS campaigns or before first use		Project Records - PSECAs Annually	Country	495; 100%	471; 100% Fixed Soak pits: 97 Mobile Soak Pits: 374	120; 100%	135; 100% Fixed Soak pit: 40 Mobile soak pit: 95						
1.3.6	Number and percentage of storehouses inspected and approved prior to IRS campaigns		Project Records - PSECAs Annually	Country Storehouse Type	103; 100%	102; 100% Central Warehouses: 3 District warehouses: 9 Operational Sites Warehouses: 90	25; 100%	17; 100% Central warehouse: 1 Operation Site Warehouses: 17						
1.4	Promote Gender Equality in all Facets of Planning and Implementation													
1.4.1	Number and percentage of women hired to support VC campaigns		Project Records Annually	Country Sex (# and %) Job Function				987 ⁷ (35%)						

⁷ 544 Enumerators/ Supervisors, 1 Assistant Health zone Manager, 2 Central Financial Assistants, 5 District Financial Assistants, 2 Central M&E Assistants, 1 Operational site Coordinator, 12 Site supervisors, 14 DEC, 1 e-Inventory DEC, 19 Warehouse manager, 53 Team Leaders, 81 Spray Operators, 105 Washers, 142 Mobilizers, 5 Janitors

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results										
					Year 1		Year 2		Year 3		Year 4		Year 5		
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result	
1.4.2	Number and percentage of women hired in supervisory roles in target areas for VC activities		Project Records Annually	Country Sex (# and %) VC Intervention Job Function	307; 50%	246; 40.6% VC Intervention Type: IRS District M&E Assistant (8/9) District Coordinator Assistant (1/10) Finance Assistant (10/10) Sector Manager (66/187) Team Leader (132/390)	150; 50%	73 ⁸ ; 30% VC Intervention Type: IRS							
1.4.3	Number and percentage of trainees (permanent and seasonal) who have completed gender awareness training		Project Records Annually	Country Sex (# and %) Job Function	248; 100%	27; 100% M: 18 F: 9	30; 100%	319 ⁹ ; 100% M:221; 69.3% F:98; 30.7%							
1.4.4	Number and percentage of women in senior leadership roles in VectorLink country offices	X	Project Records Annually	Country Sex (# and %)											
1.5	Implement and Support SBCC and Mobilization Activities														
1.5.1	Number of radio spots and talk shows aired		Project Records Annually	Country VC Intervention Talk Show or Radio Spot	1,944	1,689	1080	900 VC Intervention Type: IRS Radio Spots							

⁸ 5 District finance Assistants, 2 M&E Assistants, 12 Site supervisors, 1 Site Coordinator, 53 Team leaders

⁹ 31 Project permanent staff, 5 Assistant Health zone Managers, 1 Central Logistics Assistant, 2 Environmental Compliance Assistants, 3 Central M&E Assistants, 18 Operational site Coordinators, 40 Site supervisor, 5 Logistic District Assistants, 39 Warehouse managers, 175 Team Leaders

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.5.2	Number of print materials distributed to or targeted at beneficiaries		Project Records Annually	Country VC Intervention	551,168	403,684 Flies: 385,482; Posters: 18,000; Banners:202	7,906	8,243 VC Intervention: IRS Posters: 8,127 Banners: 116						
1.5.3	Number of people reached with vector control and/or SBCC messages via door-to-door messaging		Project Records Annually	Country VC Intervention Sex	885,200	1,197,346 VC Intervention: IRS M: 548,641 W: 648,705	671,716	N/A						
2. Entomological and Epidemiological Data to Drive Decision-Making														
2.1	Vector Control Activities Monitored via Entomological and Epidemiological Data													
2.1.1	Number of project-supported entomological sentinel sites established to monitor vector bionomics (vector species, distribution, seasonality, feeding time, and location)		Entomological Reports Annually	Country VC Intervention:	11 ;100%	11; 100%	12; 100%	12; 100% IRS						
2.1.2	Number and percentage of vector bionomics monitoring sites measuring all basic entomological indicators (species composition, indoor and outdoor human biting rates, hourly human biting rates, indoor resting densities)		Entomological Reports Annually	Country VC Intervention:	11 ;100%	11; 100%	12; 100%	12; 100%						
2.1.3	Number and percentage of vector bionomics monitoring sites measuring the following all advanced entomological indicators: sporozoite rates and entomological inoculation rates		Entomological Reports Annually	Country IRS or Entomology Only Program	11 ;100%	11; 100%	12; 100%	12; 100% IRS						

