



U.S. PRESIDENT'S MALARIA INITIATIVE



THE PMI VECTORLINK PROJECT TANZANIA

2019/2020 TANZANIA END OF SPRAY REPORT

SPRAY CAMPAIGN: OCTOBER 15, 2019 – MARCH 19, 2020

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ACRONYMS

AIRS	Africa Indoor Residual Spraying project
BCC	Behavior Change Communication
CFV	Control Flow Valve
DCV	Data Collection Verification
DEC	Data Entry Clerk
DHIS2	District Health Information System 2
DHO	District Health Officer
DIECO	District Information, Education, and Communication Officer
DITT	District IRS Technical Team
DMFP	District Malaria Focal Person
DSET	Data Science, Surveys and Enabling Technology
DVCO	District Vector Control Officer
ECO	Environmental Compliance Officer
EE	Error Eliminator
ESIA	Environmental and Social Impact Assessment
GEFE	Gender Equality and Female Empowerment
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
mHealth	Mobile Health
NEMC	National Environment Management Council
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Programme
PMI	President's Malaria Initiative
PMT	Performance Monitoring Tracker
PPE	Personal Protective Equipment
PSDQA	Post-Spray Data Quality Audit
Q&A	Question and Answer
RSL	Race to the Starting Line
SMS	Short Message Service
SOP	Spray Operator

TOT	Training of Trainers
TPRI	Tropical Pesticide Research Centre
USAID	United States Agency for International Development
WEO	Ward Executive Officer
WHO	World Health Organization
ZAMEP	Zanzibar Malaria Elimination Programme
ZEMA	Zanzibar Environmental Management Agency

EXECUTIVE SUMMARY

The President’s Malaria Initiative (PMI) VectorLink Tanzania Project, funded by the U.S. Agency for International Development (USAID) and implemented by Abt Associates, supports the implementation of indoor residual spraying (IRS) in mainland Tanzania and Zanzibar. PMI is jointly implemented by USAID and the Center for Disease Control (CDC). The objective of PMI Vectorlink Tanzania is to further PMI’s goal to halve the burden of malaria in 70 percent of the at-risk populations in sub-Saharan Africa. PMI Vectorlink Tanzania fits into the National Malaria Control Programme (NMCP) and the Zanzibar Elimination Malaria Programme (ZAMEP) mission. The mission aims to ensure that Tanzanians have access to quality, effective, safe, and affordable malaria interventions through timely and sustainable collaborative efforts with partners and stakeholders at all levels.

The PMI VectorLink Tanzania conducted its 2020 IRS campaign in three phases between October 15, 2019, and March 19, 2020, initially targeting 513,770 structures for IRS; 472,539 on the mainland and 41,231 in Zanzibar. The campaign took place in three phases. The first phase covered four districts including three refugee camps on the Mainland, namely, Biharamulo in Kagera Region; and Kakonko, Kasulu, and Kibondo with their respective refugee camps of Mtendeli, Nyarugusu, and Nduta in Kigoma Region. The second phase covered nine districts in Zanzibar: Central, North A, North B, South, West A, and West B on Unguja Island and Micheweni, Mkoani, and Wete on Pemba Island. The final and third phase was expected to cover two districts on the mainland: Bukombe in Geita Region; and Ukerewe in Mwanza Region.

Overall, the PMI Vectorlink Tanzania sprayed 471,622 structures out of 503,567 structures found by spray operators (SOPs) in the targeted districts, a coverage rate of 93.7 per cent. PMI Vectorlink Tanzania protected 1,915,151 residents, including 373,976 children under the age of five and 56,964 pregnant women.

PMI Vectorlink Tanzania used 68,097 sachets of SumiShield 50WG and 66,362 bottles of Actellic 300CS insecticides at structures sprayed per insecticide bottle or sachet ratio of 3.6 in Mainland and 3.5 in Zanzibar.

TABLE I: 2019/2020 VECTORLINK TANZANIA CAMPAIGN SUMMARY

	Tanzania Mainland		Zanzibar	Total
Number of districts sprayed by PMI-supported IRS in 2019/2020	3 (Kakonko, Kasulu, and Kibondo)	3 (Biharamulo**, Bukombe, and Ukerewe)	9 (Central, Micheweni, Mkoani, North A, North B, South, West A, West B, Wete)	15
Insecticide	Pirimiphos-methyl (Actellic®300 CS)	Clothianidin (SumiShield 50WG)	Clothianidin (SumiShield 50WG)	
Number of structures targeted by PMI-supported IRS	234,189	238,350	41,231	513,770
Number of eligible structures found by SOPs	246,282	211,320	45,965	503,567
Number of structures sprayed by PMI-supported IRS	227,385	199,705	44,532	471,622
Spray coverage	92.3%	94.5%	96.9%	93.7%
Total population protected by PMI-supported IRS:	934,802	754,975	225,374	1,915,151
Children under five	186,322	150,575	37,079	373,976
Pregnant women	24,834	25,780	6,350	56,964

Dates of PMI-supported IRS campaign	October 15 – November 25, 2019	October 15 – November 25, 2019**	February 15 – February 27, 2020	
		March 3 – March 19, 2020		
Length of the campaign (in days)	36	36/15**	12	63
Number of people trained with U.S. Government funds to deliver IRS*:	2,667		515	3,182
Supervisors	61			75
Team leaders	358		14	425
SOPs	2,248		67	2,682
			434	

* This is based on the PMI indicator definition. It includes only spray staff such as SOPs, team leaders, supervisors. It excludes data clerks, information, education and communication mobilizers, drivers, washers, porters, pump technicians, clinicians, and security guards.

** Biharamulo District used SumiShield 50WG and was sprayed between October 15 and November 2019, along with Kakonko, Kasulu, and Kibondo Districts.

The VectorLink Tanzania team experienced several challenges before and during the spray campaign:

- Environmental Compliance Certificate: Received the certificate from the Ministry of the Environment on the day that spraying was supposed to start, which delayed the start by a day.
- NMCP delays in confirming the districts to be sprayed which happened three months just before the campaign.
- Early-onset of the rainy season: SOPs were unable to meet their daily target on days when it rained.
- Refusals: A few community members in some of the sites refused to open their houses for spraying, often citing a desire to maintain privacy of their belongings and fearing that items could get wet from the rain.
- Locked structures: Some structures that met eligibility requirements for spraying had no occupants to allow access to spray teams, as owners were residing in urban areas at the time of spray. In some cases owners had gone to prepare their farms ahead of the heavy rain season.
- Poor household preparation: Failure of communities and SOPs on both the mainland and Zanzibar to correctly prepare households for spraying, which decreased the pace of IRS activities.
- Both in Ukerewe and Bukombe the campaign was stopped before completion at the direction of the Government due to COVID 19 pandemic. The project demobilized the sites at PMI's direction, since there was no verbal or written approval from the Government to resume IRS and in the interim, the heavy rain season had started.

COUNTRY BACKGROUND AND ACTIVITY SUMMARY

The United Republic of Tanzania has a total area of 947,480 km², with a 2019 mainland population estimated at 55.8 million¹ people. The country has two independent ministries of health, one for the mainland and one for the Zanzibar archipelago. Each ministry has full autonomy over a program for malaria control; the mainland's National Malaria Control Programme (NMCP) and the Zanzibar Malaria Elimination Programme (ZAMEP). Zanzibar's malaria control is currently in the pre-elimination phase.

MAINLAND TANZANIA

The malaria situation in mainland Tanzania has changed over time, and there is increasing evidence that malaria prevalence dropped significantly over the past decade following the scale-up of interventions, including indoor residual spraying (IRS). These efforts contributed to a decrease in malaria mortality, especially in children under the age of five, between 2005 and 2016. Malaria morbidity also declined, from 18 million cases in 2008 to 5.5 million in 2017, despite population growth. An analysis of health facility data from the national routine reporting system, the District Health Information System 2 (DHIS2), also shows decreasing malaria incidence and mortality rates for the period 2004–2018.² Almost the entire population of mainland Tanzania is at risk for malaria. There are, however, considerable variations in the levels of transmission due to a range of factors, including geography and climate, access to prevention methods, and land-use patterns. The mosquito vector *Anopheles (An.) funestus* is distributed throughout the country, whereas *An. arabiensis* and *An. gambiae* s.s. have been observed in different proportions in various regions of mainland Tanzania. *An. merus* is restricted to the coasts of both the mainland and Zanzibar.³

SELECTION OF INTERVENTION AREAS

The National Malaria Control Program (NMCP), in conjunction with the President's Malaria Initiative (PMI) and other key malaria vector control stakeholders, such as the President Office Regional Authority and Local Government (PORALG), selected six districts for the 2019/2020 IRS campaign. These districts are Kasulu, Kibondo, and Kakonko in Kigoma Region; Bukombe in Geita Region; Biharamulo in Kagera Region; and Ukerewe in Mwanza Region.

ZANZIBAR

Zanzibar is an archipelago in the Indian Ocean, 25–50 kilometres (16–31 miles) off the northeast coast of the Tanzanian mainland. It consists of numerous small islands and two large ones: Unguja, the larger and formally referred to as Zanzibar, and Pemba. The islands constitute 2,461 square kilometres (950 square miles). The estimated population was 1.6 million in 2018.⁴ The two main islands experience differences in annual rainfall, temperature, and humidity. Similarly, there is a variation of vegetation between the northern and southern

¹ National Bureau of Statistics (NBS) projections, 2018; <https://www.nbs.go.tz/nbstz/index.php/english/statistics-by-subject/population-and-housing-census/977-population-projections-for-the-period-of-2013-to-2035-at-national-level>

² WHO.AFRO 2018; <https://www.afro.who.int/news/who-recognizes-national-efforts-towards-malaria-elimination>

³ <https://www.intechopen.com/books/biological-control-of-pest-and-vector-insects/major-disease-vectors-in-tanzania-distribution-control-and-challenges>

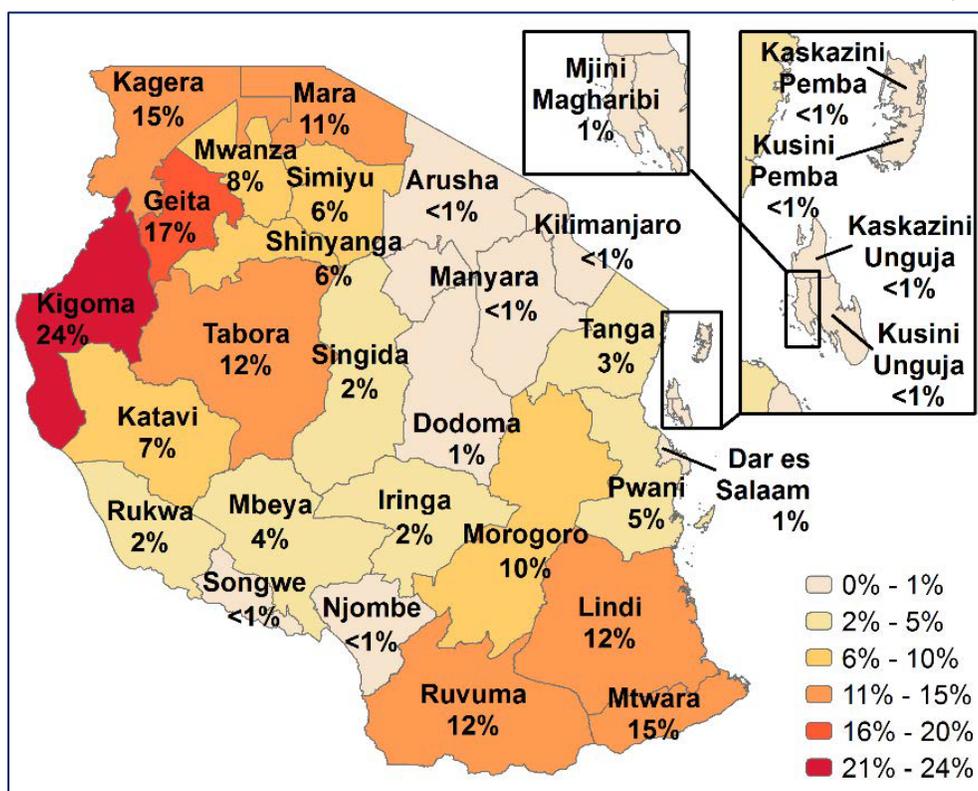
⁴ National Bureau of Statistics (NBS) projections, 2018; <https://www.nbs.go.tz/nbstz/index.php/english/statistics-by-subject/population-and-housing-census/977-population-projections-for-the-period-of-2013-to-2035-at-national-level>

districts; and western, and eastern coastlines. These ecological differences are associated with the distribution and density of the primary malaria vector. Through the implementation of the Malaria Early Epidemic Detection System and Malaria Case Notification, ZAMEP has been identifying *shehias*⁵ that are malaria hot spots with continued malaria transmission, which the project targets for IRS as Zanzibar pursues malaria pre-elimination.

SELECTION OF ZANZIBAR INTERVENTION AREAS

Zanzibar Malaria Elimination Program (ZAMEP), PMI and PMI VectorLink reviewed malaria incidence data from October 2018 to September 2019 for all shehias. Shehias were ranked by incidence and those with the highest incidence selected, up to the project’s target of 41,231 structures. The IRS target shehias totaled 127: 101 from six districts in Unguja and 26 from four districts in Pemba. The selected shehias had malaria incidence of ≥ 3.4 cases per 1,000 population.

FIGURE I: PREVALENCE OF MALARIA IN CHILDREN BY REGION IN TANZANIA, 2017



Source: Malaria Indicator Survey 2017, Pg. 5

FIGURE 2: MAP OF TANZANIA MAINLAND SHOWING IRS TARGETED DISTRICTS

⁵ *Shehia* is the smallest administrative unit in Zanzibar.

Year	Districts	Structures Sprayed	Population Protected	Insecticide
2015/2016	Zanzibar – 7	27,664	130,170	Pirimiphos-methyl CS
	Mainland – 9	508,704	2,008,366	
2016/2017	Zanzibar – 9	38,884	191,119	Pirimiphos-methyl CS
	Mainland – 10	651,149	2,478,004	
2017/2018	Zanzibar – 8	67,450	334,715	Pirimiphos-methyl CS
	Mainland – 9	677,147	2,506,212	Pirimiphos-methyl CS and Clothianidin
2018/2019	Zanzibar – 10	94,339	477,243	Pirimiphos-methyl CS
	Mainland – 7	501,584	1,926,767	Clothianidin WG
2019/2020 (Target)	Zanzibar – 10	41,231	499,798	Clothianidin WG
	Mainland – 6	472,539	2,531,237	Pirimiphos-methyl CS and Clothianidin WG

INSECTICIDE SELECTION

The NMCP and PMI chose clothianidin for the October/November 2019 IRS campaign in Mainland Tanzania while ZAMEP and PMI chose and clothianidin for the Zanzibar's February/March 2020 IRS campaigns. These choices aligned with the interim insecticide resistance monitoring and management plans for the two areas. Actellic 300CS and Sumishield 50WG continued to be effective against local mosquitoes in Zanzibar and Tanzania mainland. The decision to switch the two products was a programmatic decision that is geared at preserving the efficacy of these malaria arsenals for ZAMEP, NMCP and PMI.

