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MALAWI INDOOR RESIDUAL SPRAYING ACTIVITY

FINAL REPORT
JULY 9, 2010 – JULY 9, 2013

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CONTENTS

Acronyms	i
Executive Summary	1
Chapter I. Progress and Results	3
A. Introduction	3
B. Phase 1: July 2010-July 22, 2012.....	3
B1. Objective 1.....	3
B2. Objective 2.....	8
B3. Objective 3.....	10
B4. Objective 4.....	12
C. Phase 2: July 23, 2012-July 30, 2013.....	13
C1. Objective 1.....	13
C2. Objective 2.....	16
C3. Objective 3.....	18
Chapter II. Data and Indicators	21
Chapter III. Best Practices	29
Chapter IV. Financial Overview	31
Annexes	
Annex A. Success Stories	A-1
Annex B. List of IRS Materials	B-1
Annex C. IRS Planning Process	C-1
Annex D. IRS Implementation Process	D-1

ACRONYMS

BCC	behavior change communications
DHO	district health officer
EHO	environmental health officer
FAO	Food and Agriculture Organization of the United Nations
IEC	information, education, and communication
IRS	indoor residual spraying
M&E	monitoring and evaluation
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
PPE	personal protective equipment
TOT	training-of-trainers
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria and Malawi

Malaria is the leading cause of morbidity and mortality in Malawi, particularly in pregnant women and children under the age of five. It is the most common cause of outpatient visits and hospitalizations, accounting for 34 percent of outpatient visits, 40 percent of children's hospital visits, and 40 percent of all hospital deaths. In 2006, the World Health Organization (WHO) reported that there were nearly 6 million episodes of malaria every year in Malawi. In addition, the disease has serious socioeconomic impacts on communities, resulting in job loss and unemployment, school absenteeism, and high expenditures on treatment and prevention.

Malaria transmission is highest during the rainy season, from October to April. Though intensity varies by season and topography, the disease is found throughout the country. Malaria is spread by mosquitoes infected with a particular parasite. When they bite humans, mosquitoes transmit the parasite to the body, where it multiplies in the liver and infects the red blood cells. Symptoms can be mild, such as fevers and headaches, or be more intense, including frequent vomiting and potential death. There are numerous ways malaria can be prevented and treated, including indoor residual spraying (IRS), long-lasting insecticide treated nets, and Artemisinin-based combination therapy.

Malawi is one of 15 countries that has benefitted from the President's Malaria Initiative (PMI) since 2006. Launched in 2005, PMI is a five-year, \$1.2 billion initiative led by USAID to rapidly expand malaria prevention and treatment initiatives. Initially, PMI aimed to reduce malaria-related mortality by 50 percent in 15 highly burdened countries in sub-Saharan Africa by 2010. In 2008, however, the Lantos-Hyde Act extended PMI funding through 2014 and revised its goal to reduce malaria by 70 percent in the identified countries by 2015.

The Malawi branch of PMI develops annual malaria operational plans to guide country activities. IRS is repeatedly listed as a top component of these plans. To reach the 70 percent reduction goal, PMI/Malawi has sought to cover 85 percent of the most vulnerable groups using proven preventative and treatment measures, including IRS, long-lasting insecticide treated nets, and Artemisinin-based combination therapy.

PMI/Malawi Target

Spray 85 percent of households targeted for IRS by 2015.

IRS As a Preventive Measure

IRS is a standardized control method to combat malaria by directly targeting the source — mosquitoes. Requiring well-trained and -supervised personnel, IRS uses hand-operated pressurized sprayers to coat the interior and exterior walls of buildings with a chemical insecticide that kills the mosquitoes upon contact. The type of insecticide is selected based on building material (mud, brick, or wood), duration of the malaria season, and the residual effect (i.e., if the insecticide has been effective or if immunity has developed in the area).

IRS in Malawi

To achieve PMI's goal, USAID worked with Malawi's Ministry of Health and the National Malaria Control Program (NMCP) to increase interventions to reduce the burden of malaria on local communities. These efforts culminated in the creation of the Malawi IRS program in

2006. With USAID/PMI support, the Malawian government introduced IRS as a pilot prevention strategy in northern Nkhotakota District in 2007. The entire district was sprayed in 2009.

In 2010, USAID/PMI expanded IRS beyond Nkhotakota, to conduct spray campaigns in Salima District. The active involvement of district-level government officers in planning, implementation, and training led to the further capacity development for the planned national IRS in 2010 and beyond. Despite financial constraints in 2011 that limited the campaign to only one district, the project sprayed in six districts during the 2012 campaign (see box, right).

Districts Sprayed
• 2007: Northern Nkhotakota
• 2009: Nkhotakota
• 2010: Nkhotakota & Salima
• 2011: Nkhotakota
• 2012: Salima, Nsanje, Chikwawa, Karonga, Nkhata Bay, Mangochi

Each spray campaign required immense planning, coordination, and supervision. After the campaigns in 2010 and 2011 were successfully completed, project objectives were slightly modified during the third quarter of 2012. As a result, the program focused on building the capacity of the NMCP to directly facilitate IRS operations and management. Exhibit 1 shows the progress of the three campaigns.

Exhibit 1. Results of IRS Campaigns, 2010-2012

Year	Structures Treated	% Coverage	Population Protected	Children < 5 Years	Pregnant Women
2010	97,329	72.5%	364,349	77,217 (21.2%)	10,414 (2.9%)
2011	88,490	87.7%	321,919	62,032 (19.3%)	8,397 (2.6%)
2012*	575,945	86.1%	2,065,458	365,302	73,634

* The NMCP provided the data for the 2012 spray campaign.

In July of 2010, USAID/Malawi issued a three-year follow-on task order contract for the continued implementation of the IRS activity. Under this contract, the project worked with key partners, including USAID/PMI, Malawi’s Ministry of Health, and NMCP, to build upon previous efforts to combat the burden of malaria. The project team also worked with district-level counterparts for effective implementation. Please see Annex A for Success Stories from the project.