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.4	Number and percentage of insecticide resistance monitoring sites that tested all priority insecticides for the relevant local vector control intervention		Entomological Reports Annually	Country VC Intervention: \	13 ;100%	13; 100%	13; 100%	13; 100%						
2.1.5	Number and percentage of houses in which WHO cone bioassays were conducted within two weeks of spraying with greater than 98% test mortality recorded for IRS countries		Entomological Reports Annually	Country Insecticide Type	72; 100% 40, 100% 32, 100%	72; 100% Actellic 300CS: 40, 100% SumiShield WG 50: 32, 100%	40;100% 16,100% 16,100% 8, 100%	40;100% Actellic 300CS: 40, 100% Sumishield 50 WG: 16,100% Fludora Fusion: 8, 100%						
2.1.6	Number and percentage of sites that conducted WHO cone bioassays after the completion of spraying at monthly intervals until test mortality drops below 80% for two consecutive months for IRS countries		Entomological Reports Annually	Country Insecticide Type:	9; 100% 6, 100% 3, 100%	9; 100% Actellic 300CS: 6, 100% Sumishield 50 WG: 3, 100%	5; 100% 2, 100% 2, 100% 1, 100%	5; 100% Actellic 300CS: 2, 100% Sumishield WG50: 2, 100% Fludora Fusion: 1, 100%						
2.1.7	Number of countries with an integrated vector control analytics dashboard created by PATH, available for decision-making	X	Project Reports Annually	Country										
2.1.8	Number of people trained (VectorLink and non VectorLink staff) in entomological monitoring		Project Records Annually	Country Sex (# and %)	N/A	N/A	N/A	12						

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.9	Number and percentage of sites in which WHO cone bioassays were conducted to evaluate bio-efficacy of bed nets		Entomological Records Annually	Country	N/A	N/A	N/A	N/A						
2.1.10	Number of nets in which WHO cone bioassays were conducted to evaluate bio-efficacy of bed nets		Entomological Records Annually	Country	N/A	N/A	N/A	N/A						
2.2	NMCPs Develop Country-Level IRS and Other Malaria VC Strategies													
2.2.1	Number and percentage of countries with an integrated malaria vector control strategy, including a plan for monitoring and managing insecticide resistance supported by the project	X	Project Records Annually	Country										
2.2.2	Number and percentage of countries with a data and visualization dashboard complete for IRS and/or entomology data in VectorLink Collect for vector control decision making	X	Project Records Annually	Country										
2.2.3	Number of countries that implement sub-national insecticide rotation	X	Project Records Annually	Country										
2.3	Build capacity of NMCPs and local institutions to collect, analyze, and use data for strategic malaria control decision-making													
2.3.1	Number of individuals trained from NMCPs and national institutions to review and interpret data for integrated vector control decision making		Project Training Records Annually	Country Job Function Organization	N/A	N/A	N/A	N/A						
2.3.2	Number and percent of targeted individuals that report using new analytical tools and/or skills in their planning, resourcing, implementation, or measurement activities		Capacity Assessments Thrice Over Project Life	Country Job Function Organization	N/A	N/A	N/A	N/A						