The market price for SumiShield 50WG and Actellic 300CS is approximately \$26. Through the UNITAID-funded NGenIRS Project, the price of SumiShield 50WG and Actellic 300CS was subsidized to \$16.54 after the project met the required minimum volume guarantee and procured it in a single entity (PMI funding).

IMPLEMENTATION OF IRS ACTIVITIES

The PMI VectorLink Tanzania project implemented three phases of IRS campaigns for a total of 63 operational days. The campaigns were implemented between October 2019 and March 2020, covering six districts in mainland Tanzania and nine districts in Zanzibar. Phase one, in the Mainland, lasted 36 operational days from October 15 through November 25 with varying start dates. Targeted locations included the following districts; Biharamulo in Kagera Region, Kakonko, Kasulu, and Kibondo in Kigoma Region with their respective refugee camps of Mtendeli, Nyarugusu, and Nduta. Phase 2 lasted for 12 operational days, from February 15 - 27, 2020, in nine Zanzibar districts in both Unguja and Pemba Islands. In the third phase the spray campaign was implemented for 15 days from March 3 – 19, 2020, in Ukerewe district, Mwanza Region and Bukombe district, Geita Region. Phase three was suspended on March 19, 2020, nine days before completion, due to Corona Virus health alert by the Ministry of Health, Community Development, Gender, Elderly and Children.

IRS PLANNING AND PARTNER COLLABORATION

The PMI VectorLink project understands that planning is critical to the success of the IRS. The project in collaboration with PMI, NMCP, and ZAMEP continued to use the Race to the Starting Line (RSL) tool and an IRS activity schedule for all stakeholders to review and plan the IRS campaign. The RSL calls for a nine-week pre-spray countdown and shows deadlines for activities leading to the spray campaign. The IRS activity schedule lists activities and exact dates for implementing the activities. The RSL and the IRS activity schedule ensure harmonization of spray schedules to protect vulnerable populations during historic peak transmission seasons.

For the 2019/2020 campaign, PMI, VectorLink, NMCP, and stakeholders determined the spray timing based on the DHIS2 malaria case data, which showed malaria peaks for the mainland IRS districts occurring in December/January as a result of the short rains in October/November. With regards to Zanzibar spray campaign, PMI, VectorLink, ZAMEP, and stakeholders, through a consultative meeting agreed to start IRS on February 15, 2020 in order to maximize the residual efficacy of Sumishield 50 WG and address the malaria peaks that usually follow the rains.

REGIONAL AND DISTRICT ADVOCACY AND SENSITIZATION MEETINGS

As part of spray preparation, PMI VectorLink Tanzania held regional- and district-level advocacy and sensitization meetings in both mainland Tanzania and Zanzibar. Participants of these meetings were the regional and district health management team members, regional and district administrative leaders, security officers, and representatives of the NMCP, ZAMEP, National Environment Management Council (NEMC), and Zanzibar Environmental Management Authority (ZEMA).

Meetings focused on the following agenda items:

- Inform stakeholders about the PMI VectorLink Tanzania project's objectives, goals, and planned activities
- For the old districts, the meetings assess previous IRS campaign challenges and lessons learned. Make recommendations to improve performance during the 2019/2020 campaign
- Share and review the 2019/2020 IRS operational plan and gather feedback
- Explain how to engage and solicit community participation and involvement of local leaders, particularly hamlet leaders, before, during, and after the spray campaign
- Evaluate the effectiveness of the methods used in information, education and communication

- (IEC)/behavior change communication (BCC) before and during the campaign
- Outline the role and involvement of community leaders, especially hamlet, village, district, and regional supervisors, in the IRS campaign
- Solicit commitment of district resources as the districts' contribution to the IRS implementation, for example, the provision of IRS site storage spaces and vehicles during supervision of recruitment process and spray operators training.
- Provide recruitment processes and guidelines as well as encourage the participation of women in the IRS campaign. Explain the feasibility and benefits of women's participation in the community at large
- Ensure that all stakeholders are aligned and engaged to work together to support successful IRS operations.

The district advocacy and sensitization meetings on the mainland were used as a platform to impart and cascade key IRS information. Ward Executive Officers (WEO) returned to their communities to communicate the IRS messages to hamlet and village leaders so that they, in turn, would sensitize their communities. In parallel, WEOs were instructed to lead the recruitment process through village government within their catchment area of authority. Recruitment adverts and guidelines were channeled through them.

In Zanzibar, PMI VectorLink Tanzania and ZAMEP organized combined pre-spray regional and district advocacy and microplanning meetings, one in Pemba and three in Unguja. The four respective regional commissioners attended the meetings. District officials from all 9 target districts also attended: district commissioners (DC), district administrative secretaries (DAS), officer commanding districts (OCD), district executive directors (DED), and district medical officers (DMO).

MICRO-PLANNING MEETINGS

Following the regional and district advocacy and sensitization meetings, PMI VectorLink Tanzania conducted micro-planning meetings in all IRS districts. The main objective was to discuss roll-out and implementation of IRS operations in the districts. Meeting participants included DMOs, district malaria focal persons (DMFP), District Information, Education, and Communication Officers (DIECO), and district health officers (DHO). The people who hold these four officer positions in each district constitute the District Indoor Residual Spraying Technical Team (DITT) during the campaign. These meetings were a potential forum to discuss key issues to lead successful IRS implementation in each respective district. The following issues were thoroughly presented and discussed:

- Detailed IRS activity schedule
- Comprehensive recruitment guidelines and schedule of temporary IRS staff
- Different ways to encourage more women to participate, for example, targeting them in recruitment announcements for temporary staff, and ensuring an equal number of female and male recruits are shortlisted at the village level for the final interview and are hired after the final interview, ensuring an equal number of each gender
- The district's roles and responsibilities, such as providing stores and data centers in all district operations sites as well as vehicles for supervision
- Role of local leaders in the supervision of IRS activities during the operations
- Feedback mechanism during IRS operations
- Renovation of IRS operations sites
- Community mobilization plan for IRS with emphasis on hamlet leaders and shehias working with site mobilizers
- IRS approaches to deploy
- IRS calendars and process to review them
- Administrative redistricting of some shehias
- Participants agreed that regular feedback was the cornerstone for success at each stage of project implementation.

IRS TRAINING

During the planning period, PMI VectorLink Tanzania staff prepared and reviewed IRS training materials. It then shared the materials with national facilitators, who co-facilitated the training. Tables 3 provides details on the types of training, and the number of participants from mainland Tanzania and Zanzibar disaggregated by sex. The project held training for all cadres of staff, except water fetchers. It trained a 5% buffer in the SOP, storekeeper, and data entry clerk (DEC) cadres to accommodate any worker drop-outs or dismissals.

TABLE 3: IRS TRAINING AND PARTICIPANTS, MAINLAND AND ZANZIBAR

Training on IRS	Cadres of People Trained	Mainland		Zanzibar		IRS Training Total		Gender Awareness		Total
		F	M	F	M	F	M	F	M	
ToT	National and sub-national representatives	0	4	6	14	6	18	6	18	24
ToT	External Supervisor	2	4	0	0	2	4	2	4	6
	Abt permanent staff	0	0	0	0	0	0	11	22	33
ToT	DIIT - DMFP	0	0	0	0	2	4	2	4	6
ToT	DIIT (DMO, DHO, DIEC)	3	15	0	0	3	15	3	15	18
ToT	Site Supervisors	29	32	1	13	30	45	30	45	75
ToT	Team leaders	141	217	32	35	173	252	173	252	425
Spray Operations	SOPs*	1,080	1,168	234	200	1,314	1,368	1,314	1,368	2,682
Insecticide Poisoning Management	Clinicians	8	28	7	3	15	31	15	31	46
Mobilization	Mobilizers	33	28	8	6	41	34	41	34	75
Store Management	Storekeepers*	50	50	6	11	56	61	56	61	117
Pump Maintenance	Pump Maintenance	1	60	1	13	2	73	2	73	75
Washing	Washers	80	15	12	2	92	17	92	17	109
Security	Security guards	39	157	0	24	39	181	39	181	220
Driving	Drivers	0	136	0	49	0	185	0	185	185
M&E	M&E assistants	3	8	1	3	4	11	4	11	15
M&E	Data entry clerks*	35	37	8	6	43	43	43	43	86
	TOTAL M/F	1,506	1,963	316	379	1,822	2,342	1,833	2,364	4,197
	TOTAL/ training	3,469		695		4,164		4,197		

*Include reserve participants

SPRAY OPERATIONS & SUPERVISION

IRS HUMAN RESOURCES

Overall, the project hired 3,840 seasonal staff to implement the 2020 IRS campaign. Table 4 shows details of seasonal staff hired for each cadre of the 2019/2020 campaign, disaggregated by sex. The proportion of women hired for each cadre is indicated in the last column. Women hired to work at supervisory levels such as external supervisors, site supervisors, team leaders, storekeepers, and M&E assistants accounted for 41.2% (260/631) of all staff employed into supervisory positions, compared with 36.7% in 2019.

TABLE 4: PEOPLE HIRED TO SUPPORT THE CAMPAIGN BY CADRE & SEX

Cadre	Female	Male	Total	% of Female Hired
External supervisor	2	5	7	28.6%
Site Supervisors	30	45	75	40.0%
Team leaders	173	252	425	40.7%
SOPs	1,232	1,327	2,559	48.1%
Mobilizers	40	35	75	53.3%
Storekeepers	51	58	109	46.8%
Pump maintenance technicians	2	73	75	2.7%
Washers	92	17	109	84.4%
Water fetcher	28	68	96	29.2%
Security guards	38	182	220	17.3%
M&E assistants	4	11	15	26.7%
Data entry clerks	38	37	75	50.7%
Total	1,730	2,110	3,840	45.1%

IRS APPROACH

PMI VectorLink Tanzania used three IRS approaches, district-based IRS, community-based IRS, and quasi-community-based IRS, in an attempt to use the least expensive, yet practical approach for each area. District-based IRS was used where the terrain was difficult for walking and bicycles, and or if IRS was being done for the first time. Community-based IRS was used in flat terrain, suitable for walking or cycling, and where communities were familiar with the IRS approach. The quasi-community-based approach was used to prepare a site before graduating it to the community-based approach. For all methods, spraying started from the distant communities and ended with communities around the operations sites. The project continued to use CFVs with the Hudson sprayers and the Goizper pumps to ensure good quality of spray.

COMPOSITION AND MANAGEMENT OF SPRAY TEAMS

In every operations site, the IRS staff comprised the following cadres: one supervisor who managed the spray teams in the field, a storekeeper, a site mobilizer, a pump technician, two site guards, a cleaner/washer, a water fetcher, and a team leader and team of SOPs. The teams had an average of six SOPs, and each site supervisor supervised an average of 35 SOPs. The SOPs reported directly to their team leader, who in turn reported to the site supervisor.

PAYMENT OF SEASONAL STAFF

PMI VectorLink Tanzania continued its 2019/2020 practice of using M-Pesa, a mobile money transfer service offered by Vodacom mobile network, to pay all seasonal staff (SOPs, team leaders, supervisors, washers, water fetchers, storekeepers, security guards, mobilizers, DEC's, and M&E assistants) on the mainland during IRS

training and field operations. The project made bulk transfers of funds to each seasonal staff person's cell phone number after each training session and twice during the 24-day or 12-day spray campaign.

M-Pesa payments have several advantages over cash payments:

- Time-saving: Seasonal workers did not have to travel to collect their wages, which the project sent directly to their phones. Seasonal workers could receive pay even while at work.
- Cost-saving: Mobile money reduces the cost of transporting large amounts of cash to operations sites. It also obviates the need to pay security services/ police to escort the Finance team when they transported cash.
- Female empowerment: Women who participated in the IRS campaign had full control over their wages since they received money directly on their phones.

The project sent Finance and Administration staff from the Mwanza office to assist the PMI VectorLink office coordinator in Zanzibar in confirming signed contracts, compiling the payment lists, cross-checking sign-in sheets, and verifying phone numbers before payment. As a result of last year's initiative where the project coordinated with Vodacom to register all seasonal workers, even those who had non-Vodacom numbers, all seasonal workers had registered Vodacom numbers to facilitate their payments. The office coordinators were responsible for distributing and collecting signed contracts from the seasonal staff. The coordinators also collected all daily attendance registers for seasonal staff before preparing payrolls.

INSECTICIDE

The project categorized procurement of IRS commodities into international and local procurement to ensure cost-effectiveness and timely delivery of commodities.

LOCAL PROCUREMENT

Local procurement was an open, competitive tendering process that included a solicitation for quotes for services and materials. The PMI VectorLink Project Tanzania procurement committee made the selection based on the lowest cost and technically acceptable bid according to the criteria in the solicitation for quotations. The services/items procured locally included the following:

- Printed materials for IEC, IRS data collection, and commodity tracking
- Personal protective equipment (PPE) items
- Vendors for breakfast for the spray teams
- Transportation services for IRS distribution, operations, and supervision
- Operation site refurbishment materials, including materials for soak pits

Annex A lists local purchases, and quantities the project procured for each item.

INTERNATIONAL PROCUREMENT

The items procured internationally included the following:

- Gloves and nose masks (also called respirator masks)
- Face shields
- Insecticide (SumiShield 50WG)
- Goizper team leader kits
- Goizper tool to tighten the sprayer chamber

Annexe B lists international purchases, and quantities procured for each item.

LOGISTICS AND STOCK MANAGEMENT

In 2019/2020, PMI VectorLink Tanzania set up 108 operations sites for the mainland and Zanzibar IRS campaigns. The project hired 108 storekeepers to be the custodians of the operations site stores and one additional storekeeper for the Wete main warehouse in Pemba (Figure 4). Please see Annex C for details.

PMI VectorLink deployed two types of insecticides: SumiShield 50WG in Zanzibar, Biharamulo, Ukerewe and Bukombe and Actellic 300CS in Kakonko, Kibondo and Kasulu. The balance of SumiShield50WG from 2018 were 6564 sachets and the project bought 65,670 sachets of SumiShield 50WG and distributed them to Tanzania mainland sites. 70,992 bottles of Actellic 300CS were purchased and distributed in Kakonko, Kasulu and Kibondo sites. Also, the project received 5,119 bottles of Actellic 300CS from Zanzibar which remained from the last campaign and was procured by Global Fund. Due to the insecticide resistance mitigation plan, Actellic was not going to be used again in Zanzibar before these bottles would have reached their expiration date. The project sent four of the sachets of SumiShield and two bottles of Actellic 300cs to the Tropical Pesticide Research Centre (TPRI) for quality analysis. Additionally, one sachet of SumiShield was issued to ZAMEP for susceptibility testing before use; and two sachets were sent to the Ifakara Health Institute to support an experiment on vector control product testing and equivalent evaluation, with PMI's approval. The IRS campaign consumed 55,278 of the sachets SumiShield and 66,362 bottles of Actellic 300CS leaving a post-spray balance of 15,890 sachets of SumiShield; 11,164 were kept in the Mwanza warehouse and 4,726 in the Geita warehouse, and 9,747 bottles of Actellic 300CS kept at Geita warehouse. In Zanzibar, the project procured 11,790 sachets of SumiShield and distributed to Unguja and Pemba sites. Also the project transported and distributed 1,059 sachets remaining from Biharamulo sites to Zanzibar due to a projected shortage of insecticide in Zanzibar. The IRS campaign in Zanzibar consumed 12,819 sachets of SumiShield, leaving a post-spray balance of 30 sachets. These sachets were issued to ZAMEP, so the project has a zero balance of insecticide in Zanzibar.