Throughout the first two years of operation, the project worked to achieve four objectives outlined in the initial task order contract. Under these objectives, the project collaborated with the NMCP to complete two spray seasons in 2010 and 2011. As mentioned, after the second spray season, the project scope of work shifted from direct implementation to providing technical assistance to the NMCP to conduct quality, effective and sustainable IRS campaigns. This shift was formalized under a contract modification (Mod006). With the new scope of work, the project supported the completion of one spray season in six targeted districts from October 2012 through March 2013. While working in with the NMCP, the project finalized numerous guidelines, training manuals, and tools to help ensure the sustainability of future IRS campaigns. A list of these materials is in Annex B.

CHAPTER I. PROGRESS AND RESULTS

A. Introduction

Malawi IRS was implemented in two phases. Phase 1 (July 2010-July 2012) focused on four objectives:

- Objective 1: Support IRS planning, operations, and logistics for implementation in Malawi.
- Objective 2: Ensure all aspects of program implemented in environmentally sound manner, in compliance with all Malawi and U.S. government regulations and any best practices.
- Objective 3: Strengthen capacity of NMCP and public and private sector at all levels to plan, implement, and monitor IRS operations toward the goal of long-term sustainability of IRS programs in Malawi.
- Objective 4: Provide regular monitoring and evaluation (M&E) for IRS programs in Malawi.

During this phase, the team had direct responsibility for the spraying implementation.

From July 2012 to July 2013, Phase 2 focused on providing technical assistance and support to the NMCP for implementation through three objectives:

- Objective 1: Strengthen capacity of NMCP and public and private sector at all levels to plan, implement, and monitor IRS logistics and operations toward the goal of long-term sustainability of IRS programs in Malawi.
- Objective 2: Provide technical assistance on all aspects of the Ministry of Health/NMCP IRS programs so that they are implemented in an environmentally sound manner, in compliance with all Malawi and U.S. government environmental regulations and best practices.
- Objective 3: Provide technical assistance for regular monitoring and evaluation of IRS programs in Malawi.

Below is a discussion of each objective and the activities the project completed.

B. PHASE 1: JULY 2010-JULY 2012

B1. Objective 1: Support IRS planning, operations, and logistics for implementation in Malawi

2010 Spray Campaign

The first spray season took place in Nkhotakota and Salima districts in 2010. Partners included USAID and key government ministries such as the Ministry of Health, Ministry of Agriculture, and the Department of Environmental Affairs. More than 72 percent of the

estimated 134,000 targeted structures were sprayed, protecting nearly 365,000 residents from malaria. These outcomes resulted from meticulous, labor-intensive planning, preparation, and implementation.

Planning

The project held a three-day micro-planning workshop in September, 2010, during which participants developed a detailed IRS implementation plan for Nkhotakota and Salima. A total of 58 district environmental health officers (EHOs) and senior health surveillance assistants participated; district health officers (DHOs) continue to use this implementation plan to guide IRS planning and operations. In addition, the project team co-led a stakeholder workshop with the NMCP in late September to review the National IRS Guidelines and the IEC Strategy, and draft a National IRS Training Manual. These workshops helped establish a foundation on which the partners built the skills to conduct an IRS campaign. Please see Annexes C and D for graphic representations of the planning and implementation processes.



An M&E officer reviews information gathered before the campaign.

Community Mobilization

With the plans to help guide operations, the project reached out to communities to gain their support. Team members visited Nkhotakota and Salima, and held informational meetings with key community leaders and groups. These meetings helped prepare local residents for the spraying and gained their support by raising awareness of IRS practices and benefits. The team trained health surveillance assistants and volunteers to conduct door-to-door visits to ensure each household received adequate information about the spray process and the roles community members played. To reinforce the message and sensitization to it, the team collaborated with the district government structures to disseminate messages, including through local radio stations and from Ministry of Information vehicles driving throughout the villages making announcements over megaphones.

Geographical Reconnaissance and Geo-Coding

Malawi IRS conducted a geographical reconnaissance exercise throughout Nkhotakota and Salima. With subcontractor Malaria Consortium, team members collected data on how many structures in each village were eligible for spraying. With Chancellor College, the team also trained 40 Ministry of Health staff from the districts in the theory and practice of measuring these structures' sprayable surface areas. In March 2012, the project submitted a geo-coding report to PMI that outlined the findings of the reconnaissance exercise. It contained seven maps that demonstrated the concentration of structures in each traditional authority area in the districts. This data was used to quantify commodities, logistics, and human resource requirements, develop the spray implementation schedule, and facilitate M&E of the campaign.

Materials

Using results from geo-coding, the project team procured the materials for the spray campaign: more than 35,000 liters of the insecticide Actellic 50EC (pirimiphos-methyl),

spray cans, personal protective equipment (PPE), and vehicles. At the request of the Malawi Environmental Affairs Department, the project submitted a two-liter sample of the insecticide to the Malawi Bureau of Standards for testing to ensure it was safe for use. However, the test was not conducted because the bureau did not have the proper equipment.

Some spray cans were defective but the manufacturer, Hudson X-Pert, provided 170 replacement cans. PPE arrived later than anticipated due to shipping difficulties, delaying the start of the spray season by two weeks. The project rented 66 vehicles to transport the spray teams to the field on a daily basis; the vehicles were selected based on safety requirements and traffic police clearances.

Training

Actellic 50EC was introduced in Malawi in 2010. This necessitated intensive training of the implementers and participants to ensure understanding of and adherence to USAID safety rules on the use of organophosphates, the class of insecticide that includes pirimiphos-methyl. The suppliers assisted the team in conducting workshops to develop a properly trained labor force to lead the campaign. In mid-September, they conducted a six-day training-of-trainers (TOT) workshop for spray operators focusing on malaria vector and transmission,



Spray operator trainees demonstrate the proper use of PPE.