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
					Year 1		Year 2		Year 3		Year 4		Year 5	
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
3. Procurement and Logistics														
3.1	Cost-Effective Procurement Mechanism Established													
3.1.1	Number and percentage of insecticide procurements that had a pre-shipment QA/QC test, done by a third party, at least 60 days prior to spray campaign	X	Procurement Records Annually	Country Insecticide Type										
3.1.2	Number and percentage of insecticide procurements received on-time to allow for the initiation of spray operations as scheduled		Procurement Records Annually	Country Insecticide Type	1; 100%	1; 100% Organophosphate:100% Clothianidin:100%	1;100%	1 ; 100% Organophosphate:100% Clothianidin:100% Fludorafusion:100%						
3.1.3	Number and percentage of targeted countries with international equipment procurements, including PPE, received on-time to allow for the initiation of vector control campaigns as scheduled	X	Procurement Records Annually	Country VC Intervention										
3.1.4	Number of VectorLink staff trained on procurement	X	Project Records Annually	Country										
3.2	Robust Inventory Management and Logistics Systems Established													
3.2.1	Number and percentage of logistics and warehouse personnel (seasonal and full-time) trained in VC supply chain management		Project Training Records Annually	Country VC Intervention Sex Job Function	196; 100%	197; 100% IRS M: 75 F: 1	47; 100%	45;100% IRS M: 27; 60% F: 18, 40% Central logistic Assistant:1 District Logistic Assistant: 5						

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results										
					Year 1		Year 2		Year 3		Year 4		Year 5		
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result	
								Warehouse Manager: 39							
3.2.2	Number and percentage of operations site warehouses where physical inventories can be verified by daily stock records		Inventory and Stock Records Annually	Country	99; 100%	90; 100%	20 ; 100%	17; 100%							
3.2.3	Number and percentage of IRS countries that successfully completed spray operations without an insecticide stock-out	X	Inventory and Stock Records Annually	Country Insecticide Type											
4. Innovation															
4.1	Conduct operational research or monitoring to scale up new tools, methods, and approaches														
4.1.1	Number of operational research studies on promising new tools or new methods/approaches to existing tools that are implemented		Project Records Annually	Country Type of Innovation	N/A	N/A	N/A	N/A							
4.2	Create and share knowledge through dissemination of best practices and lessons learned														
4.2.1	Number of innovations, best practices, and other data or lessons learned shared with other partners or international institutions for global reporting on the Vector Learning Exchange	X	Project Records Annually	Country Technical Area											
4.2.2	Number of individual members who use the Vector Learning Exchange	X	Project Records Annually	N/A											
4.2.3	Number of symposia and/or presentations submitted to and accepted at global conferences		Project Records Annually	Country Technical Area	N/A	1	N/A	N/A							
4.2.4	Number of success stories written or videos produced and shared on the VectorLink project website		Project Records Annually	Country	1	0	1	1							
4.2.5	Number of peer-reviewed journal articles submitted and accepted	X	Project Records Annually	Technical Area											

#	Performance Indicator	Global Project Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results										
					Year 1		Year 2		Year 3		Year 4		Year 5		
					Target	Result	Target	Result	Target	Result	Target	Result	Target	Result	
4.2.6	Number of contributions to vector control global or country policy and/or guidance documents		Project Records Annually	Country Technical Area			1	2 : 1 malaria elimination plan, 1 malaria communications plan							
4.3	Develop and deploy cost-savings approaches														
4.3.1	Number of innovative or novel approaches implemented to achieve cost savings in IRS and integrated malaria vector control programs		Project Records Annually	Country VC Intervention	1	0	1	1							
4.3.2	Number of cost effectiveness assessments of existing approaches in the implementation of IRS and integrated malaria vector control programs		Project Records Annually	Country VC Intervention	1	0	1	1							
4.4	Cultivate public-private partnerships														
4.4.1	Number of private sector entities engaged with to establish public private partnerships to increase the quality and coverage of malaria vector control activities globally		Project Records Annually	Country	N/A	N/A	N/A	N/A							