FIGURE 4: GEITA WAREHOUSE



The project distributed IRS materials to all operations sites seven days before the 2019 IRS campaign began. The early distribution enabled storekeepers to verify needed materials and actual receipts and store the materials as appropriate. The availability of the materials during spray operator (SOP) training enabled the spray teams and other temporary staff to hold dress rehearsals, and for the project to identify and promptly address all shortcomings. The project distributed insecticides to the sites the week of the campaign for verification and storage.

During the IRS campaign, regional and district supervisors, project staff, and visiting PMI, NMCP, ZAMEP, NEMC, and Abt Associates home office staff inspected warehouses in all 108 operations sites. They monitored the movement of materials and insecticides and ensured environmental compliance. At the midpoint of operations, the project redistributed insecticide between the operations sites as needed. Supervisors ensured that storekeepers promptly updated their records and they conducted follow-up with storekeepers who were not compliant. All records matched physical stock counts in the stores at all times.

IEC/SBCC ACTIVITIES & OUTCOMES

The primary objective of the PMI VectorLink Tanzania's IRS communication activities was to ensure a successful spray campaign by motivating near-universal coverage, timely preparation of premises, and adherence to safety precautions. IEC/BCC is a vital component of IRS to ensure safe, high-quality, and effective campaigns with the high coverage and long-lasting impact of spraying.

In 2019/2020, PMI VectorLink Tanzania and DIECs in both mainland Tanzania and Zanzibar implemented IEC/SBCC activities for IRS, in particular, mass media messaging and community-level outreach activities. Before spraying, the project conducted advocacy and sensitization meetings at regional, and district levels on the mainland and the regional level in Zanzibar. These meetings were aimed to win the political will and support for IRS from authorities at all levels, and from communities.

IEC/SBCC approaches also involved the use of site mobilizers to coordinate hamlet leaders on the mainland and shehas in Zanzibar as they mobilized their communities before and during the spray campaign. The mobilization effort was supplemented by mass communication through local radio stations across IRS districts as well as by the distribution of printed IEC materials.

Specifically, 2019/2020 IEC/BCC focused on:

- Notifying communities on the forthcoming IRS campaign and the exact dates when their village or hamlet is expected to be sprayed
- Emphasizing household roles and responsibilities including properly preparing their structures before spray teams arrived, being available during spraying to open the structures and do any needed final preparation, and providing a bucket of water for mixing the insecticides
- Informing stakeholders and beneficiaries about safety issues related to the environmental and health effects of using insecticides
- Addressing community beliefs, misconceptions, and frequently asked questions about IRS and malaria
- Stressing gender equality in all IRS activities by emphasizing the need for more female participation and using IEC materials that depict women in various IRS roles
- Identifying synergies with the USAID Tulonga Afya Project and sharing VectorLink Tanzania's IEC/BCC materials. The joint technical meeting was held with the project team, Tulonga Afya and NMCP to review and revise all IRS materials.

ADVOCACY MEETINGS

PMI VectorLink Tanzania conducted advocacy and sensitization meetings at regional, district and ward level. The main objective of the meetings was to communicate IRS messages and win political will and support at all levels to lay groundwork and guarantee successfully project implementation. In mainland during district advocacy meetings, the project assigned WEOs to communicate the IRS message to Village Executive Officers (VEOs) and hamlet leaders so they would disseminate the information to the communities. In Zanzibar, regional advocacy meetings involved national, regional, and district leaders. Table 5 shows the number of meetings and participants.

TABLE 5: REGIONAL AND DISTRICT ADVOCACY MEETINGS

Advocacy Stage	Location	Number of Meetings	Number of Participants
Regional Advocacy	Kigoma	1	16
	Kagera	1	10
	Geita	1	11
	Mwanza	1	12
District Advocacy	Kasulu	1	32
	Kibondo	1	41
	Kakonko	1	30
	Biharamulo	1	34
	Bukombe	1	38
	Ukerewe	1	45
Mainland Total		10	269
Regional and District Advocacy	Pemba	1	55
	Unguja	3	109
Zanzibar Total		4	164

COMMUNITY SENSITIZATION

PMI VectorLink Tanzania reached the communities with IRS key messages through community leaders and site Mobilizers. WEOs and Shehas, attended the district advocacy meetings and thereafter instructed to cascade the information to the lower level at their locality. Hamlet leaders and shehia mobilizers then took on the task of sensitizing and mobilizing their communities for the spray campaign. Site mobilizers lead the entire sensitization activities at hamlet and shehia level. Jointly with local leaders they organized and conducted sensitization meetings, conducted localized public announcement and door to door mobilization. Distribution of printed IRS materials like posters, Q&A and fact sheets was also done during implementation of IRS community sensitization and mobilization. Site mobilizers received data from hamlet leaders and shehas on estimated number of households before the actual spray day. The estimates were shared with site supervisors for planning. After completing IRS, mobilizers were informed by shehas and hamlet leaders of the estimated remaining households that were not sprayed. These remaining households were later scheduled for mop-up or revisits.

During 2019/2020 campaigns, site mobilizers visited 1,439 out of 1,439 hamlets and three refugee camps in the first Mainland phase in Kigoma and Kagera regions. In phase two, all 78 targeted shehias in the in Zanzibar were visited before IRS. For the third campaign in Mainland, 624 out of 878 hamlets were mobilized, leaving 19 hamlets mobilized but not reached during spray, and 235 hamlets not mobilized due to COVID-19.

During the spray campaign, SOPs asked household respondents whether their structures were mobilized before SOPs reached them. Of the 503,567 structures found, 487,531 (96.8%) structures confirmed that they were mobilized before the SOP arrived.

IEC/BCC MATERIALS AND INFORMATION

PMI VectorLink Tanzania engaged the local radio stations in Kagera, Kigoma, Mwanza, Geita, and Zanzibar to air 122 radio spots and 60 announcements in Swahili (Table 13). The spots aired at times that maximized the duration and coverage pre-, mid-, and post-spray. Mainland residents heard four radio spots – “Tunahama

Tena,” (We are Moving Again) “Jingle,” “Dawa ya Ukoko” (Residual Insecticides) and “Bao.”⁶ On Zanzibar, the BCC unit prepared “Upigaji Dawa Majumbani” (Indoor Residual Spraying).

The local radio stations used and districts covered were as follows:

- Radio Kwizera: Kasulu, Kakonko, Kibondo, Bukombe and Biharamulo
- Shirika la Utangazaji Zanzibar (ZBC): Unguja and Pemba
- Istiqama for development Radio: Pemba
- Radio Metro FM stereo: Ukerewe

In addition, PMI VectorLink Tanzania distributed 6,937 fact sheets and 1,956 questions and answer (Q&A) sheets and put up 3,112 posters in the targeted mainland districts. In Unguja and Pemba, shehia leaders distributed 1,189 IEC materials comprising fact sheets, posters, and Q&A sheets. The materials had been prepared by the PMI VectorLink project in collaboration with Johns Hopkins University Center for Communications Programs.

TABLE 6: PMI VECTORLINK TANZANIA MESSAGE DISSEMINATION CHANNELS BY DISTRICT

Zone/Region	Location	Radio Spots	Radio Announcements	Fact Sheets	Q & A Sheets	IRS Posters
Geita	Bukombe	22		668	188	300
Kigoma	Kakonko	24		516	145	231
	Kakonko-Mtendeli camps			81	23	36
	Kasulu			999	282	448
	Kasulu-Nyarugusu camps			404	114	181
	Kibondo			976	275	438
	Kibondo-Nduta camps			275	78	124
Kagera	Biharamulo			1,424	402	639
Mwanza	Ukerewe	22		1,216	343	546
Mainland Total		68		0	6,559	1,850
Zanzibar	Pemba	20	34	78	22	35
	Unguja	34	26	494	139	222
Zanzibar Total		54	60	572	161	257
Grand Total		122	60	7,131	2,011	3,200

WORLD MALARIA DAY

To commemorate the 2020 World Malaria Day on April 25, 2020, PMI VectorLink Tanzania through the NMCP, ZAMEP, and IRS regional authorities contributed to the information that was in the Ministry of Health press release as an alternative to normal commemoration events, due to the COVID-19 pandemic

CAPACITY BUILDING EFFORTS

The PMI VectorLink project continued to develop the capacity of local staff and government counterparts by integrating them into VectorLink plan of action. In 2020, PMI VectorLink strengthened the capacity of government stakeholders through their participation in the ToT and technical training to ensure high-quality

⁶ “Bao” is an African game which resembles chess, mostly played by elders in the community. During bao games, elders often deliberate and decide on important matters concerning their communities.

IRS spray, mobile-based supportive supervision of a spray campaign, logistic assessment, procurement, and safe and correct insecticide applications and finally on the post environmental compliance activities.

Involvement of ZAMEP staff and district representatives in the procurement of local materials ensured transparency and awareness of the procurement process. In addition, once ZAMEP IRS focal person participated as observers in the mainland spray campaign, to experience how an intensive IRS operation is managed.

To ensure the project's compliance with environmental policies of the country, technical staff from Zanzibar Environmental Management Authority (ZEMA) participated during training and supervision of the IRS campaign in Zanzibar. For Tanzania Mainland, National Environmental Management Council (NEMC) participated during IRS campaign supervision in different districts.

The PMI VectorLink Project capacity building exercise with the NMCP and ZAMEP, scheduled for March and April 2020, were postponed due to COVID-19. The training was on data management, analysis, interpretation, and report writing for six participants, three from ZAMEP and three from NMCP, in two separate workshops. The training was aimed at increasing knowledge and capacity to use and own the data. This activity will be carried over to the 2020 – 2021 work plan year.

COVID-19 DURING UKEREWE & BUKOMBE SPRAY

Due to the halt of the spray campaign, a total of 145 (78.4%) out of 185 villages were reached for IRS with at least a single visit, while 22 and 18 villages in Bukombe and Ukerewe districts, respectively, were not reached at the halt of the campaign. For the villages that were reached with at least 1 visit, it is important to note that VectorLink IRS planning designates 'Mop-Up' days where spray teams return to villages to attempt to spray any unsprayed structures that exist.

The PMI VectorLink Tanzania project has been supporting the ITN distribution intervention between October 2019 and March 2020 through the School Net Program (SNP) and Health Facility channels in both Bukombe and Ukerewe districts. The distribution is expected to provide community protection in both sprayed and unsprayed location within the two districts.

GENDER MAINSTREAMING

The USAID policy of gender equality and female empowerment (GEFE) aims to improve lives of citizens around the world by advancing equality between men and women and empowering women and girls to participate fully and benefit from their society's development. PMI VectorLink Tanzania recognizes GEFE as a development goal in its own right, as well as approaches to accelerate progress toward vector control. PMI VectorLink Tanzania attained 45.1% women's participation during the 2020 spray campaign compared to 36.3% in the previous year. During the recruitment of field staff, priority was given to women applicants if a female candidate had equal merit to a male candidate.

All operations sites were refurbished so that they could accommodate males and females, ensuring clean, safe toilets as well as showers and changing rooms that provided privacy.

PMI VectorLink Tanzania also worked with the NMCP and ZAMEP to develop IEC materials with photographs depicting women spraying. This was to motivate more women to join the IRS program. Anecdotal data suggest that these inclusive images were important to female SOPs in their decision to apply for positions on the campaign. Therefore, PMI VectorLink Tanzania will continue to use the photos in the future to recruit more women.

PMI VectorLink Tanzania distributed sanitary pads to female SOPs in all targeted districts in the 2019/2020 spray season. Anecdotal reports from seasonal workers suggest that the women appreciated these supplies, which allowed more women to consistently come to work. In addition to providing these pads, the project

provided for discreet and hygienical disposal of women's menstrual hygiene products at operations sites. During the spray campaign, all IRS sites displayed Swahili sexual harassment posters, which reinforced a workplace culture free of harassment.

Last year, PMI VectorLink piloted adapted PPE for women in Pemba, in response to concerns that standard PPE does not align with local norms for women's attire. The project had local tailors sew skirts, and each woman was allocated two skirts, as with coveralls, to allow for washing. Some women appreciated the skirts and said that it was not difficult to complete their work while wearing them (Figure 10). The pilot was up-scaled in 2020 to include Unguja Island, also in Zanzibar as an option to be worn by women over PPE coveralls. Uptake of the skirts was lower in Unguja than in Pemba. The project will continue to offer this option in both Unguja and Pemba.

During the campaign, one seasonal worker in Zanzibar and one in Kakonko were found to be pregnant. In Zanzibar she was assigned to work at the Unguja data center to arrange files and file SOP forms. In Kakonko, she worked as site cleaner with no direct contact with insecticide or items contaminated with insecticide. The reassignment aligned with VectorLink's pregnancy policy.

PMI VectorLink Tanzania ensured that all permanent and temporary staff had training on gender mainstreaming before starting the spray campaign. The project incorporated gender mainstreaming into all IRS pre-spray training programs, which focused on PMI sexual harassment guidelines. Project staff facilitated gender awareness for team leaders, site supervisors, storekeepers, SOPs, and all other temporary staff, including government personnel who were to work on the project during the spray campaign. The training was in Swahili so that all participants could understand it. Gender mainstreaming training established communication channels and hotlines to report any sexual harassment and gender-based violence among temporary staff.

PMI VectorLink Tanzania implemented the Support for Nursing Moms on Business Travel Policy for two staff who needed to travel to Bukombe and Ukerewe districts to support IRS trainings and final payment of field staff.

OVERVIEW & RESULTS OF PILOTS

- PMI Vectorlink Tanzania piloted the use of mobile soak pits in 3 sites in Ukerewe to ensure all accessible locations and islands were reached with indoor residual spraying services.
- PMI Vectorlink Tanzania piloted mobile data collection by SOPs in 5 hard-to-reach community IRS sites, 2 in Zanzibar and 3 in Ukerewe district, to ensure timely data collection, reporting, and data accuracy. Due to the success of the pilot, the project will upscale its implementation from 20 to 500 additional smart phones for SOP data collection in 2020/2021.
- Introduced SOP forms with unique IRS numbers during the first phase of the campaign. The pilot aimed to reduce duplicate IRS numbers, making the data cleaning process more efficient.
- Implemented a mobile-based mobilizer form across all sites where site mobilizers uploaded number of estimated structures at hamlets and shehias; and identified unsprayed households for planning during mop-up. The successful rollout will be up-scaled by linking mobilization data with the VectorLink Collect database for side-by-side analysis of spray progress and coverage data.
- Introduced a mobile based incident reporting form for all IRS supervisors. The mobile form guaranteed a timely flagging of incidents from the field for timely reporting of incidents to PMI.
- Introduced site continuous supervision books to track supervisory feedback to sites and data centers for future follow-ups. This enabled subsequent supportive supervision visit at sites and data centers to not only document their observations, but follow-up on agree action plans from previous supervisory visits.