IRS operational strategy, insecticides, spraying techniques, and environmental compliance. These workshops prepared participants to lead larger spray teams during implementation. Because a post-training assessment revealed that some participants had difficulty grasping the spray techniques, the project conducted a three-day follow-up workshop in early November to focus on this topic alone. An assessment afterward showed dramatic improvement in the understanding and practical application of the spraying techniques.

The project also conducted a workshop for 666 spray operators from November 15-20, 2010. It focused on IRS theory and provided participants with the practical skills to participate as a spray operator. The project team led numerous other workshops for different supporting positions needed to ensure the safety, efficiency, and successful execution of the campaign. These included training for clinicians, training on emergency management of insecticide positioning, and training for administrative staff (e.g., data clerks, storekeepers, washers, and drivers). Exhibit 2 (next page) shows how many people attended the workshops in preparation for the first spray season, which occurred within just four months of contract award.

During the 21-day campaign, teams sprayed 97,329 structures — 93.5 percent of structures found and 72.6 percent of the estimated target structures. More than 364,349 individuals were protected as a result of the spray campaign; 21.2 percent of these were children under five years and 2.9 percent were pregnant women.

Following spray operations, the team focused on post-campaign activities. It accounted for the environmental safety of all campaign materials. This included incinerating solid waste at

appropriate facilities, proper decommission of operation sites, and tracking the inventory of remaining commodities for future spraying. The team conducted follow-up beneficiary satisfaction reviews to assess community impressions and obtain information to help improve future IRS campaigns, and documented successes and obstacles encountered throughout the campaign.

Exhibit 2. Results of IRS Campaign, 2010

Type of Training	Nkhotakota District		Salima District		Total Male/Female		Total
	Male	Female	Male	Female	Male	Female	
TOT: spray operators	18	0	19	3	37	3	40
Spray operators	241	74	264	87	505	161	666
Supervisors	19	0	27	3	46	3	49
Team leaders	48	10	48	16	96	26	122
TOT: mobilizers	12	0	8	4	20	4	24
Mobilizers	245	190	288	161	533	351	884
Clinicians	21	11	15	5	36	16	52
Data clerks	2	2	1	3	3	5	8
Storekeepers	18	1	16	4	34	5	39
Total	624	288	686	286	1310	574	1884

2011 Spray Campaign

The project used the knowledge and training developed from the first spray season to initiate a rapid start-up for the second spray season in 2011. Due to limited funds, only Nkhotakota district was slated for spraying. In response, the project adapted the preparation steps to focus on its geographical needs. The team led efforts to procure supplies, including 47,508 liters of Actellic 50EC. With some PPE equipment remaining from the previous campaign, staff procured the additional items through local and international vendors, including aprons, carrier bags, gloves, visors, and neck covers. The project evaluated district storage facilities to ensure they were in full compliance with environmental regulations to store the insecticide and materials. Despite these preparations, the spray season was delayed by two weeks due to a fuel scarcity. The program managed to overcome the obstacle through partnerships with local organizations.

Community Mobilization

With the plans and appropriate materials in place, the team led mobilization efforts to ensure all community members in Nkhotakota were prepared for the activity. In addition to adapting and re-using leftover information, education, and communication (IEC) materials from the 2010 campaign, the program printed other materials, including 55 posters, 16,000 brochures, and 99,529 door stickers. The project also organized meetings with the District Executive Committees and the Area Development Committees to ensure community support from the

highest level and to provide community members with another avenue through which they could pose questions and voice concerns.

Training

Next, the team turned its attention toward building a pool of trained technical personnel for the 2011 campaign. The project trained more than 885 IRS participants on spraying techniques, IEC and behavior change communications (BCC) awareness and supervision, and data management. Facilitators used the opportunity to pre-test the revised IRS Training Manual, which was still in draft form.

A six-day TOT of spray operators was held in October for more than 22 environmental health officers from Nkhotakota. To ensure quality control measures were in place for proper insecticide use, the team invited an external trainer from Arysta Life Sciences, the insecticide supplier, to participate and offer guidance throughout the workshop.

Immediately following the workshop, the project provided guidance for the newly trained team leaders to conduct and lead a six-day training activity for spray operators, putting their acquired skills and knowledge to the test. These leaders trained 503 seasonal workers from Nkhotakota, including 10 full-time employees of a private company, the Illovo Sugar Company. (See pages 11 and 15 for more information.) This workshop incorporated theory and practice modules, and concluded with a test on both. Based on test results, trainees were categorized into the roles of spray operators or washers.

As with the 2010 spray season, the team held other workshops related to different technical areas of the spray campaign, including mobilization, environmental, health, storage, and data management and reporting. The comprehensive training regimen enabled project staff, district and community members, and spray operators to feel adequately prepared to implement the 2011 spray season. Exhibit 3 shows how many men and women were trained.

Exhibit 3. Trained Personnel, 2011 Spray Campaign

Type of Training/Cadre	Nkhotakota District (PMI/USAID)		Other 6 Districts (Government-Funded)		Total
	Male	Female	Male	Female	
TOT spray operators	17	3	0	0	20
Spray operators	211	144	0	0	355
Team supervisors	1	36	0	0	37
Team leaders	51	20	0	0	71
TOT mobilizers (IEC/BCC)	19	1	0	0	20
Mobilizers (IEC/BCC)	210	103	0	0	313
Clinicians	18	4	0	0	22
Storekeepers and managers	20	4	0	0	24
Data clerks	3	2	10	8	23
Total	550	317	10	8	885

Thanks to the quick and effective period of preparation, the project sprayed 94 percent of the structures the spray operators found and about 88 percent of the structures that were deemed

eligible to spray. These efforts protected more than 300,000 residents, 20 percent of whom were children under five and 3 percent of whom were pregnant women.