ANNEX B: ENVIRONMENTAL MITIGATION AND MONITORING REPORT

List each Mitigation Measure from Column 3 in the EMMP	Status of Mitigation Measures	List Any Outstanding Issues Relating to Required Conditions	Remarks
1. Education, Technical Assistance, Training	NA	N/A	N/A
2. Research and Development <ul style="list-style-type: none"> • Implement laboratory environmental, health, and safety (EHS) manuals with standard operating procedures (SOPs), or use existing SOPs, for laboratory operations in accordance with country-specific compliance mechanisms. • Implement SOPs for the safe storage, transport, and use of equipment, chemical reagents, insecticides, and supplies in conformance with international best practices (e.g., WHO, FAO) and host country requirements. Provide training to workers on the approved SOPs or Waste Management Plan (WMP) developed for properly handling and disposing of wastes. 	Periodic monthly supervision was carried out by the Technical Director in the various entomological sites. Trainings were given to entomology teams on the management of their laboratory and the waste management it produces	N/A	N/A
3. Public Health Commodities	N/A	N/A	N/A
4. Small-Scale Construction <ul style="list-style-type: none"> • Obtain all needed authorizations prior to construction: permits, environmental and social impact assessments, etc. • Retain competent, licensed professionals to design and supervise construction 	N/A	N/A	N/A

List each Mitigation Measure from Column 3 in the EMMP	Status of Mitigation Measures	List Any Outstanding Issues Relating to Required Conditions	Remarks
<ul style="list-style-type: none"> • Establish health, safety and environmental obligations in all contracts. • Complete a site emergency action plan • Provide safety training to all workers using construction equipment • Identify closest health care facility to handle injuries • Asbestos, lead based paints and other toxic materials will not be used under any circumstances. If the presence of asbestos is suspected in a facility to be renovated, the facility must be tested before rehabilitation works begins. Should asbestos be present, then the work must be carried out in conformity with host country requirements and with guidance to be provided by the Implementing Partner. All results of the testing for asbestos shall be communicated to the COR • Develop and follow a waste management plan (WMP). Identify authorized recycling or disposal facilities prior to generation of waste. • Minimize the generation of waste by: <ul style="list-style-type: none"> - Correctly assessing material needs (not over-buying) - Reducing amount of packaging used by suppliers - Reusing material on site, such as use of discarded materials for leveling ground and filling trenches, etc. • Designate secure on-site waste storage facilities 			

List each Mitigation Measure from Column 3 in the EMMP	Status of Mitigation Measures	List Any Outstanding Issues Relating to Required Conditions	Remarks
<ul style="list-style-type: none"> • Ensure all workers are trained and dispose of wastes properly. • Complete and track hazardous waste manifests for all shipments • Source all construction material from an ecologically safe provider. • Contractor must provide and all workers must use personal protective equipment (PPE) such as hardhats, footwear, dust mask, safety glasses and reflective vests, as needed. • Ensure first aid and spill clean-up kits are easily available • Contractors must comply with the “Small-Scale Construction” chapter of the USAID Sector Environmental Guidelines (www.usaidgems.org/sectorGuidelines.htm). • Contractor will provide drinking water, latrine and a handwashing station to workers. • Contractors will arrange working hours to minimize disruption to the community. • If needed, construct drainage canals and infiltration pits for management of storm water and prevention of soil erosion. • Post-construction: ensure leftover materials have been properly disposed of. 			
5. Small-Scale Water and Sanitation	N/A	N/A	N/A
6. Nutrition	N/A	N/A	N/A