- Introduced IRS card and sticker tracking forms at operations sites. The forms enabled storekeepers to identify the flow, usage, and return of IRS cards and stickers to and from the field to avoid possible misuse and prevent stock-outs.
- Piloted the 1:2 male:female ratio of applicants during SOP recruitment. Due to below 40% participation of women in IRS in prior years, the project encouraged the selection of more qualified women applicants at villages, resulting in an increased ratio of female seasonal workers from 36.3% to 45.1%. The project will continue this successful approach in future campaigns.
- Up-scaled Skirt PPE for SOPs in Zanzibar from the previous year's pilot in Pemba. Due to Zanzibar's conservative culture, the project introduced the PPE skirts to be worn on top of coveralls, for women who were not comfortable wearing coveralls only.

POST-SEASON ACTIVITIES

POST-SPRAY EVALUATION

Post-spray review meetings were scheduled for March and April, 2020 for Mainland Tanzania and Zanzibar. These were postponed due to COVID-19.

INVENTORY ASSESSMENT

All warehouses conducted a post-spray inventory assessment of materials, insecticides, and empty insecticides sachets. The inventory counting report provides an update on the materials and insecticides the project had before the campaign, quantities procured, items used during the campaign, and items that remained after the campaign for future use. The report also indicates quantities of new, used, damaged (requiring service and repair), and disposable items. Annex C shows the result of the post-IRS inventory report.

DEMOBILIZATION

Immediately after the IRS operation, the project team decontaminated all IRS materials and left them to dry at the IRS sites. The teams then demobilized materials from IRS sites to warehouses in Geita, and Mwanza in mainland Tanzania and Unguja and Pemba in Zanzibar for storage until the next IRS campaign. The project's ECO led the post-spray IRS inspections and IRS site closures with the support of the regional coordinators. These inspections aim to ensure collection and safe disposal of wastes, leaving the sites in an environmentally compliant condition. After confirming that the sites were in a safe and well-maintained state, the ECO formally handed back the sites to the local authorities for safe custody until the next IRS operation.

ENTOMOLOGY

To define the entomological impact of indoor residual spraying of households with insecticide (IRS) with clothianidin (SumiShield 50WG) and Pirimiphos methyl (Actellic® 300 CS), the President's Malaria Initiative (PMI) supported the USAID Okoa Maisha Dhibiti Malaria (OMDM) project by providing them with IRS calendars so that they could carry out entomological surveillance and insecticide residual efficacy testing in IRS and non-IRS districts of the North-Western Lake Zone Regions.

For details on OMDM's results, please refer to their project reports.⁷

⁷ Source: USAID Umuhimu wa Takwimu za Malaria (UTM), IRS Quality Assessment Report Year 1, December 7, 2018. Available at <https://www.pmi.gov/how-we-work/technical-areas/entomological-monitoring>.

ENVIRONMENTAL COMPLIANCE

The goals of the environmental compliance activities were to ensure the safety of field staff and community members, to avoid contaminating the environment, and to ensure compliance with U.S. Agency for International Development (USAID) and national requirements in the importation, storage, and use of insecticides. In pursuance of environmental compliance requirements in IRS three assessments were conducted to back up decision making in aligning IRS with legal requirements and best management practices of IRS. Annex D contains the 2019 – 2020 Environmental Mitigation and Monitoring Report.

PRE-, MID-, AND POST-SEASON ASSESSMENTS

PRE-IRS ASSESSMENT

A PMI VectorLink Tanzania team comprising the environmental compliance officer (ECO), operations manager, and the five IRS regional coordinators conducted pre-IRS environmental compliance assessments for 108 operations sites, 94 in mainland Tanzania and 14 in Zanzibar. The assessments took place between July and August 2019 for Mainland and December 2019 for Zanzibar. They focused on the status of IRS operations sites and identified refurbishments needed for storage facilities, effluent management systems, and fences to prohibit access by non-IRS staff and animals. For proposed new sites, the assessment established optimal locations based on Best Management Practices Manual guidelines and other local requirements. The team used pre-designed mHealth-based electronic data forms on smartphones, which when submitted generated a worklist of gaps to be addressed prior to IRS implementation. Upon completion of the work, a final assessment was conducted and the findings were discussed between the ECO and the project Director of Environment to ensure all environmental compliance requirements were in place prior to delivery of insecticides.

To comply with an importation requirement, project personnel delivered to the TPRI in Arusha a sample of four sachets of SumiShield 50WG and two bottles of Actellic 300CS for the quality assay. The TPRI found the submitted samples to be of the required quality, with active ingredient at the level of (50.1–50.5 per cent). The results compare well with the WHO/United Nations Food and Agriculture Organization specification, which ranges from 47.5 per cent to 52.5 per cent. A copy of the certificate of analysis appears in Annex F.

MID-IRS ASSESSMENT

A wide range of supervisory teams from PMI VectorLink and other stakeholders such as NEMC, the NMCP, ZEMA, and ZAMEP, and regional and district authorities conducted mid-IRS assessments. The inspections assessed and improved the level of environmental compliance through supportive supervision. The areas of supervision covered aspects morning mobilization such as provision of breakfast, donning full PPE prior issuance of insecticides, checking for fitness of each member of the spray team prior departure to the fields and ensuring if all equipment and other supplies required by every SOP is adequate. In areas where SOPs were using vehicles to reach the spray communities, supervisors inspected all vehicles for safety issues. At the household level, the supervisors checked if structures were well prepared for spray and if household members had adequate information required for their safety pre, during and post house spraying. Where they noted gaps, the supervising team instituted immediate corrective measures. These included instructions to supervisees and replacement or repair of missing or damaged tools.

Some of the findings pertained to reportable incidents that were dealt with in accordance to PMI/USAID requirements and best management practices. Such events included anomalies related to health of any member of the spray teams, supervisors and beneficiaries. Other incidents of concern were loss of insecticides, spill of insecticides in the environment and damage or loss of project property. The events were captured and reported to home office who eventually reported to PMI/USAID within 48 hours of the incident occurring. Each

incident was followed up to institute timely mitigation measures. Below is the summary of incident events reported in the 2019/2020 IRS campaign.

TABLE 7: SUMMARY OF INCIDENT REPORTS

No.	Type of Incident	Districts Where It Occured
2019/10	Boxes burnt at the Geita warehouse compound	Geita Town Council in Geita Region – Mainland Tanzania
2019/12	A project vehicle slid off of a muddy road and required repairs.	Kasulu District of Kigoma Region – Mainland Tanzania
2019/13	An SOP was exposed to insecticide when the hose disconnected from the spray pump. First aid was given and the affected person taken to hospital for a check-up. No signs and symptoms related to insecticide intoxication	Mtendeli Refugee Camp, Kakonko District of Kigoma Region – Mainland Tanzania
2019/14	Two structures recorded as sprayed were found to have been only partially sprayed. These were re-sprayed by a different SOP.	Kakonko District of Kigoma Region – Mainland Tanzania
2019/15	An SOP had a sudden attack of diarrhea and vomiting while at work. She was treated and recovered.	Biharamulo District of Kagera Region – Mainland Tanzania
2019/16	Ten SOPs were falsifying data. The team conducted an extensive investigation of all data from this site and five nearby sites, which showed that data falsification was limited to this group. The 10 SOPs and their Team Leader were terminated, unsprayed structures were sprayed during mop-up and all data were corrected.	Biharamulo District of Kagera Region – Mainland Tanzania
2019/17	A Security Guard was injured by a person who has a history of psychiatric issues. The injured person was treated and resumed work.	Biharamulo District of Kagera Region – Mainland Tanzania
2019/18	An SOP was exposed to insecticide when the sprayer hose disconnected while the pump was under pressure. First aid was given and the affected person taken to hospital for a check-up. No signs and symptoms related to insecticide intoxication	Nduta Refugee camp, Kibondo District of Kigoma Region – Mainland Tanzania
2019/19	An SOP lost an insecticide sachet while working in the community.	Biharamulo District of Kagera Region – Mainland Tanzania
2019/20	An SOP was exposed to insecticide when she tried to unblock the nozzle on her pump using a stick. The SOP accidentally pressed the trigger on the pump, resulting in insecticide exposure on her face. She was given first aid and was transferred to the local health center for treatment.	Kibondo District of Kigoma Region – Mainland Tanzania
2019/21	Three sachets of insecticide were discovered missing while counting a consignment at the warehouse. The team recounted sachets and it seems that the sachets went missing during field operations in Biharamulo.	Geita Town Council in Geita town, Geita Region – Mainland Tanzania
2019/22	Fencing wire, wooden poles, drainage pipes and plastic sheeting that were used at an IRS operations site at Mtendeli camp were stolen.	Mtendeli Refugee camp, Kakonko District of Kigoma Region – Mainland Tanzania

2020/01	A pump technician was injured during a training session when he attempted to open a pump chamber before depressurizing the pump. He was treated at the local health facility and released. There was no release of insecticide from the pump.	Central District, Unguja, Zanzibar
2020/02	One SOP sustained a cut while entering the shower room at the IRS site. She was treated at the local hospital.	North A district, Unguja , Zanzibar
2020/03	An SOP lost one insecticide sachet while at work. The case was reported to police but the sachet was not recovered.	Central District, Unguja, Zanzibar
2020/04	One SOP fell sick while at work. She was treated at Makangale dispensary and Micheweni hospital.	Tumbe, Pemba,Zanzibar
2020/05	One sachet of insecticide was missing in a delivery from the warehouse to an operations site.	Bukombe District of Geita Region – Mainland Tanzania
2020/06	Sudden death of a Site Supervisor	Ukerewe District of Mwanza Region – Mainland Tanzania
2020/07	An SOP was bitten by a dog. The SOP was treated at the local health facility and released.	Ukerewe District of Mwanza Region – Mainland Tanzania
2020/08	An SOP had a bicycle accident. She was treated at the local health facility and released.	Ukerewe District of Mwanza Region – Mainland Tanzania
2020/09	One SOP lost an empty sachet which was confirmed to have been found by head of the head of household. It was thrown in the pit latrine.	Bukokmbe district of Geita Region – Tanzania Mainland

POST-IRS ASSESSMENT

The PMI VectorLink Tanzania ECO, assisted by the Operations Manager and Regional Coordinators, conducted post-IRS assessments after closure and demobilization of IRS supplies back to regional or central warehouses. Using pre-designed electronic data forms, the assessment scored various aspects to ensure closure was performed properly.

PMI VectorLink Tanzania used iron sheets secured with padlocks to cover permanent soak pits that had received effluent from the washing bays. The aim is to prohibit access by humans and other animals to the contaminated surface. Also, it will prevent the growth of plants and collection of debris that eventually clogs the system.

TABLE 8: IRS SITES THAT WERE REFURBISHED BEFORE 2019/2020 IRS CAMPAIGN

Location	Permanent Sites/Subsites	Site Refurbished or Set-Up (soak pit, storeroom, fence, etc.)
Mainland Tanzania	94	94 IRS sites/subsites were refurbished
Zanzibar	14	14 IRS sites/subsites were refurbished

DEMOBILIZATION AND WASTE MANAGEMENT

After the IRS campaign, all insecticides, IRS supplies and generated wastes (insecticides packaging materials, contaminated masks and damaged materials) were demobilized back to the central warehouses. At the warehouse wastes were sorted and managed according to pre-determined protocols. PMI VectorLink Tanzania uses different approaches for waste management: effluent detoxification, incineration, recycling, re-use, and disposal at the municipal landfill. Several factors guided the choice of approach: the type of the waste (effluent

or solid), whether or not contaminated with insecticide, opportunities for recycling, and laws and regulations of the U.S. and Tanzanian governments.

For detoxification of effluent from washing pumps and SOPs' PPE, two approaches were employed to manage the effluent, one was to reuse the effluent as a diluent for insecticide in the next day of the operation (effluent from basin No 1, 3, 5 & 7), the effluent generated from washing boot, gloves helmet and face shield were treated using the soak pits installed with multiple layers of gravel, stones, and wood charcoal, and sawdust or rice hulls. These layers provide numerous functions that collectively ensure filtration, reduction of flow speed, dispersion, adsorption, and absorption of insecticide as the effluent seeps through the soak pit layers. This technique complies with PMI Best Management Practice Manual standards, which the WHO, USAID, and the Government of Tanzania accept.

For paper wastes (cardboard used as packaging material and guide handbooks), PMI VectorLink Tanzania secured vendors for recycling.

PMI VectorLink Tanzania incinerates contaminated solid wastes that can neither be recycled nor given away. Incineration is done at Nyanguge in Mwanza Region and at Kivunge Hospital in Zanzibar, in PMI-owned incinerators that can combust wastes at greater than 1,000°C. Wastes incinerated included sachets used as primary packaging containers for clothianidin (SumiShield 50WG), contaminated masks, sand used during spill management, and other secondary packaging materials not suitable for recycling and which do not produce dioxins on burning.

After the paper labels are removed the empty plastic containers for Actellic 300CS will be cleaned, shredded, packed and sent for recycling. The wastes are recycled into conduit pipes and other materials that cannot be used to handle human and animal feeds and have minimal human contacts.

Other non-contaminated and damaged solid wastes not suitable for incineration were given away, when possible, or as a last resort, sent to municipal landfills. Items in this category include boots, coveralls, helmets, and haversacks. Teams cleaned and gave away items with minor damage to selected groups in need of such items, such as prisons and schools.

For mainland Tanzania, metallic solid wastes will be turned over to licensed and NEMC-certified vendors Ibrahim S. Omari and Ally Mussa Tarimo, and plastic waste will turn over to Victoria Molders. Electronic waste like calculators, will be given to Kenwood Enterprises Tanzania Limited, a company registered in the country to handle this waste. The Zanzibar Environmental Management Authority (ZEMA)-certified recycling company, Ally Othman Shredding Center, will recycle the bottles. In Zanzibar, vendors with permits to handle various other wastes are being identified. Information on solid waste quantification and management is in Annex G. (This will be available at the end of the all operations and after post-IRS stocktaking)

5 MONITORING AND EVALUATION

5.1.1 DATA COLLECTION

The PMI VectorLink Tanzania M&E team adhered to standard M&E protocols and introduced modifications in the data collection tools such as the IRS cards, Daily Spray Operator forms, and Daily Team Leader Summary forms for M&E assistants, supervisors, and team leaders. The changes resulted from 2018/2019 feedback and reviews from project peers, the home office M&E specialist, and Abt's Data Science, Surveys and Enabling Technology (DSET) team. These improvements ensured the collection, management, and reporting of high-quality data.