Post-Spray Activities

In order to ensure safe and effective completion of the spray season, the team led post-spray compliance activities. The project accounted for remaining insecticide and materials; moved all commodities and equipment from the satellite storage facilities to the district warehouse; disposed of all insecticide waste generated from operations in ways compliant with environmental regulations at St. Gabriel's Hospital in Lilongwe; and incinerated all solid waste (e.g., gloves and masks) at the Nkhotakota District Hospital. At PMI's request, the project also provided temporary storage for the



A spray operator speaks with a resident of Ngabani village to assess satisfaction with the campaign.

remaining insecticide in the main warehouse in Lilongwe until it could be transferred to NMCP facilities in the targeted districts.

At the completion of the second spray season, the team led a two-day workshop for seven district health office staff on how to conduct a community beneficiary satisfaction review. After learning how to collect and analyze relevant data, participants joined facilitators to conduct a beneficiary satisfaction review in Nkhotakota. Comprising focus group discussions and interviews, the survey indicated that 91.7 percent of the community members expressed appreciation for the 2011 spraying operations, saying it was the best campaign they had experienced. Reports also showed that community members noticed an immediate impact on mosquitoes, resulting in fewer cases of malaria.

B2. Objective 2: Ensure all aspects of program implemented in environmentally sound manner, in compliance with all Malawi and U.S. government regulations and any best practices

Planning

The pre-spray training and post-spray activities for both spray seasons contained integral components dedicated to ensuring environmental compliance. The Best Management Practices document helped guide each campaign. Furthermore, to provide guidance on environmental protection and human safety during implementation, the project conducted an environmental impact assessment and a supplemental environmental assessment before setting up activities. Both documents were approved by the Malawi National Executive Committee of the Environmentalists. External consultants were engaged to conduct these studies, which then led to the development of the Environmental Mitigation and Management Plan, which was used to put all mitigation and collective measures in place before, during, and after spraying. Each staging site was constructed in accordance with environmental



Signage at storage and operational sites helped ensure communities were not exposed to chemicals.

guidelines for pesticide storage from WHO and the Food and Agriculture Organization of the United Nations (FAO). Per requirements, all operational sites contained storage facilities, soak pits, washing area slabs, and bathing shelters for spray operators. The sites were also enclosed with a fence to prevent unauthorized entry.

A pre-spray inspection was conducted for operation sites to verify that mitigation measures were taken, and that each fully met the compliance requirements outlined in the Best Management Practices document. In addition, the project team assisted the district EHOs in conducting an exercise to mark and buffer structures within 50 meters of any body of water, game reserve, or sensitive ecosystem to prevent exposure to insecticide chemicals. For sites that did not meet the requirements, district EHOs were given steps to follow before beginning the campaign. In addition, all female participants were given pregnancy tests to prevent contact to potentially harmful chemicals. Women who tested positive were assigned to other duties.

Training

The team also ensured all participants and materials adhered to environmental requirements. In collaboration with the NMCP, the project organized pre-campaign workshops that focused on the importance of environmental compliance in pre-, mid-, and post-spray operations. Spray operators learned how to properly construct a spray site, to determine if targeted spray structures adhered to requirements, and to appropriately wear and use PPE.

Mid-Spray Inspection

To ensure consistency in the mid-spray environmental compliance inspection, the project engaged the same national environmental consultant who conducted the pre-spray inspection. The objective was to assess continued adherence to USAID, WHO, and FAO standards throughout implementation. The consultant visited spray sites, monitored field operations, and surveyed storage and warehouse management practices. A post-assessment report indicated full compliance with environmental standards. The team also supported the NMCP to conduct a mid-spray inspection in the other five districts that were sprayed using Ministry of Health funds: Nsanje, Chikwawa, Mangochi, Nkhata Bay, and Karonga. The same consultant carried out the exercise with staff from the district-level offices of the national Environmental Affairs Department.

Post-Spray Activities

The project team worked to maintain environmental compliance throughout post-spray activities. First, it decommissioned operation sites by conducting a thorough inventory of the remaining commodities in satellite storage units and cleaning and separating the items into groups based on whether they were reusable. After all commodities were accounted for in a master inventory, they were transferred to main district warehouses. The team then carefully cleaned and covered the satellite stores and staging sites and dismantled surrounding fences to protect them for future use.

All material waste generated from the spray seasons was collected in the central warehouse and disposed of using facilities in compliance with requirements in the environmental impact assessment and supplemental environmental assessment. In 2011, the project incinerated a total of 37,190 empty insecticide bottles from Nkhotakota. In addition, the team assisted the

NMCP to dispose of waste accumulated in the surrounding districts at St. Gabriel's Hospital in Lilongwe. A total of 5,486 kilograms of waste was incinerated. All other waste, including PPE and packaging materials, was incinerated at Nkhotakota District Hospital. The team held follow-up discussions with the NMCP to determine next steps for the remaining insecticide. In both spray campaigns, the expiration date of the insecticide left enough time for it to be used on the next campaign.

B3. Objective 3: Strengthen capacity of NMCP and public and private sector at all levels to plan, implement, and monitor IRS operations toward the goal of long-term sustainability of IRS programs in Malawi

The project team geared its actions throughout the planning, implementation, and monitoring processes to focus on the long-term goal of sustainability. Each aspect of the campaigns was done in complete collaboration with key local partners at the national and district levels. From the initial stages of drafting the IRS campaign strategy to the incorporation of IRS in the training curricula of relevant institutions, the project worked hand-in-hand with the NMCP and district-level Ministry of Health staff to ensure that developing local capacity remained a primary focus.

Policies and Documents

Before the first spray campaign began, the key partners updated national policies and created new guidance manuals for the effectiveness and the stability of future IRS campaigns. To ensure all participants were following the same operational standards, the partners held a three-day workshop within the first few months of the program dedicated to analyzing old policies and developing new national strategies. Together, they drafted the National IRS Guidelines and developed a countrywide IRS Implementation Plan. Furthermore, they put together the first drafts of the National IRS Training Manual and the National IEC/BCC Strategy.