List each Mitigation Measure from Column 3 in the EMMP	Status of Mitigation Measures	List Any Outstanding Issues Relating to Required Conditions	Remarks
<p>7. Vector Control</p> <ul style="list-style-type: none"> • Insecticide selection for any USAID-supported malaria program is subject to the criteria listed in the USAID Programmatic Environmental Assessment, country SEAs, and host country requirements. • Procurement and inventory logs must be maintained. • Ensure storage facility and personal protective equipment (PPE) are appropriate for the active ingredient used and in accordance with approved SOPs. • Distribute insecticides to facilities that can manage such commodities safely in storage, use, and disposal (i.e. in a manner generally equivalent to Implementing Partner's own SOPs/WMP) • Inspect and certify vehicles used for insecticide or team transport prior to contract. • Train drivers • Ensure availability of cell phone, personal protective equipment (PPE) and spill kits during insecticide transportation. • Initial and 30-day pregnancy testing for female candidates for jobs with potential insecticide contact. • Health test all spray team members for duty fitness. • Procure, distribute, and train all workers with potential insecticide contact on the use of PPE. 	<ul style="list-style-type: none"> • In addition to the organophosphate, PMI VectorLink Madagascar, during the year 2019, used a new class of insecticide: Neonicotinoid. A new SEA has been validated by USAID in 2019 • Pre-contract inspection and certification of vehicles was conducted on November 01, 2019 • Driver training was conducted on November 1, 2019. About 98 drivers were trained for the 2019 spray campaign in five districts. • All drivers had cell phones as a pre-requisite for hiring and were provided with PPE and spill kits after being trained. PMI VectorLink Madagascar conducted supervisions for the morning mobilization vehicle inspection. • Initial pregnancy tests were conducted before hiring Spray Operators, Washers and Store Assistants from October 28 to November 03, 2019 • Medical examinations were conducted for potential candidates as one of the benchmarks for selection of Spray Operators from October 28 to November 03, 2019. • Both International and local procurement were carried out successfully prior to all trainings. • The correct mixing procedure for pesticides, including triple rinse of the bottles, was included in all trainings. The 		<ul style="list-style-type: none"> • The SumiShield 50 WG has been used in Tulcar II and Sakaraha Districts, and Fludora Fusion in Ihosy. • For the South West, PMI VectorLink Madagascar contracted 80 vehicles and 18 vehicles for Ihorombe. • 175 Team Leaders (147 in South West and 28 in Ihorombe) were trained. Team Leaders were also trained in the maintenance of spray pumps. • At the end of the campaign, each storeroom was decontaminated by washing with water and soap mixed with bleach. • 8,127 posters, 4,151 T-shirts, 4,151 caps, and 116 banners were distributed. 900 radio spots were broadcasted. • Recommendations and instructions are shared with the resident. The

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<ul style="list-style-type: none"> • Train operators on mixing insecticides and the proper use and maintenance of application equipment. • Provide adequate facilities and supplies for end-of-day cleanup. • Enforce application and clean-up procedures. • Implement Information, Education and Communication (IEC) campaigns to inform homeowners of responsibilities and precautions, including washing itchy skin and going to health clinic if symptoms develop and do not subside • Ensure health facility staff are aware of insecticide poisoning management • Storage facilities and transportation vehicles must be physically secured to prevent theft. • Maintain records of all insecticide receipts, issuance, and return of empty containers. • Conduct analysis comparing number of houses treated vs. number of containers used. • Examine houses treated to confirm application • Perform physical inventory counts during the application season. • For shipments of insecticide over water, sachets/ bottles will be packed in 220 liter open top barrels with a water-tight top and a locking ring, or in a similar durable container. Waterproof labeling must be 	<p>Supervisors were trained together with the Team Leader as pump mechanics for the maintenance of the pumps.</p> <ul style="list-style-type: none"> • Most of the storage facilities were rented by the project. However, the end-of-day cleanup was solely the responsibility of the site coordinator, site supervisor and supported by the field supervisors at each operations site. VectorLink Madagascar conducted 801 supervisions for the end of day clean up. • The clean-up procedure for the pumps was done in the designated wash areas and supervised by the site coordinator. • PMI VectorLink Madagascar conducted sensitization campaigns and information before spraying. IEC materials were distributed among households. • 3,241 supervisions were made and found 26 cases where the resident was not informed of exposure protocol (Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside). • Insecticide poisoning management was done for the health facility staff: from October 14 to 19, 2019. • 111 inspections regarding storage facility were conducted. 		<p>resident was immediately informed of the measures to be taken and helped to prepare their houses properly before spraying. The information was given immediately to the beneficiaries so that they could know the steps to follow in the event of an accident.</p> <ul style="list-style-type: none"> • 130 health facility staff were trained (103 in South West, 27 in Ihorombe). • In the South West: 5.8 structures were sprayed per bottle / sachet, and in Ihorombe 4.4 structures per bottle / sachet. • 18 Site Coordinators, 40 Site supervisors and 39 Store keepers were trained. • Among the trainings, there is BMP, the port and the use of the PPE, the maintenance of the equipment and the distances to respect for the beekeeping sites