The Daily Site Mobilizer form was used by site mobilizers during visits with hamlet and shehia leaders ahead of IRS campaign to collect information on the possible number of households in the area and provide key sensitization messages. Data collected were entered into a mobile-version of the mobilizer form for reporting to the VectorLink team. In addition, data were communicated to the site supervisors and used to calculate an updated estimate for the number of structures. This information was displayed on spray calendars at every operation site; it guided the site team in determining the number of SOPs to assign to spray each targeted locations and was used later to determine the number of structures that were not sprayed in the area.

The flow of spray data for the 2019/2020 PMI VectorLink Tanzania IRS campaign was as follows: SOPs collected spray data at each structure, which team leaders and supervisors verified. Supervisors and supervision vehicles (for distant sites) transported the forms to the data entry centres. DEC's performed a final verification of spray form data and arithmetic checks before entering the data into the VectorLink Collect database. At the end of each day, the M&E assistants reviewed the data entered for anomalies and addressed issues with data centre staff. For quality control purposes and timely generation of weekly client spray progress reports, the standard was to enter all data within 48 hours of spraying. DEC's filed and archived daily SOP forms at each of the data centres. Meeting the 48-hour data entry turnaround posed a challenge for some remote sites because of the time it took to transport the forms to the data center. In some widespread districts and districts with small Islands, supervision vehicles could not collect forms from all operations sites on the same spray day. There were three operational sites with a total of twenty spray operators in Tanzania mainland and two operational sites with a total of eleven spray operators in Zanzibar that piloted the use of mobile phones to collect spray data. SOPs collected spray data at each structure using mobile phones, which team leaders verified at the end of the day before submitting to the VectorLink Collect DHIS 2 server.

5.1.2 DATA ENTRY

The project used the VectorLink Collect DHIS 2 database. Spray data were entered directly into the customized, fully functioning offline desktop event capture application and an application that connects to the VectorLink Collect server, which is the primary, centralized database for storing all the spray data from the Daily SOP forms from the PMI VectorLink project.

PMI VectorLink Tanzania employed 72 DEC's (61 on the mainland and 11 in Zanzibar) to enter all spray data generated from all districts. Project laptops were used for spray data entry. The 2019/2020 VectorLink Collect desktop client was installed on DEC's and M&E assistants' laptops and connected to the internet for easy synchronization of data to the online VectorLink Collect production server. The project used double data entry, in which data were entered first by totals (i.e., data entry by the total lines of each form) for quick reporting and feedback, then by details (i.e., data entry by detailed data for each structure) for more accurate data entry and verification. A total of 31 SOPs (11 in Pemba Zone and 20 in Ukerewe District) captured spray data through mobile phones using the DHIS 2 Android Capture application. Data were synchronized from their mobile devices directly to the VectorLink Collect server on a daily basis.

5.1.3 DATA QUALITY ASSURANCE

To ensure data integrity, PMI VectorLink Tanzania used standardized quality assurance and control tools and provided comprehensive training for all seasonal workers, support staff, and supervisors. Two data quality assurance tools, the Error Eliminator and DCV, helped improve the quality of data collection and facilitated data entry during the 2019/2020 spray campaign. These tools helped assess the accuracy and completeness of SOP forms and verify household data. The DCV data collected were used to monitor spray coverage during the live campaign, and identify issues in the campaign as detailed in Table 9.

TABLE 9: USE OF DCV FORM: COMMON ISSUES FOUND AND CORRECTIVE ACTIONS TAKEN

Error/Issue Observed	Corrective Action Taken
<p><i>Underestimation of total number of eligible structures found by SOPs.</i> In households where structures were locked, some SOPs failed to record these on the SOP form as part of the total number of eligible structures found.</p>	<p>The M&E and operations teams corrected this error to SOPs, team leaders, and field supervisors. The team emphasized that all eligible structures were part of the count, whether locked or open. Spray teams were to probe further concerning the eligibility of structures, especially when the structure was locked. This issue was spotted early on, so the team avoided larger data collection issues throughout the campaign.</p>
<p><i>Unsprayed eligible structures.</i> In some households with multiple structures, residents insisted that SOPs spray only one structure. The reasons the residents gave were that the other structures were used to store food items/ maize from abundant harvests or, when it was rainy, to store household items removed from the sprayed structure/s.</p>	<p>The M&E team asked SOPs, team leaders, and field supervisors to note this error and to be sure to count both eligible and sprayed structures, especially in large households with multiple courtyards. In the future, SOP training will include practical exercises to deal with such situations.</p> <p>The M&E team emphasized that food items /maize must be removed to wherever possible and the structure sprayed. In the case of rain, spray teams were advised to revisit the household and spray the remaining structure/s at a later date.</p>

For paper-based data collection, all data forms were verified by the site supervisors and M&E assistants before the forms were submitted to the data centers. DECs also verified the data forms to confirm summations before entering them into the database, and they returned forms with logical errors to the field. A double data entry system to ensure completeness of spray data was used at the data centers. The database has a variance check, duplicate finder, and mop-up tools that check the data for anomalies that must be further reviewed by both the M&E and the spray field teams. For mobile data collection, built-in form validations prevented errors at the point of collection in the field.

5.2 MHEALTH

PMI VectorLink Tanzania continued the partnership with Dimagi LLC to use the CommCare mobile health (mHealth) system for the 2019/2020 IRS campaign, in addition to Open Data Kit-based supervision tools, to support quick decision making across different components of the program. Using the CommCare system, PMI VectorLink Tanzania staff and district supervisors were able to conduct standard supportive supervision, access daily spray data quickly, conduct data verification at the household level; and remind temporary staff about regulations and operational procedures through daily job aid messages.

The mHealth reporting tools for data collection and verification, which the project used throughout the campaign, included:

5.2.1 SUPERVISORY APPLICATION

The supervisory application suite was for use by site supervisors, district coordinators, external supervisors, and VectorLink staff to support IRS supervisory activities. The application was accessible through the CommCare mobile phone app for all non-project supervisory staff and ODK Collect for all PMI VectorLink supervisors; the users received training on it during the ToT training. The application suite contained multiple forms covering key supervisory functions, including morning mobilization and transportation, storekeeper performance, household preparation, SOP performance, and end-of-day clean-up. Based on the information reported each day, CommCare and ODK Collect used daily email alerts to report any red flags to project supervision teams observed during IRS operations. Examples of red flags were pump leakages, refusals by communities, and the need for additional items at sites such as gloves and first aid kit items.

Of the supervisory forms submitted on CommCare, there were 1,481 morning mobilization inspections, 902 vehicle inspections, 6,424 homeowner preparations/ SOP performance inspections, 1,269 storekeeper performance inspections, and 1,207 end of day cleanup inspections.

5.2.2 DATA COLLECTION VERIFICATION

The M&E assistants used the data collection verification (DCV) mobile tool to collect household-level information on the spraying status of randomly sampled households. The M&E assistants verified the collected information by comparing ward and shehia-level spray coverage results to the VectorLink Collect database coverage for the same location. The margin of error during comparison was ± 5 per cent, i.e., any difference above 5 percent, given sufficient sample size, means there could be critical data discrepancies. From 5,657 sampled structures in 128 wards and 32 shehias visited in 2020, DCV produced a 90.7 per cent coverage rate compared to the VectorLink Collect database reported 93.7 percent coverage (difference of 3.7%), well within the $\pm 5\%$ margin.

5.2.3 PERFORMANCE MONITORING TRACKER

During training, storekeepers learned to manage the PMT sheet at their respective sites. Users received instruction on how to maintain a constant flow of up-to-date operational data on the PMT sheet, which served as the basis for the PMT SMS system. At the end of each spray day, storekeepers sent aggregate data from the day's operations via Performance Monitoring Tracker (PMT) form in CommCare application to the Telerivet system, which populated daily emails on PMT reporting spray progress and coverage figures from the site to the national level. The PMI VectorLink Tanzania team used the report to monitor sites with low spray coverage, fluctuating progress, and increased insecticide consumption. Overall, site storekeepers sent 2,507 SMS messages to the Telerivet system during the 2019/2020 spray campaign.

5.2.4 SMS JOB AID MESSAGES

During the spray campaign, PMI VectorLink Tanzania sent workers in the field SMS reminders about pertinent topics such as freedom from harassment at work, SOPs' daily structure targets, the importance of donning PPE, and avoiding eating while on duty. The project also sent emergency messages to cadres, such as pump technicians, either to communicate programmatic changes or to reinforce adherence to IRS operating procedures, such as marking of structures, dissemination and use of IRS cards and stickers in the field and SOPs' need to depressurize their tanks when moving between structures and while in the vehicles. During the 2019/2020 spray campaign, 68,186 job aid messages went out to DMFPs, supervisors, team leaders, SOPs, storekeepers, and mobilizers.

5.3 RESULTS

SPRAY RESULTS PER DISTRICT

During the 2019/2020 IRS campaign, SOPs sprayed 471,622 structures out of the 503,567 eligible structures found, resulting in 93.7% spray coverage. A total of 1,915,151 (93.8%) of 2,041,070 people reached were protected by IRS. The number of people protected includes 56,964 pregnant women and 373,976 children under five (Table 11).

TABLE 11: SUMMARY OF RESULTS FOR TANZANIA 2019/2020 IRS CAMPAIGN

Zone/District	Targeted Structures	Total Structures Found	Total Structures Sprayed	Spray Coverage (%)	Spray Progress (%)	Population found	Population protected	Pregnant Women Protected	Children Under Five Protected
Biharamulo*	102,617	108,309	103,659	95.7%	101.0%	429,471	411,417	13,911	85,190
Bukombe	48,134	38,949	36,915	94.8%	76.7%*	135,166	127,947	3,519	27,061
Kakonko	37,153	40,730	38,432	94.4%	103.4%	162,940	154,658	3,239	26,972
Kakonko-Mtendeli camps	5,827	7,816	7,482	95.7%	128.4%	32,964	31,924	966	7,856
Kasulu	71,958	80,654	75,287	93.3%	104.6%	323,326	301,832	8,060	59,637
Kasulu-Nyarugusu camps	29,085	33,134	30,046	90.7%	103.3%	131,658	121,164	3,674	26,704
Kibondo	70,315	65,434	58,884	90.0%	83.7%	277,687	250,230	6,365	46,249
Kibondo-Nduta camps	19,851	18,514	17,254	93.2%	86.9%	79,554	74,994	2,530	18,904
Ukerewe*	87,599	64,062	59,131	92.3%	67.5%*	235,963	215,611	8,350	38,324
Mainland Total	472,539	457,602	427,090	93.3%	90.4%	1,808,729	1,689,777	50,614	336,897
Pemba	5,653	6,835	6,634	97.1%	117.4%	37,685	36,667	979	6,915
Unguja	35,578	39,130	37,898	96.9%	106.5%	194,656	188,707	5,371	30,164
Zanzibar Total	41,231	45,965	44,532	96.9%	108.0%	232,341	225,374	6,350	37,079
Total	513,770	503,567	471,622	93.7%	91.8%	2,041,070	1,915,151	56,964	373,976

*Campaign was halted due to Covid-19 health alert from the Government of Tanzania.

Overall, the results of the IRS campaigns met or exceeded targets. However, the direction by the Government to suspend the Ukerewe and Bukombe campaigns on March 19 meant that the project could not complete IRS in these areas. This is reflected in lower spray progress figures for these districts.

In Bukombe and Ukerewe districts, the estimated population, based on the NBS 2012 census projection, was 720,287 people. From the IRS data collection, as of March 19, 343,558 people (47.7% of the population estimate) were protected in the two districts. The results indicate there *could* be 376,729 (52.3%) people that were potentially unprotected from the IRS campaign. Since Bukombe and Ukerewe were being sprayed for the first time, the true population was unknown. The NBS population estimates were higher than what was encountered on the ground in the areas reached for spray during the first 15 days of the IRS campaign. Using the VectorLink data to inform population projections, based on the average number of people found in structures sprayed and the estimated number of structures not sprayed, an alternative projection is that 144,599 beneficiaries (39,267 in Bukombe and 105,332 in Ukerewe) were unprotected due to the halted campaign. Individuals not reached via IRS include a mix of those whose villages the project had not yet reached (40

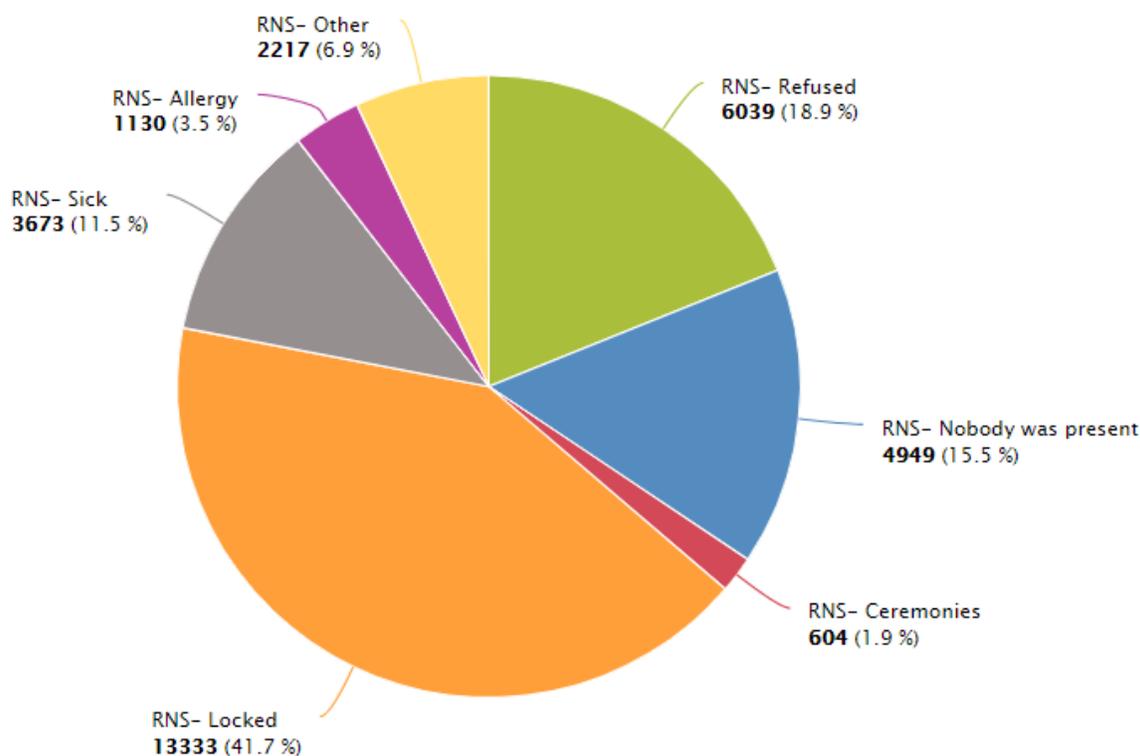
villages), as well as those who were not available during the first visit and who may have been reached during a re-visit, had the campaign not been halted (145 villages).