The National IRS Training Manual provides guidance on workshops for IRS participants and standards for the supervision and monitoring of IRS implementation. The IEC/BCC Strategy fills a gap identified in related national policies focusing on IRS; it is a handbook of recommended methods to sensitize local communities that will result in increased knowledge, and therefore increased acceptability and demand for IRS within communities. The updated National IRS Guidelines, which address obstacles, lessons learned, and best practices, will be applied to future IRS operations in Malawi. Together, these three documents strengthen the ability of the NMCP at the national level and of technical staff at the district level to implement IRS campaigns.

Training

The team also worked with key partners to develop and run technical training workshops for IRS staff, district-level staff, and national-level NMCP staff. As discussed under Objective 1, 1,884 individuals were trained in 2010 in Nkhotakota and Salima districts for technical positions, including storekeepers, data clerks, mobilizers, spray operators, team leaders, and supervisors. Of these, 90 came from the other five IRS districts supported by the Ministry of Health. In 2011, there were 885 participants in Nkhotakota alone.

As project operations shifted to concentrate on capacity building, the team held workshops for NMCP members and DHOs to prepare for the upcoming campaign. At one two-day workshop, 20 participants reviewed IEC/BCC Communication Strategy and developed action plans for the next campaign. At a procurement planning process workshop, participants discussed steps for preparing for a campaign, from geographical reconnaissance and quantification methods to procurement and transportation of commodities. The team held also one more IRS Training Manual workshop to review the most recent draft. Seven IRS district coordinators and two DHOs attended, and numerous improvements were incorporated into the manual. It was then pretested during the 2012 training and concluded in 2012.

Partnerships

To further support the focus of long-term sustainability, the project partnered with local stakeholders, including colleges, universities, and private sector organizations. The project subcontracted with Chancellor College of the University of Malawi to undertake the portion of the reconnaissance exercise involving the geo-coding of structures in Nkhotakota. This exercise helped determine the target number of structures eligible for IRS.

The project also partnered with the Malawi College of Health Sciences, the Polytechnic of the University of Malawi, and Bunda College of Agriculture to advocate for the incorporation of IRS training into their academic curricula, emphasizing that it would help develop the future leaders of IRS implementation in Malawi. The modules were completed during a four-day workshop with the NMCP, DHOs, and the Malawi College of Health Sciences; they focused on the training, management, and operations of IRS campaigns. The project also organized and facilitated a TOT workshop for 14 lecturers from all three institutions to establish a pool of personnel capable to teach the modules.

A lecturer from Bunda College of Agriculture was later contracted to facilitate an environmental compliance workshop with support from the NMCP. Though these training modules were largely developed in during Phase 1, the schools began to integrate them into their curricula during Phase 2, thereby creating a pool of experts to ensure the sustainability of IRS human resources in Malawi.

The project also partnered with private sector organizations, including the Malaria Alert Centre, which worked on entomological monitoring activities, evaluating the effectiveness of different types of insecticide. It identified Nkhotakota as the point of reference to conduct the study on the effectiveness of Actellic 50EC and performed monthly post-spray assessments in Nkhotakota and Salima. The results certified its efficacy.

Effective Monitoring for Effective Results

Results from the Malaria Alert Centre studies on entomological monitoring revealed that after two months of spraying, Actellic 50EC was still effective, with a mosquito mortality rate of greater than 83 percent.

In addition, the project initiated discussions with the private sector to support the NMCP with local resource mobilization. Consequently, the Malawi Agricultural Trading company provided the NMCP with six sprayers, six sets of overalls, and six pairs of gumboots.

The program encountered a major obstacle while preparing for the 2011 spray campaign: a fuel shortage. To address the issue, the project partnered with two private sector organizations, the Illovo Sugar Company and Total Malawi. Total Malawi provided fuel in

bulk and Illovo Sugar provided the storage facility. This arrangement ensured a constant supply of fuel was available throughout the campaign, enabling the IRS operations in Nkhotakota to take place.

B4. Objective 4: Provide regular M&E for IRS programs in Malawi

In order to ensure success, a project must routinely reflect on its performance and allow for continuous adaptation. The IRS team developed and implemented M&E and quality assurance activities to ensure all aspects of the project were efficient, effective, and adhered to high quality standards and human safety requirements. The team completed routine surveys, evaluations, and assessments; developed guidelines, manuals, and plans; established monitoring and supervisory systems and processes; and trained the participants involved.

Planning

The project developed numerous plans to support direct implementation procedures. A performance monitoring plan, drafted in November 2010, served as a roadmap for capturing high-quality data and analyzing project performance. After incorporating input from USAID/PMI, the team submitted a refined and finalized plan that specified key indicators, targets, and desired results. The team also supported the NMCP in developing and reviewing the National IRS Guidelines, the IRS Training Manual, and the IEC/BCC Strategy. Together, the partners updated and standardized the data collection tools and checklists used by IRS implementers across the districts. Project staff also collaborated with partners to analyze the technical effectiveness of different implementation methods, and worked with the Malaria Alert Centre on entomological monitoring activities to determine the effectiveness of insecticides.

The manuals provided guidance on capturing data about spraying, but the project needed an effective “information warehouse” to store it. The team developed a new database, based on Microsoft Access, to replace the Excel format used in previous spray campaigns. It stored figures and information relating to spray coverage and field training in IRS districts, and allowed for daily compilation of performance data, which was in turn used to develop weekly performance reports to share with PMI and other stakeholders. The database is now being used in districts supported by PMI and the Malawian government.

The team also developed a plan for enhanced supervision and monitoring of activities in 2010, and finalized it for use in the 2011 campaign. The plan helps spray teams adhere to standard procedures, techniques, and environmental guidelines; it provides clear lines of authority and supervision within the teams, instructs community liaisons how to provide appropriate and adequate information to household owners, and guides data collectors on how to obtain complete, accurate, and reliable spray performance data.

Monitoring and Supervision

The project team closely monitored the spraying operations and supervised field activities on a daily basis. This not only ensured environmental compliance, but also held spray operators accountable for continuously implementing an effective campaign. The project documented challenges encountered and results

Team Supervision

- 2010: Forty supervisors managed 123 team leaders who directly supervised 666 spray operators
- 2011: Supervisors responsible for 71 team leaders who supervised 355 sprayer operators.

achieved, and made corrective measures on the spot. Weekly operations review meetings were held at the district level with spray team members, district health office staff, and other stakeholders to analyze progress and address issues to promote efficiency and success.