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<p>affixed to the barrel, with the identity of the pesticide, number of bottles inside, the weight, the type of hazard posed by the contents, and the personal protective equipment to be worn when handling the barrel.</p> <ul style="list-style-type: none"> • Train applicators on the SEA operational requirements, SOPs, PMI BMPs, and approved WMP, developed for the safe and effective storage, distribution, application, and disposal of insecticides • Ensure application equipment and PPE are appropriate for the active ingredient used and in accordance with approved SOPs, and maintain equipment to avoid leaks. • Maintain application equipment • No application of insecticides within 30 yards of beekeeping sites • Handling, treatment, and disposal of nonhazardous (general waste) and hazardous wastes must be in accordance with the approved WMP/SOPs and the PMI BMPs. The WMP, which outlines SOPs for managing waste processes, must be in accordance with PMI best practices and host country requirements • Choose sites for disposal of liquid wastes, including fixed and mobile soak pit sites according to PMI BMPs • Construct fixed and mobile soak pits with charcoal according to the BMPs to adsorb insecticide from rinse water 	<ul style="list-style-type: none"> • 65 supervisions on the transport were conducted. • 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 the regional and district level, as well as the sub-districts warehouses. 111 controls were made regarding the documents of stock. • On average, one bottle / sachet is needed to spray 5.5 structures • 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 at least 3,097 examinations. • The Logistics Manager and ECO ensured physical inventory during and after the spray season. 128 inspections were made. • Site Coordinator, Site Supervisor and Store keeper training was conducted from September 09 to September 14, 2019. • Team Leader and Spray Operator training was conducted (Team Leader on October 21 - 26, 2019 and Spray Operator from October 28 to November 02, 2019). • PMI VectorLink Madagascar had submitted the Waste Management Plan in October 2019 in accordance with the Best Management Practice. • The selection of sites was done by the ECO and supervised by the COP according to 		<ul style="list-style-type: none"> • PMI VectorLink Madagascar used 40 soak pits (32 in the South West and 8 in Ihorombe). 95 mobile soak pits were built. • The soak pits with concrete were functional during the year and did not require any repairs. • PMI VectorLink Madagascar finalized the negotiation with Adonis for the start of waste treatment in December • PMI VectorLink Madagascar used 17 storerooms.

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<ul style="list-style-type: none"> • Maintain soak pits as necessary during season • Monitor waste storage and management during campaign • Monitor disposal procedures post-campaign • Wastes will only be disposed in incinerators that comply with PMI BMPs Collect and maintain treatment and disposal documents and records on file • Country-level USAID EC documentation must contain guidance on proper disposal of wastes 	<p>the PMI BMPs. A lot of rounds of Pre-Season Environmental Compliance Assessment were conducted. For the South West 34 PSECA were conducted (from August 14 to October 25, 2019), and 13 PSECA in Ihorombe during the same period.</p> <ul style="list-style-type: none"> • 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 Site Coordinator 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 the BMP. • 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 • 111 inspections on storekeeper performance were conducted. • 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. • All solid waste generated will be incinerated at a waste management and recycling company, Adonis Madagascar. • Many trainings were done for IRS 		

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	<p>stakeholders in the five districts: Staff of basic health center, Operational Site Coordinator (OSC), Site Supervisor, Drivers, Team Leaders, Spray Operators, Warehouse keeper.</p> <ul style="list-style-type: none"> The rehabilitation of the storeroom was done according to the recommendation of the BMP and using local materials if possible. The rehabilitation work was done under the supervision of the ECO. 		
8. Emergency Response	N/A	N/A	N/A

ANNEX C: SPRAY TEAM ORGANIGRAM