In addition to IRS, in both Bukombe and Ukerewe, PMI VectorLink Tanzania supported ITN distribution between October, 2019 and March, 2020, via the School Net Program and health facility channels.

REASONS NOT SPRAYED

In the 2020 PMI VectorLink Tanzania spray campaign, 31,945 structures (6.3%) were not sprayed. The reasons for this were: locked structures (41.7%), refusals (18.9%), no adult was around (15.5%), sick person in the structure (11.5%), “other reason” (6.9%), allergy (3.5%), and ceremonies/funerals (1.9%). The pie chart in Figure 5 illustrates this breakdown.

FIGURE 5: REASONS THAT STRUCTURES WERE NOT SPRAYED



SPRAY PERFORMANCE/ INSECTICIDE USAGE RATE

SOPs used 66,988 sachets of SumiShield 50WG and 65,843 bottles of Actellic 300CS to spray 471,622 structures during the 2019/2020 spray campaign. On average, one sachet sprayed 3.6 structures, and one bottle sprayed 3.6 structures. SOPs used an average of 2.4 bottles and sachets per day, and each SOP sprayed an average of 9.5 structures per day. Table 12 shows details of insecticide consumption by the district.

TABLE 12: INSECTICIDE USE DURING 2019/2020 IRS CAMPAIGN

District	Total Structures Sprayed	Total Bottles/Sachets Used	Number of SOPs ⁸	Average Number of Structures Sprayed per Bottle/Sachet	Average Number of Bottles/Sachets per SOP per Day	Number of Structures Sprayed per Day per SOP
Biharamulo	103,659	30,033	466	3.5	2.7	9.2
Bukombe	36,915	9,857	219	3.7	1.9	11.2
Kakonko	38,432	11,246	169	3.4	2.8	9.2
Kakonko Mtendeli Camp	7,482	2,076	26	3.6	3.3	10.3
Kasulu	75,287	21,782	327	3.5	2.8	10.3
Kasulu Nyarugusu Camp	30,046	8,174	132	3.7	2.6	9.2
Kibondo	58,884	18,521	320	3.2	2.4	7.9
Kibondo Nduta Camp	17,254	4,044	90	4.3	1.9	8.2
Ukerewe	59,131	14,553	398	4.1	1.5	10.3
Mainland Total	427,090	120,286	2,147	3.6	2.3	9.4
Pemba	6,634	1,498	56	4.4	2.2	11.3
Unguja	37,898	11,047	356	3.4	2.6	9.8
Zanzibar Total	44,532	12,545	412	3.5	2.5	10.0
Total	471,622	132,831	2,559	3.6	2.4	9.5

⁸ Recruitment data

CHALLENGES, LESSONS LEARNED, AND RECOMMENDATIONS

CHALLENGES AND LESSONS LEARNED

The main challenges experienced and lessons learned during the 2019/2020 IRS campaign include the following:

CHALLENGES

- Unexpected heavy rains on some of the days during the spraying season on the Mainland made some SOPs unable to meet their daily targets. That meant that some teams had to catch up on sunny days.
- The number of targeted structures obtained from ZAMEP for Zanzibar IRS planning was less than the actual number of eligible structures found during operations.
- There were pockets of refusals and resistance to IRS because residents were unfamiliar with IRS. In some communities, particularly in urban areas, homeowners refused IRS because of the house preparation effort involved. Many asserted that they are able to afford medication when they fall sick.
- Some of the houses were not well prepared for the arrival of SOPs, which delayed the SOPs because they had to help prepare the house. They found things like seaweed and coconuts in the rooms that were meant to be sprayed; in some cases, the main bedrooms were locked from spray because they had too many things to move outside before spray.
- A delay in the Ministry's approval of the Environmental Compliance Certificate forced a one-day delay in starting the IRS campaign on the mainland
- Despite emphasis during training and spray, some SOPs failed to record unsprayed structures during the first visits of hamlets or shehias.
- Delayed submissions of mobilization data by mobilizers negatively impacted the site's ability to use these data to make real-time decisions for modifying the spray calendar and deciding where to send spray teams.
- Incomplete IRS campaign for Ukerewe and Bukombe. Due to COVID-19, the government asked the project to pause operations and some structures were left unsprayed. As these were new districts, this also presents a challenge for the project to project the total number of eligible structures in these districts for the next campaign.
- Delay in clearance of internationally-procured N95 masks, due to the new clearance policy by the Government which makes Government Procurement Services Agency (GPSA) the sole clearing agency. The project procured additional masks locally in order to proceed with IRS implementation.

LESSONS LEARNED

- The newly introduced Daily Site Mobilizer form and mobile mobiliser form helped the mobilizers know the estimated structures earmarked for spray, and they worked with site supervisors and hamlet leaders in identifying unsprayed structures for mop-up. The mobile form helped in sharing updates as soon as they were available.
- Intensive and strict supportive supervision of the site, district, regional, national, Abt staff, and external supervisors contributed significantly to decreased cases of insecticides loss.
- Assignment of tasks to field supervisors created a sense of both ownership and accountability during the campaign. Two DITT members and two ZAMEP supervisors in each location were assigned to do DCV while the remaining supervisors did regular supervisory checks, making it easy to spot red flags and take quick corrective measures during the campaign.
- Use of carefully selected, experienced external supervisors strengthened supportive supervision and on-the-job mentoring of spray teams.
- Building sister washing slabs shortened formerly long queues for SOPs and expedited end-of-day clean-up.
- Continue to provide bi-weekly feedback on DCV results, identifying villages and shehias with spray coverage discrepancies. The information will guide site supervisors on areas to revisit for mop-up and documentation of unsprayed structures.
- Expansion of a PPE skirt for female SOPs in Unguja was well received, as it was in Pemba last year. The team may modify the design of the skirt slightly in future years in response to feedback and will continue to emphasize to all seasonal workers that the use of the skirt is optional.
- Weekly review meetings involving site supervisors, mobilizers, DITT, external supervisors, and Abt staff were very useful as they enabled site supervisors and mobilizers to know where they are not performing well so they could improve.

RECOMMENDATIONS

- Rain coats should be available during IRS seasons to be used during unexpected rains.
- The number of target structure for Zanzibar IRS should be harmonized/confirmed by Abt staff and ZAMEP staff prior to commencement of IRS to avoid the discrepancy observed during the past campaign. If the number of structures observed during verification exceeds the approved PMI target, then the project will need to spray fewer shehias.
- Areas with known experience of refusals should be identified earlier before the campaign so that SBCC programs/activities on IRS may be strengthened with the support from top district administration and religious leaders.
- Provide SOPs with adequate time to practice using smartphones for mobile data collection by covering the topic on day three or four of the SOP training. Many SOPs in the mobile data pilot this year were not accustomed to using smart phones.
- Structures with sprayable surfaces but no occupants to prepare and open them for spraying should be identified by hamlet leaders/shehas and be excluded from the estimated targeted structures, this will also increase efficiency by SOPs as they walk long distances to structures with no occupants.
- Site mobilizers should insist homeowners to prepare their houses before SOPs arrive, also he/she should inform them of the importance of early house preparations.
- The number of site washers and water fetchers should reflect the number of wash slabs per site and

quantity of materials to be washed.

- Strengthen follow up of the unrecorded unsprayed structures where all supervisors should be insisted to make close follow up at each site they visit and this should be included in supervision checklist
- Frequent learning sessions for supervisors, engagement during data analysis, and feedback meetings could create more data ownership, improve interpretation skills, and build the capacity of the DITs
- Large scale-up of mobile data collection at SOP-level to have real-time, structure-level data available for operations decision-making every single day. .
- Update the TL serialized insecticide form to allow entries of insecticide exchange within and between spray teams.
- Mobilization data should be integrated into VectorLink Collect project database to facilitate analysis across data streams.

ANNEX A: LOCAL PROCUREMENT

Description	Unit of Measurement	Quantity
Assorted Materials		(per item unless noted)
Araldite glue for Hudson pump repairs	Pc	198
Bar soap	Bar	1822
Aprons (for washers)	Pc	78
Coverall	Pc	80
Gumboot	Pair	490
Helment	Pc	30
Basin 80 L	Pc	270
Batteries for watchmen and team leaders	Pc	16584
Calculators	Pc	0
Barrel for solid waste	Pc	60
kChalk (pct. of 100)	Packet	880
Washing brush	Pc	18
Handkerchiefs (for sieving water)	Pc	3232
Jug - 2lt	Pc	15
Calibrated jug	Pc	87
Liquid washing soap (5 L)	5L Bottle	178
Lubricant oil (1L bottles)	Bottle	206
Padlocks	Pc	203
Plastic cup (0.5L)	Pc	379
Plastic bag for parking material	Kg	800
Yellow hazard bags	Pc	410
Colour coded vest - Yellow	Pc	29
Colour coded vest - Orange	Pc	56
Dust bin	Pc	10
Mopper bucket (cleansing set)	Pc	0
Female skirt for Pemba	Pc	50
Emergency Solar light	Pc	55
Vitamin E jelly	Pc	5960
Plastic bucket 10L with side marking lines painted in RED	Pc	42
Whistle for security	Pc	15
Sanitary napkins for female spray personnel	Pc	1775
Sisal rope - cylinder roll, 80m length, 2mm diameter	Roll	288
Socks	Pair	3141
Stationary - box files for Data Management Unit and sites	Pc	606
Stationary - Attendance Register	Pc	141
Stationary - clear bag files	Pc	1630
Stationary- notebook	Pc	4323

Description	Unit of Measurement	Quantity
Stationary - store ledger book	Pc	189
Stationary – marker pens	Pc	9245
Stationary – masking tape	Pc	612
Stationary - pens	Pc	4323
Stationary – stapler machine	Box	32
Stationary – stapler pins	Pc	70
Flip chart	Pc	210
Toilet paper	Pc	3000
Tooth brush (for cleaning nozzles)	Pc	700
Towel (small towel,100% cotton	Pc	3176
Torch	Pc	800
Water Tank (1000L)	Pc	43
Rubber band	Pack	170
Visitors books	Pc	9
Thermometers	Pc	122
Life jackets	Pc	20
Nose masks (N 95)	Pc	36,027
Printed materials		
<i>M&E forms</i>		
IRS cards	Pc	195,072
Spray operator forms	Pc	78,859
Team leader forms	Pc	14,094
PMT forms	Pc	360
EE form for supervisor	Pc	330
PMT forms	Pc	360
Mobilizer form (A4)	Pc	2,394
Daily IRS Cards and stickers tracking log	Pc	3,296
Site continuous supervision booklet	Book	123
<i>IEC materials</i>		
IEC materials - Q&A brochures	Pc	2,010
IEC materials - fact sheets	Pc	7,120
IEC materials - posters	Pc	3,210
Sexual harrasment board	Pc	31
<i>Store stationary</i>		
Bin cards	Pc	14,700
Household stickers	Pc	565,560
Daily distribution form	Pc	3,300
Goods received notebooks	Pc	2,830
Goods issued note books	Pc	245
Good received note book (carbonated 50 pages)	Book	18
Daily insecticide tracking sheets	Pc	2,750
Daily monitoring form for insecticide consumption	Pc	2,760
Temperature log sheet	Pc	320
Pocket Guide for team leaders	Book	30

Description	Unit of Measurement	Quantity
Pocket guide for spray operators	Book	420
Pocket guide for storekeeper	Book	80
<i>Finance Forms</i>		
Training attendance sheet	Book	140
Daily IRS attendance sheet	Book	130
IRS vehicle logbook	Book	180
Medical attendance card	Pc	200
Temporary worker contracts	Book	160
IRS transportation		
IRS supervision vehicles	Vehicle	17
Vehicles for distribution of IRS materials	Vehicle	48
Vehicles for transporting of spray operators	Vehicle	107

ANNEX B: INTERNATIONAL PROCUREMENT

Description	Unit of Measurement	Quantity
Nose Mask	Pc	49,800
Long gloves for washers	Pair	216
Face shield	Pc	1,000
Tool for tighten Goizper pump chamber	Pc	34
Goizper Team Leader kit 7.5L	Pc	67
Sumishield 50WG	Sachets	77,460
Actellic 300cs	Bottles	70,992
Goizper Pump	Pc	300
Goizper lance	Pc	198
Evo complete Handle	Pc	299
Goizper IK CFV	Pc	300
Goizper complete chamber	Pc	70
Goizper Hose	Pc	136
Goizper Safety valve	Pc	200
Goizpet Fan even Nozzle Yellow	Pc	95
Goizper Nozzle VC with Protector	Pc	200
Goizper Nozzle HCwith Protector	Pc	200
Goizper Filling Filter	Pc	136
Goizper Straps	Pc	100
Goizper strap pins	Pc	300

ANNEX C: STOCK UPDATE

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
PPE:						
Total coverall	Pc	8269	80	8349	0	8328
Nose masks (N95)	Pc	32902	36,027	68,929	60,785	8144
Neck protection	Pc	7285	0	7285	0	7310
Total gumboot	Pair	3030	490	3520	0	2326
Gloves new	Pair	1227	0	1227	0	800
Gloves used	Pair	4065	0	4065	0	2663
Long gloves for washers	Pair	164	238	380	121	259
Helmet, complete (with harnesses and chin strap)	Set	4233	0	4233	0	4233
Helmet harness	Pc	4633	30	4633	457	4176
Face shield new from U.S. 2017 and 2018	Pc	6423	1000	7523	2516	5007
Shield brackets new from the U.S.	Pc	868	0	868	0	868
Shield adaptor	Pc	16003	0	16003	0	16003
Other equipment for operation:						
Handkerchief	Pc	638	3232	3870	2946	946
Socks	Pc	462	3141	3603	3000	603
Small towels	Pc	425	3176	3601	3131	470
Haversack with USAID logo	Pc	4292	0	4292	0	4039
Plastic cup (0.5 L)	Pc	2423	379	2802	0	2620
Tool kits	kit	306	0	306	0	305
Basin 80 Lts	Pc	1390	270	1660	0	1558
Barrel for liquid waste	Pc	185	0	185	0	178
Hoe	Pc	108	13	121	0	118
Grass slasher	Pc	126	0	126	0	119
Rakes	Pc	119	0	119	0	111
Plastic buckets 20 Lts	Pc	1889	0	1889	0	1565
Plastic buckets 10 Lts	Pc	132	42	174	0	155
Jag for bucket and basin	Pc	3048	15	3063	0	2374
Thermometer	Pc	129	122	251	0	229
Moper bucket, moper (cleansing set)	Set	685	0	685	0	707
Squeezer	Pc	488	0	488	0	536
Soft broom	Pc	238	0	238	0	238