C. PHASE 2: JULY 2012-JULY 2013

The project received a contract modification on July 22, 2012, that shifted the main emphasis from direct implementation to developing the capacity of the NMCP to facilitate and lead spray campaigns. In this new phase, the team was held to three revised project objectives, which carried them to the end of the project and led to the successful completion of one spray season by the NMCP. Initially, the campaign targeted seven districts: Nkhotakota, Karonga, Nkhata Bay, Salima, Mangochi, Chikwawa, and Nsanje. However, due to limited funds, the NMCP sprayed all but Nkhotakota. Because the project had implemented campaigns in Nkhotakota for the previous two years, there was an abundance of experienced trainers and supervisors who were able to temporarily relocate to the six districts to further support the spraying efforts.

The project organized a 10-day workshop with a human resource and international training expert in August 2012. This master trainer helped the team further develop its training skills and developed the tangible technical tools to support the NMCP. With his assistance, the team drafted instructor guides for IRS technical staff, including spray operators, mobilizers, warehouse managers, supervisors and team leaders, mosquito collectors, and data management personnel.

The project worked with the NMCP to quickly adjust and adapt prior campaign preparation methods for the 2012 campaign. Together, they facilitated environmental assessments and surveys throughout the communities. During previous M&E in direct coordination with the districts, the team developed the links between the NMCP and the districts to provide technical leadership on data collection, quality assurance, and compilation.

C1. Objective 1: Strengthen capacity of NMCP and public and private sector at all levels to plan, implement, and monitor IRS logistics and operations toward the goal of long-term sustainability of IRS programs in Malawi.

Through meetings, strategy sessions, and training, the project transferred knowledge and skills to the NMCP and the DHOs. The team used the two years of IRS campaign experience in Malawi to provide technical guidance and direction to the NMCP and district health offices; as a result, both were able to successfully conduct the spray campaign in 2012.

Planning

As preparations for the third spray season began, the project referenced the numerous policies, guidelines, manuals, and tools focusing on IRS in Malawi drafted in the first two years. Though not yet finalized, the National IRS Guidelines, IEC/BCC Strategy, and the National IRS Training Manual helped the partners develop a roadmap for campaign operations. In addition to using these tools in planning for the 2012 campaign, the partners further updated and refined them for submission. The tools have since been finalized and disseminated to the districts implementing IRS.

The project also finalized an instructional film about IRS to be used in campaign preparations. Produced by a local media consulting firm, Tenacious Multi Media, the film

features field shots and interviews with key stakeholders and beneficiaries from the 2011 campaign. It outlines training and community mobilization efforts, implementation and supervisory activities, and data collection and monitoring features. Because of the comprehensive nature of the video, NMCP and the project staff used it as an advocacy tool for IRS and as a training aid for workshops.

Community Mobilization

With policies and manuals established, the team turned its attention to gaining the support of local communities and ultimate beneficiaries. The project supported district health offices to implement social mobilization campaigns throughout the targeted districts. Basic information about the importance of IRS was shared through megaphones and radio messages, as well as in meetings with community members, their village leaders, and religious and educational institutions. The project also distributed letters that were read aloud in communities to provide further guidance about preparing for and ensuring a successful campaign.



The chief of party and a team leader discuss the spray campaign with residents of Ndamila village.

In Malawi, every community is required to establish a policing forum to help prevent and report instances of theft. The project supported the district health offices to establish partnerships with the district police stations to strengthen commodity management and to prevent insecticide pilferage. Members of the district police stations volunteered to facilitate sensitization meetings to provide further guidance to community members on how they could get involved and contribute to the success of the IRS campaigns.

Materials and Logistics

The team helped the NMCP facilitate meetings with district IRS staff to conduct a logistics assessment to determine what commodities were needed for the campaign. The project had 10,487 liters of Actellic 50EC left over from the 2011 spray season, and transferred equipment (e.g., spray pumps and PPE) to the NMCP for use in 2012. Because Actellic 50EC was successful in Salima in 2010, the project transferred it from the central storage warehouse in Lilongwe to the Salima district storage center. In 2011, the NMCP procured 4,444 cartons of Alphacypermethrin insecticide but did not use any of them; these were also transferred to the target districts for the 2012 campaign.

Due to budget constraints, however, the NMCP could purchase only enough materials for the spray operators to work in three districts at a time. As a result, the campaign was extended from three months to six months; it ended in March 2013. Salima, Nsanje, and Chikwawa were sprayed from October to December 2012, and Karonga, Nkhata Bay, and Mangochi were sprayed from January to March 2013.

In addition to assisting with the procurement of materials for the campaign, the project team provided technical assistance and guidance to the NMCP to prepare staging sites and construct and renovate soak pits and storage warehouses. Together, they rehabilitated seven main storage facilities in the six districts and completed associated environmental compliance

inspections. The team engaged an external environmental consultant to inspect the sites and verify that each met environmental regulations.

Training

Although the campaign focused on spraying three districts at a time, the partners realized there was a need for a large pool of qualified personnel. Using the National IRS Training Manual and the instructional film, the partners facilitated technical workshops to build the team of technical specialists.

Before providing individual training tailored to the districts, the partners gathered the DHOs from all six targeted districts for a four-day workshop to prepare planning and implementation schedules. The modules focused on the recruitment of seasonal workers, developing draft spray calendars, supervision and monitoring during spraying, environmental compliance, and the logistics and tracking of commodities. After the workshop, the DHOs returned to their districts to conduct five-day workshops during which they created individual implementation schedules for the campaign and shared knowledge with their district colleagues. Each district developed and finalized detailed plans and identified logistical and human resource needs.

IRS Training Guides

- TOT
- Training of spray operators
- Training of team leaders and supervisors
- Training of mobilizers
- Training of data managers and data clerks
- Training of mosquito collectors
- Training of warehouse managers and store keepers
- Training of security guards
- Management process tools

The project and NMCP partnered with Illovo Sugar Company, which participated as part of its corporate social responsibility efforts, to lead two five-day TOT training sessions for spray operators in September 2012. Training focused on topics such as malaria vector and transmission, IRS operational strategies, spraying techniques, supervision, and monitoring and environmental compliance. In addition, the project and NMCP led training sessions to develop warehouse managers and pump maintenance technicians, and held warehouse management training and data management training.

A central focus throughout Phase 2 was the sustainability of IRS training. Although the team developed training modules with the Malawi College of Health Sciences, the Polytechnic of the University of Malawi, and Bunda College of Agriculture during Phase 1, the colleges began integrating them into their curriculum during the 2012 academic calendar.

The training of lecturers from the Malawi College of Health Sciences and the Polytechnic of the University of Malawi took place in June 2012. In response, the project supported the NMCP to organize a training of pre-service students on IRS management and operations in September. Two five-day workshops were held for 32 students from the Malawi College of Health Sciences and 24 from the Polytechnic of the University of Malawi to equip them with essential knowledge and skills for IRS and to build a pool of qualified individuals and a sustainable IRS workforce. Lecturers from the colleges who had been trained as IRS trainers led the workshops, with support from NMCP facilitators. At the end of the workshop, the project donated six sets of PPE and sprayers to each school for future training. Following these efforts, and with support from the project team and the NMCP, Bunda College trained 42 students on environmental compliance with IRS in March 2013.

Post-Spray Activities

The project staff assisted the NMCP to conduct all post-spray activities. This included taking stock and conducting a thorough inventory of all commodities in the district warehouses. Once all materials had been removed from the storage and operational sites, the project gave technical direction to the NMCP on the decommission process.

Because of delays in data flow from the field, data entry and analysis continued after the end of spraying. The team recruited temporary data entry clerks and provided further supervisory support to Nsanje, Chikwawa, Salima, and Mangochi districts to speed up the entry and analysis processes and compile coverage performance reports.



Spray operators clean their equipment at the end of the day in Mangochi district.

C2. Objective 2: Provide technical assistance on all aspects of the Ministry of Health/NMCP IRS programs so that they are implemented in an environmentally sound manner, in compliance with all Malawi and U.S. government environmental regulations and best practices.

The project provided technical guidance to the NMCP to adhere to Malawi and U.S. government environmental regulations and best practices. Environmental compliance in IRS is essential to prevent human exposure to and environmental contamination from insecticide. The partners conducted field visits to spray operational sites to inspect storage warehouses, staging sites, and compliance of PPE utilization. Furthermore, an external environmental consultant conducted pre- and mid-spray inspections and compiled reports, and partners provided ongoing supervision on compliance.

Preparations

In preparation for the spray campaign, the partners ensured all project sites and materials were in compliance. This included renovating buildings for space and completing repairs on previously used materials.

Identification and renovations of storage facilities. In collaboration with the district health offices and the NMCP, the project evaluated all prospective storage facilities in targeted districts. Staff completed field visits to district warehouses and the satellite storage units throughout the districts. Based on priority and available funding, the team financed renovations on three main storage units and 11 of 41 satellite storage facilities. Simultaneously, the partners conducted storage facility assessments to verify the capacity of each to hold materials before they were delivered.

Staging sites. As minor renovations to storage facilities were underway, the NMCP turned its attention to the staging sites. An assessment of 18 sites was completed before the first three districts were sprayed in 2012. The NMCP determined that no new staging sites would need to be constructed: Those from the previous campaigns were intact and reusable. Minor renovations, including strengthening fences to prevent entry of unauthorized personnel, were carried out.

Pre- and mid-spray inspections. A consultant conducted pre- and mid-spray environmental compliance inspections for the first three districts and completed a mid-spray inspection for the second set of districts. The consultant assessed the storage facilities and staging sites before the campaign began and identified minor shortfalls. The project took corrective measures based on the consultant's recommendations before starting to spray. Although the report noted there were not enough masks for spray operators and that they were irregularly supplied to the sites, the team worked with the NMCP to mitigate and improve this throughout the campaign.

Training

The NMCP facilitated training for staff on environmental compliance in advance of spraying. It held a one-day workshop in July with 26 participants from all six districts, including district IRS coordinators, IEC/BCC officers, and district malaria coordinators. The workshop also reviewed data collection forms and supervisor checklists with the participants so they could teach the IRS participants how to utilize the tools during implementation.

In addition, a three-day environmental compliance assessment workshop took place prior to the campaign. The project worked with an external consultant from the Bunda College of Agriculture to facilitate the workshop, which focused on quality assurance and standardization. The event drew participants from the six IRS implementing districts, including environmental district officers and EHOs. Centered on the supervision and monitoring of environmental compliance before, during, and after IRS campaigns, the workshop featured theory and practice modules. The facilitators involved participants in actual operations inspections. Working alongside a technical expert, the participants developed the technical knowledge and on-the-ground understanding of how assessments are conducted.

Incorporating training into university curriculum. The team worked with the lecturers from the Department of Environmental Health at the Polytechnic of the University of Malawi to incorporate training of IRS into the pre-service training curriculum, relying on their breadth of knowledge in environmental compliance and facilitation of technical workshops. Lecturers trained 32 students in their final year on the theoretical and practical knowledge and skills of IRS management and operations.

The course consisted of classroom and practice modules, including a field visit to a staging site. Both pre- and post-test evaluations were administered to measure student progress. With positive feedback and observable success, the project also provided similar technical support by organizing the same workshop for 24 final-year students at the Malawi College of Health Sciences. This not only provided students with additional technical skills but contributed to the capacity building efforts in establishing a sustainable IRS workforce for future implementation.

Post-Spray Activities

As with each previous spray season, the project emphasized the importance of ensuring complete environmental compliance once the campaign concluded. Operational sites were cleaned and vetted, PPE was washed and divided into usable and non-usable piles, and leftover commodities were counted and evaluated.