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
Hard broom	Pc	341	0	341	0	338
Dustbins	Pc	99	10	109	0	106
Calibrated jug 2Lts	Pc	129	87	216	0	194
Tooth brush for nozzle cleaning	Pc	236	700	936	531	405
Colour coded vest yellow	Pc	596	29	625	0	366
Color-coded vest orange	Pc	203	56	259	0	164
Washing brush	Pc	198	18	216	0	174
Plastic apron	Pc	139	78	217	0	163
Consumables:						
Battery per watchmen (Size MU-1)	Pc	3770	16,584	20,584	16,174	4174
Liquid washing soap	P/5L	322	178	500	380	120
Bar soap	Bar	1055	1822	2877	1663	1214
Powder soap	15Kg	15	0	15	3	12
Toilet paper	Pc	287	3000	3287	2301	986
Lubricant oil	Litre	49	206	255	178	77
Spray Equipment:						
Total Hudson pump	Pc	1722	0	1722	0	1502
Goizper pumps	Pc	1463	300	1763	0	1760
Pump hunger	Pc	121	0	121	0	121
Pallets	Pc	676	0	676	67	619
Hudson pump spare parts						
Hudson spare kits	kit	39	0	39	39	27
Hose connector 115-950	Pc	10	0	10	0	10
8L extension tube assembly only 141-967	Pc	33	0	33	33	0
Hosepipe/hose only 115-902 (Hose 5' Long)	Pc	34	0	34	5	29
Plunger tube and handle only 147-501	Pc	23	0	23	0	23
Shutoff valve body cap 115-733	Pc	0	0	0	0	0
Teflon bearing for valve pin 110-234	Pc	0	0	0	0	0
Strainer assembly complete 146-617	Pc	0	0	0	0	0
O ring gasket for male strainer fitting 805-310	Pc	2865	0	2865	235	2630
Strainer housing assembly 146-627	Pc	121	0	121	121	0
Nozzle body 114-791	Pc	238	0	238	238	0
Shutoff cock 806-428	Pc	80	0	80	80	0
Supply tube 129-074 - 3-gallon tank	Pc	20	0	20	20	0
Supply tube 129-074 - 4-gallon tank	Pc	0	0	0	0	0
CFV (Green) 98668	Pc	83	0	83	0	83
CFV (Blue) 98667	Pc	82	0	82	0	82

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
CFV (Red) 98666	Pc	1536	0	1536	30	1506
CFV (Yellow) 98665	Pc	99	0	99	0	99
Male fitting for strainer housing 114-905	Pc	317	0	317	0	317
Nut wing 115-970	Pc	132	0	132	0	132
No. 8002E hardened stainless steel nozzle tip (TIP T-JET) 805-855	Pc	789	0	789	0	789
Nozzle body cap (nozzle nut) 115-680	Pc	883	0	883	226	657
Hose adaptor assembly (stop cock) 148-704	Pc	0	0	0	0	0
Hose adaptor 115-960	Pc	0	0	0	0	0
Supply tube adapter with wing fitting 115-968	Pc	0	0	0	0	0
Pump cylinder assembly, complete (brass cylinder assembly XP) 147-202	Pc	0	0	0	0	0
Shutoff assembly complete thrust less (thrust less subassembly) 149-706	Pc	0	0	0	0	0
Shoulder strap "2" wide 152-829	Pc	151	0	151	0	151
Hose with thrust less, shutoff and strainer assembly (hose assembly) 146-689	Pc	81	0	81	81	0
100-Lb pressure gauge 803-311	Pc	227	0	227	198	79
Filter assembly for pressure guage 146-605	Pc	163	0	163	12	151
Plunger assembly, complete for 3/4 gallon unit (147-538) 147-541	Pc	0	0	0	0	0
Cup replacement kit 148-833	Pc	92	0	92	92	0
Shutoff valve body 113-377	Pc	0	0	0	0	0
Cover assembly complete 140-205	Pc	0	0	0	0	0
Plug for gauge adaptor fitting (Plug) 114-152	Pc	781	0	781	0	781
Cotter Pin, 3/32 x 7/8 - 801-419	Pc	1815	0	1815	121	1694
1/8 x1/2 cotter pin 801-423	Pc	58	0	58	1	57
Polyethene nozzle gasket 123-950	Pc	3886	0	3886	286	3600
Extension tube and nozzle assembly 141-966	Pc	0	0	0	0	0
Nozzle assembly complete 141-989	Pc	0	0	0	0	0
Supply tube only for 4-gallon tank 129-075	Pc	26	0	26	26	0
Strainer (Filter) 152-356 (152 -135)	Pc	664	0	664	628	36
Bumper pad 151-028	Pc	680	0	680	9	671
Cup retainer 153-816	Pc	279	0	279	231	48
Washer 123-908	Pc	851	0	851	0	851
Cup leather only 154-007	Pc	401	0	401	379	22
Hose clamp 803 623	Pc	632	0	632	456	176
Valve pin assembly 143-000	Pc	988	0	988	728	260
Cover chain 116-426	Pc	362	0	362	0	362

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
Valve body cap, with O ring gaskets 149-702	Pc	129	0	129	0	129
Housing for pump cylinder 110-790	Pc	210	0	210	0	210
Shutoff valve pin 115-716	Pc	171	0	171	0	171
Shutoff valve pin washer 123 -911	Pc	0	0	0	0	0
Pump cylinder check valve assembly 140-054	Pc	507	0	507	0	507
Bumper spring 150-409	Pc	177	0	177	0	177
Shutoff valve pin spring 150-400	Pc	1198	0	1198	0	1198
Spring for pump cylinder check valve 150-604	Pc	379	0	379	169	210
Valve pin spring 150-605	Pc	4481	0	4481	185	4296
Pump cap assembly, brass 149-102	Pc	111	0	111	99	12
Valve body cap O ring 805-309	Pc	0	0	0	0	0
O ring gasket for extension tube (805 -337)	Pc	380	0	380	0	380
Plunger adaptor 153-812	Pc	856	0	856	129	727
O ring gasket for hose connector 805-307	Pc	614	0	614	0	614
O ring for supply tube 805-312	Pc	997	0	997	182	815
Shutoff valve pin packing 151-016	Pc	20	0	20	0	20
Teflon valve pin sparer 118-243	Pc	0	0	0	0	0
Valve body cap O ring for valve pin 805-335	Pc	2997	0	2997	17	2980
Cover gasket 151-401	Pc	214	0	214	13	191
Plier spanner	Pc	0	0	0	0	0
Adjustable spanner	Pc	0	0	0	0	0
Screw driver	Pc	224	0	224	82	142
Pump cylinder gasket 151-030	Pc	3925	0	3925	579	3346
Shutoff operating lever 123-899	Pc	954	0	954	76	878
Instruction booklet - 871-596B	Pc	74	0	74	0	74
Instruction booklet - 871-598	Pc	0	0	0	0	0
Goizper pump spare parts						
Complete hose	Pc	47	136	183	0	0
Evo complete handle	Pc	5	300	305	92	213
Lance tube	Pc	43	198	241	40	201
Pressure regulator without	Pc	0	300	300	70	230
IK Complete chamber	Pc	0	70	70	69	1
Tool to tighten chamber	Pc	86	34	120	0	117
Goizper team leader spare kits	kit	398	67	465	0	294
Nozzle VC with protector	Pc	0	200	200	0	100
IK tank filter	Pc	0	136	136	7	129
IK strap with pin	Pc	0	100	100	42	58

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
Goizper nozzle	Pc	0	95	0	0	95
Insecticide:						
Actellic 300CS	Bottles	5119	70,992	76,111	66,364	9747
Actellic 300CS empty bottles	Bottles	0	0	0	0	66,362
SumiShield 50WG	sachets	6564	77,460	84,024	68,134	15,890
SumiShield 50WG empty sachets	sachets	0	0	0	0	68,097 ⁹
Environmental compliance and mitigation devices:						
Plastic sheets	Pc	4362	0	4362	0	4537
Empty sachet container	Pc	2691	0	2691	42	2649
Whistle for security	Pc	205	15	220	0	218
Emergency medication kit	Pc	490	0	0	0	0
Emergency solar light	Pc	67	55	122	0	108
Torch for security guards,Sop and team leaders	Pc	2547	800	3347	0	794
Fire extinguisher 5 Kg	Pc	17	0	17	0	17
Fire extinguisher 9 Kg	Pc	212	0	212	4	208
Red tin bucket 10 litres for sand	Pc	230	0	230	0	233
Shovel	Pc	100	5	105	0	103
Safety signs and labelling	Pc	220	0	230	0	217
Water pump	Pc	0	0	0	0	0
Yellow hazard bag	Pc	7	410	417	0	304
Barrel for solid waste 100 ltrs	Pc	158	0	158	0	20
Water tank 210Lt	Pc	27	60	87	0	119
Water tank 500Lt	Pc	4	0	4	0	4
Water tank 550Lt	Pc	1	0	1	0	1
Water tank 1000Lt	Pc	60	43	103	0	101
Water tank 2000Lt	Pc	10	0	10	0	10
Water tank 3000Lt	Pc	1	0	1	0	1
Generator	Pc	0	0	0	0	0
Door locks	Pc	248	203	451	0	328
File shelf	Pc	3	0	3	0	3
Heavy-duty shelf	Pc	61	0	61	0	61
Bags for packing of materials (sandarusi)	Pc	290	800	1090	923	167
Sisal ropes	Pc	290	288	578	522	56
Weigh scale	Pc	00	0	0	0	0
Information system:						
Calculator	Pc	883	0	883	0	560

⁹ 30,043 sachets have already been incinerated. 37 full SumiShield sachets were issued to ZAMEP, IHI and TPRI.

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
USAID stickers small and big sizes	Pc	20	0	20	20	0
IRS Stickers	Pc	15600	565,560	581,160	500,776	80,384
IRS cards by SOPs	Pc	26247	195,076	221,323	170,839	50,484
Chalks white/coloured	Pc	54250	88000	142,250	130,936	11,314
SOPs form	Pc	10792	78,859	89,651	69,007	20,644
PMT forms by storekeepers	Pc	70	360	430	335	95
Team leaders forms (with error eliminator forms at the back)	Pc	1827	14,094	15,921	14,441	4804
Supervisor Forms	Pc	0	0	0	0	0
Bin cards	Pc	278	14,700	14,978	13,159	1819
Store ledger book	Pc	73	189	262	214	48
Daily distribution form	Pc	240	3,300	3540	2458	1082
Goods received note (GRN) forms	Pc	1027	2,830	3857	1703	2154
Issue vouchers booklet	Pc	51	245	296	221	75
Daily insecticides tracking sheets	Pc	392	2750	3142	1828	1314
Daily monitoring form for insecticides consumption	Pc	540	2750	3290	2260	1030
Daily temperature Log sheet	Pc	40	320	360	218	142
Attendance register	Pc	110	141	251	107	144
Visitor's book	Pc	24	9	33	3	31
My clear bag	Pc	2050	1630	3680	0	2149
ID card holder	Pc	3096	0	3096	0	1865
Box files for DMU and site stores	Pc	129	606	735	645	90
Pens	Pc	662	4323	4985	4358	627
Punch machine	Pc	127	0	127	2	125
Stapler machine	Pc	105	32	137	0	134
Pockets guides for storekeepers	Pc	80	80	160	0	160
Pockets guides for team leaders	Pc	399	30	429	0	361
Pockets guides for spray operators	Pc	2136	420	2556	0	2682
Envelope A4	Pc	0	0	0	0	0
Participant attendance list	Pc	0	140	140	140	0
Rubber band	B10	0	170	170	85	85
Stappler pin size 24/6	P1000	197	70	267	40	227
Masking tape	Pc	0	612	612	583	29
Paper clips	Box	0	0	0	0	0
Sexual harassment poster	Pc	88	31	119	0	96
Marker pen	Pc	618	9245	9863	3308	6555
Notebooks	Pc	1372	4323	5695	4512	1183

Item Name	Unit	Stock from 2019	Procured 2020	Total before IRS	Issued during IRS	Total After IRS
IEC:						
Facts sheets	Pc	0	7120	7120	7120	0
VectorLink posters	Pc	325	3210	3535	3100	435
Flip charts	Pc	0	210	210	210	0
Q&A brochure	Pc	176	2010	2186	1451	735
Atropine inj. Sulphate	Pc	0	0	0	0	0
Aladite glue	Pc	48	198	246	176	70
Sanitary pads	Pc	142	1775	1917	1726	191
Pemba skirt	Pc	368	50	418	0	418
Life jackets	Pc	47	20	67	0	67
Vitamin E jelly	Pc	0	596	596	427	169

ANNEX D: ENVIRONMENTAL MITIGATION AND MONITORING REPORT

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
1. Occupational risks for workers involved in IRS campaigns			
1.1. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport	<p>Each vehicle selected for IRS operations had to submit a certificate of inspection from the government vehicle inspector. After that, the ECO and other members of the technical team inspected the vehicles to ensure they met IRS standard requirements.</p> <p>A total of 183 vehicles were hired to support IRS operations in mainland Tanzania and Zanzibar. Also we hired two boats to serve small islands in Ukerewe.</p>	<p>The project did not contract vehicles that did not meet PMI and IRS requirements or local regulations on vehicle road worthiness, such as the driver having a valid driving license, road license, and insurance, or the vehicle having strong benches for SOPs to sit on. Old and expired fire extinguishers were replaced with new ones.</p> <p>When the vehicle broke down during the operation, the vendor replaced it with another equivalent vehicle.</p>	
1.2. Driver training	A total of 185 drivers who would transport spray teams and insecticide were trained on safety issues, including observing speed limits and ensuring passengers use safety belts, on wearing proper PPE, and on managing insecticide spills. All vehicles were issued documents such as a spill management guide and first aid guide in case of insecticide intoxication.	No issue was reported.	
1.3. Cell phone, PPE, and spill kits on board during pesticide transportation	We ensured that cellphone, PPE, and spill kits were on board during insecticide transportation.	The very few cases of drivers not found in PPE were recorded as non-compliant and corrective measures immediately taken.	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
1.4. Mandatory pregnancy testing for female candidates applying for jobs with potential pesticide contact (washers, SOPs, team leaders, storekeepers, pump technicians, and supervisors)	1,667 IRS female workers were given a pregnancy test; all but one test was negative and so those women qualified for the work.	Two pregnancy case were registered.	The two SOPs were assigned other tasks. In Unguja she was assigned to work at the data center, while in Kakonko she was assigned to clean the site.
Mandatory health fitness testing for all SOPs	All IRS workers who might be exposed to insecticide were tested for fitness. These included SOPs, washers, team leaders, storekeepers, and supervisors. 3,408 personnel were tested and found to be physically fit for IRS work.	There were no issues.	
1.5. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact	All workers who might be exposed to and thus contaminated with insecticide were trained and issued PPE for their protection.	There were no issues of concern.	
Training on mixing pesticides and proper use and maintenance of spray pumps	All SOPs were trained on mixing pesticides before spraying. Pump technicians were re-trained on pump maintenance and repair. On a daily basis during morning mobilization, the procedure for insecticide mixing was repeated by the supervisor to ensure all SOPs could do so correctly.	There were few reports of pump leakage, which were followed up and fixed.	Pump leakages were reported and fixed immediately.
Provision of adequate facilities and supplies for end-of-day clean-up	All items needed for the end-of-day clean-up (water, soap, wash basins, etc.) were adequately supplied.	No outstanding issue.	
1.6. Enforcement of clean-up procedures	Team leaders did careful supervision of end-of- day clean-up	No outstanding issue	

2. Health and safety risks for residents of treated houses (e.g., risks from skin contact and/or ingestion of insecticides)

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
2.1. Inform homeowners of their responsibilities and precautions to take during IEC campaigns	For the 2019/2020 campaign, IEC/BCC was mainly conducted by hamlet leaders and shehia mobilizers, who were trained before their engagement. Mass media campaigns, mainly on the radio, were also used.	Though there was good information coverage, some homeowners refused IRS or did not adequately prepare their households for spray.	Government leaders were engaged to address refusals and IRS was subsequently implemented with safety precautions for residents.
2.2 Prohibit spraying of houses that are not properly prepared	Where SOPs encountered inadequately or unprepared structures they had to educate and support families in household preparation for spraying.	Improper preparation continues to be a challenge; it takes up field time of SOPs who end up helping to prepare houses, or forces fewer rooms to be sprayed.	Future campaigns should more quickly leverage government machinery, especially village leaders, to ensure all houses are well prepared before SOPs arrive.
2.3 Advise homeowners to not enter their houses for two hours after spraying	Homeowners were instructed to remain outside for two hours after spray, and not to paint the house.	No outstanding issue	
2.4 Instruct homeowners to wash itchy skin and go to a health clinic if symptoms persist	This was given as part of post-spray instructions.	No outstanding issue	
3.0 Environmental risks that might be caused by insecticides reaching the targeted surfaces			
3.1. Indoor spraying only	Spraying covered the recommended surfaces.	No outstanding issue	
3.2. Train on proper spray technique and use of CFV to ensure only the needed amount is applied to targeted wall	Spraying techniques were carefully adhered to.	No outstanding issue	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
3.4. Maintain pumps to prevent leakage	Pump leakages were flagged in the first week of the campaign; two SOPs were contaminated with insecticides	A leaking pump can contaminate the SOP and the environment and waste insecticide, to adress this challenge the program did the following Thorough inspection and repair of all pumps prior the campaign The program trained a pump technician for every site who promptly repaired the reported leaking pumps.	The reported leaks were fixed. Also, the project has procured many new pumps, thus minimizing the number of old pumps that are likely to leak.
3.5 Choose sites for disposal of liquid wastes according to PMI best management practices	All soak pits were well located, fenced, and covered to ensure maximum safety.	No outstanding issue was observed.	All soak pits were fenced to ensure humans and animals had no access to them. During the campaign, the project employed site guards to keep unauthorized people and animals away. Post-IRS, steel covers were installed on all soak pits that had received contaminated effluent from the washing slab to further prevent access by people and animals.
3.6. Construct soak pits with charcoal to absorb pesticide from rinse water	Project rehabilitated and reconstructed some soak pits according to PMI best management practices guidelines.	There were no outstanding issues of concern.	
3.7 Maintain soak pits as necessary during the campaign	There were cases where soak pits showed signs of overflowing.	Such events happened due to excessive rains that coincided with the spray season.	The reported cases were fixed by vendors assigned to repair the specific IRS sites. Also, the slabs were provided with plastic covers to divert rainwater from the soak pits. In the future we plan to install a roof around the washing slab that will provide shade and prevent rain water from accessing the washing slab thus mitigating overflow

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
3.8. Inspect and certify solid waste disposal sites before spray campaign	The disposal of solid wastes from IRS are sorted using recommended approaches stated in the BMP manual also aligned to comply with requirements of the government of Tanzania. The approaches include Incineration of masks, sachets and labels from Actellic bottles, incinerators can heat beyond 800°C beyond which insecticides are denatured Recycling of Actellic plastic bottles into items that have minimal contact with human e.g. conduit pipes Recycling of cardboard and other paper by papermills Cleaning and re-use of coveralls, boots and helmets Shredding and disposal at the landfill of items that can not be re-used	There were no outstanding issues of concern.	
3.9. Monitor waste storage and management during the campaign	Waste generated from the IRS campaign is kept under strict rules of storage, which include record keeping on bin cards and ledgers and using issue vouchers when transferring them from field stores to the main warehouse.	There were no outstanding issues of concern.	
3.10. Monitor post-campaign disposal procedures	IRS wastes to be disposed of in the municipal council landfills will be accompanied by a team including the Abt ECO, a representative from NEMC, and relevant city/town council authorities.	There were no outstanding issues of concern.	
4.0. Health and environmental impacts may result due to inadequate quality control of insecticides (i.e., procuring non-approved insecticides, improper storage, or poor inventory management).			
4.1 Ensure quality of insecticides	Before it could import insecticide, the project acquired the insecticide import permit from TPRI, the government agency mandated to control importation and use of insecticides. On arrival at the entry port, samples were collected and sent to the TPRI laboratory for quality control.	Both SumiShield 50WG and Actellic 300CS were found to be of the correct quality.	
4.2 Ensure good storage facilities	There are two types of storage facility: Main warehouses, in Mwanza and Geita, are maintained year round. All were rented in an appropriate	Both main and seasonal storage facilities met PMI standards.	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
	<p>location and renovated in line with PMI best management practices: reinforced doors and windows, good light, good ventilation, and intact floor and roofs.</p> <p>Seasonal storage facilities were provided by beneficiary communities and were refurbished by the project to meet BMP requirement</p>		
4.3. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles	All stores kept their control books up to date and tallied the stock.	There were no outstanding issues of concern.	
4.4. Reconcile the number of houses sprayed vs number of sachets/bottles used	On a daily basis, storekeepers used the performance tracking sheet to record spray information that helped to check if the sprayed houses tallied with the used insecticides.	There were no outstanding issues of concern.	
4.5 Do visual examination of houses sprayed to confirm pesticide application	Quality control wall bioassay tests were conducted by an independent qualified institution, the NIMR. The results showed adherence to PMI guidelines, and WHO standards were the cutoff points. All six districts in mainland Tanzania and 10 in Zanzibar were tested. All tests scored 100% mortality after 24 hours for Actellic 300CS and 72 hours for SumiShield 50WG, indicating good spray quality.	No structures documented as sprayed were found not to have been sprayed.	Future campaigns will continue to train SOPs and team leaders to master good spray techniques in order to ensure high-quality spraying.
4.6. Perform physical inventory counts during the spray season	Coordinators, storekeepers, and supervisors in all districts checked inventory regularly during the campaign.	Five empty sachets were reported lost during the campaign	

ANNEX E: PMI VECTORLINK TANZANIA M&E PLAN

Last Updated: June 5, 2020

#	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	604,751	624,348	513,770	503,567						
1.1.3	Number of eligible structures sprayed with IRS ¹⁰		Project records Annually	Country	514,038	595,923	436,705	471,622						
1.1.4	Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)		Project records Annually	Country	85%	95.4%	85%	93.7%						
1.1.5	Number of people protected by IRS		Project records Annually	Country Sex Pregnant women Children <5	1,828,321	2,404,010	2,576,380	1,915,151						
								M: 932,679 (48.7%) F: 982,472 (51.3%) Preg. Women: 56,964 Child<5: 373,976						

¹⁰ 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	0	0	1,549,059 ¹¹	4,640,791 ¹¹						
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													

¹¹ Phase planned for Jul. – Sept. 2019 Zanzibar = 288,000 Health Facilities ITNs and Mainland = 1,261,177 SNP ITNs. Additional 4,155,270 ITNs were planned for Phase 1 & 2 distribution planned for Oct. 2019 – April 2020 i.e. Mainland – SNP = 1,850,116, Mainland – RCH = 2,105,154, and Zanzibar - ANC/EPI/Community = 200,000. Results capture distribution between Jul. 19 – Mar., 2020.

#	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
1.2.1	Total number of people trained to support VC in target areas		Project Training Records Annually	Country VC Intervention Sex Job Function	3,707	3,849	4,261	4,164 ¹² IRS M: 2,342 (56.2%) F: 1,822 (43.8%)						
1.2.2	Total number of people trained to support VC in target areas with USG funds ¹³		Project Training Records Annually	Country VC Intervention Sex Job Function	2,786	2,899	3,171	3,182 ¹⁴ IRS M: 1,665 (52.3%) F: 1,517 (47.7%)						
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	487	526	566	554 ¹⁵ M: 338 (61.0%) F: 216 (39.0%)						
1.2.4	Total number of people hired to support VC in target areas.		Project Records Annually	Country VC Intervention Sex Job Function	3,321	3,456	3,880	3,840 ¹⁶ IRS M: 2,110 (54.9%) F: 1,730 (45.1%)						

¹² 24 National and Sub-National representatives, 6 External Supervisors, 6 DMFP, 18 DITTS (DMO, DHO, DIEC), 75 Site Supervisors, 425 Team Leaders, 2,682 Spray Operators (including reserves), 46 Clinicians, 75 Site Mobilisers, 117 Site Storekeepers (including reserves), 75 Pump Technicians, 109 Site Washers, 220 Security Guards, 185 Drivers (SOP vehicles, Distribution vehicles, & Supervision Vehicles), 0 Finance Assistants, 15 M & E Assistants, and 86 Data Entry Clerks - DECs (including reserves).

¹³ For IRS programs, this includes spray operators, team leaders, and supervisors.

¹⁴ 75 Site Supervisors, 425 Team Leaders, and 2,682 Spray Operators (including reserves).

¹⁵ 24 National and sub-national representatives, 6 External Supervisor, 0 Abt permanent staff, 6 DMFP, 18 DITT (DMO, DHO, DIEC), 75 Site Supervisors, 425 Team leaders

¹⁶ 7 External Supervisors, 75 Site Supervisors, 425 Team Leaders, 2,559 Spray Operators, 75 Mobilizers, 109 Storekeepers, 75 Pump Maintenance Technicians, 109 Washers, 96 Water Fetcher, 220 Security Guards, 0 Finance Assistants, 15 M&E Assistants, and 75 Data Entry Clerks.

#	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
1.2.5	Number of VC project training workshops targeting NMCP and other host country staff		Project Training Records Annually	Country Technical Area Job Function	1	2	2	0 ¹⁷						
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	39	62	62	62 ¹⁸						
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										
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	3,327	3,448	3,791	3,722 ¹⁹ M: 2,042 (54.9%) F: 1,680 (45.1%)						

¹⁷ The training was cancelled to COVID19 health alert by the MoHCDGEC

¹⁸ Health Directors/Professionals

¹⁹ 24 National and Sub-National representatives, 6 DMFP, 18 DITTS (DMO, DHO, DIEC), 6 External Supervisors, 75 Site Supervisors, 425 Team Leaders, 2,682 Spray Operators (including reserves), 117 Site Storekeepers (including reserves), 75 Pump Technicians, 109 Site Washers, and 185 Drivers (SOP vehicles, Distribution vehicles, & Supervision Vehicles).

#	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 %)	52	56	54	46 M: 31 (67.4%) F: 15 (32.6%)						
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	6	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	88; 100%	93; 100%	120; 100%	108; 100%						
1.3.6	Number and percentage of storehouses inspected and approved prior to IRS campaigns		Project Records - PSECAs Annually	Country Storehouse Type	88; 100%	93; 100%	120; 100%	108; 100%						
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	1,328; 40%	1,259; 36.4%	1,552; 40.0%	1,730 ²⁰ ; 45.1%						
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	214; 40.0% IRS	211; 37.1% IRS	254; 40.0% IRS	260 ²¹ ; 41.2% IRS						

²⁰ 2 External Supervisors, 30 Site Supervisors, 173 Team Leaders, 1,232 Spray Operators, 40 Mobilizers, 51 Storekeepers, 2 Pump Maintenance Technicians, 92 Washers, 28 Water Fetcher, 38 Security Guards, 0 Finance Assistants, 4 M&E Assistants, and 38 Data Entry Clerks.

²¹ 2 External Supervisors, 30 Site Supervisors, 173 Team Leaders, 51 Storekeepers, and 4 M&E Assistants.

#	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
1.4.3	Number and percentage of trainees (permanent and seasonal) who have completed gender awareness training		Project Records Annually	Country Sex (# and %) Job Function	3,741	3,883	4,295	4,197 ²² M: 2,364 (56.3%) F: 1,833 (43.7%)						
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	119 IRS	336 IRS 192 Radio Spots 144 Radio Announcements	197 IRS	182 IRS 122 Radio Spots 60 Radio Announcements 0 Talk Shows						
1.5.2	Number of print materials distributed to or targeted at beneficiaries		Project Records Annually	Country VC Intervention	12,311 IRS	12,005 IRS	12,311 IRS	12,342 ²³ IRS						
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	N/A	N/A	N/A	N/A						
2. Entomological and Epidemiological Data to Drive Decision-Making														
2.1	Vector Control Activities Monitored via Entomological and Epidemiological Data													

²² 24 National and Sub-National representatives, 6 External Supervisors, 33 Abt Permanent Staff, 6 DMFP, 18 DITTS (DMO, DHO, DIEC), 75 Site Supervisors, 425 Team Leaders, 2,682 Spray Operators (including reserves), 46 Clinicians, 75 Site Mobilisers, 117 Site Storekeepers (including reserves), 75 Pump Technicians, 109 Site Washers, 220 Security Guards, 185 Drivers (SOP vehicles, Distribution vehicles, & Supervision Vehicles), 0 Finance Assistants, 15 M & E Assistants, and 86 Data Entry Clerks - DEC's (including reserves)

²³ 2011 Q&A brochures, 7,131 fact sheets, and 3,200 posters.

#	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
2.1.1	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	N/A	N/A	N/A	N/A						
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	N/A	N/A	N/A	N/A						
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	N/A	N/A	N/A	N/A						
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	N/A	N/A	N/A	N/A						
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	N/A	N/A ²⁴	N/A	N/A						

²⁴ This indicator was newly defined in project year 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
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	N/A	N/A ²⁵	N/A	N/A						
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	N/A						
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 ²⁶	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										

²⁵ This indicator was newly defined in project year 2

²⁶ This indicator was newly defined as of project year 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
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						
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%	2; 100%	2; 100%						

#	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
3.1.3	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 ²⁷	94	103 IRS M: 66 (64.1%) F: 37 (35.9%)	132	117 IRS M: 61 (52.1%) F: 56 (47.9%)						
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	88; 100%	93; 100%	120; 100%	108; 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	0	0	0	0						
4.2	Create and share knowledge through dissemination of best practices and lessons learned													

²⁷ 117 Site Storekeepers (including reserves)

#	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
4.2.1	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	1	0	0	0						
4.2.4	Number of success stories written or videos produced and shared on the VectorLink project website		Project Records Annually	Country	3	2	1	0						
4.2.5	Number of peer-reviewed journal articles submitted and accepted	X	Project Records Annually	Technical Area										
4.2.6	Number of contributions to vector control global or country policy and/or guidance documents		Project Records Annually	Country Technical Area	2	1	1	0						
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	5	2	2 ²⁸						
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	0	0	0	0						
4.4	Cultivate public-private partnerships													

²⁸ IRS site store spaces were government contributed as opposed to renting spaces; printed SOP forms with IRS numbers to replace IRS cards during the first phase of the campaign.

#	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
4.4.1	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	0	0	0	0						