Operational sites. The NMCP led the post-spray activities with assistance from project staff. Together, they oversaw the inspection and cleaning of all operational sites, including storage facilities and related IRS equipment, and helped to transfer the equipment to the central NMCP storage unit in Nkhotakota, where it could be accessed for future use. The NMCP kept an inventory of all the commodities during the transfer to the main warehouse.

Leftover materials and commodities. The project supported the NMCP by transporting and disposing the waste from the Actellic 50EC used in Salima to the St. Gabriel's Mission Hospital incineration facility in December. A total of 1,746 kilograms of waste, comprising empty bottles and packaging materials, were disposed.

C3. Objective 3: Provide technical assistance for regular monitoring and evaluation of IRS programs in Malawi

The NMCP referenced policies and guidelines, workshops, and systems in preparation steps throughout the 2012 spray season. These project-developed tools served as checks and balances to ensure the project would successfully meet the established goals.

Policies and Guidelines

The project submitted an updated performance monitoring plan in December 2012, incorporating information from the contract modification from earlier in the year. The team also finalized the capacity building tools and guides to help the NMCP continue to develop a trained pool of IRS personnel. These tools aimed to develop data managers, data clerks, and mosquito collectors, and inform M&E staff on management process tools to ensure standardized gathering, collection, and recording of information. Furthermore, the project supported the NMCP in utilizing the supervisory and monitoring plan developed before the 2011 campaign to ensure spray teams adhered to standardized, campaign-wide procedures, techniques, and environmental compliance guidelines.

Community Mobilization

Before spray campaigns, community mobilizers visited villages to meet with community members to discuss the upcoming campaign. The project worked with the district teams to guide them on how to conduct sensitization campaigns and followed up with the mobilizers to ensure the accuracy of messages disseminated to the communities.

Training and Supervision

The project reviewed, finalized, and standardized the use of training materials and guides in 2012. In addition, it organized and supported training sessions for trainers of spray operators, IRS data collection, analysis and reporting, stores management, and environmental compliance. Fifteen EHOs were trained on basic malaria entomology, giving them instruction on how to collect and analyze mosquitoes for malaria vector control programs. The team procured and provided basic entomology kits for the training session and future entomological monitoring in each district.

Training courses on IRS data management for health management information system officers and data clerks from the six IRS implementing districts occurred prior to the start of the campaign. Hosted by the NMCP, in collaboration with project staff, the courses aimed to

improve the quality of data, ensure adequate documentation, and increase the accountability of IRS programs to stakeholders. The first workshop for the officers provided the knowledge and skills on how to conduct training on IRS data management and how to supervise and monitor data management during a campaign. At the second course, participants worked with data clerks to review IRS data collection forms, and learn how to detect errors on completed forms and to the appropriate corrective measures to ensure accuracy and completeness. The officers who participated in the initial training facilitated the training of the data clerks.



A team leader observes a spray operator preparing to spray houses in Ngabani Village.

The project staff facilitated training on environmental

compliance inspections for environmental district officers and EHOs from the seven IRS implementing districts. The training provided them with knowledge and skills to evaluate compliance with international requirements and to support their districts throughout the campaign. The project also trained the storekeepers on storage management, environmental compliance, and commodity management and tracking to ensure accountability at all levels.

In collaboration with the project team, the NMCP conducted routine site visits during the campaign to assess whether participants were adhering to proper spraying techniques. During the visits, they discussed the importance of collecting reliable data and accurate reporting with spray teams. Project staff guided the DHOs in facilitating weekly progress reviews with district-level spray teams, providing spray operators with an environment to share issues faced and lessons learned, evaluate progress, and determine viable solutions.

Commodity Logistics

In order to keep track of equipment and commodities as they were moved between districts and within villages, the team provided guidance to the districts on how to maintain proper store organization, how to accurately manage commodity movement, and how to ensure proper waste management. In collaboration with the NMCP, the project supported the DHO teams in developing tools to track the movement and supply of commodities and allocation of spray teams. The project also remodeled storage facilities in all six districts to ensure safety and proper storage in compliance with the requirements for pesticide storage.

Data Collection and Entry

As data managers and clerks were being trained, project staff reviewed the database for accuracy made minor changes. Before the 2012 campaign began, the project further supported district health offices by installing the database in the IRS implementing districts to facilitate data entry and analysis and generation of performance reports. The project conducted workshops to teach staff how the database worked, ensuring the NMCP and district health office staff were able to support its use.

The project also reviewed and pre-tested M&E data collection and analysis tools, including spray operator data collection forms, supervisory checklists, and commodity accountability forms. The team conducted site visits throughout implementation with the NMCP to monitor if the forms were being used appropriately and if they accurately captured information. Further guidance was provided to district teams when data was entered into the system.

Because of delays in data flow and entry, entry and analysis continued after spraying ended. The project supported the district health offices to recruit temporary data entry staff and provided further supervisory support to teams in Nsanje, Chikwawa, Salima, and Mangochi to speed up the data entry and analysis processes and compilation of coverage performance reports.

CHAPTER II. DATA AND INDICATORS

Exhibit 4 shows progress toward targets on the approved performance monitoring plan from December 2012 during the life of the project. As the data shows, certain indicators proved more relevant at the beginning or toward the end of the project.

Exhibit 4. Progress Toward Targets, Life of Project

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
PHASE 1. The indicators below remained applicable only throughout Phase 1. Indicators that continued during both phases are listed under Phase 2.											
IR 1: IRS Planning, Operations, and Logistics for Implementation Strengthening											
1. Percentage of targeted structures in specified districts fully sprayed (Contract Output: Fully spray 85% of targeted households in districts)	An operations process indicator that shows performance coverage: structures sprayed as compared to structures found.	%	N/A	104,099	93.50%	82,629	94.0%	N/A	N/A	N/A	N/A
	An operations process indicator that also shows performance coverage: structures sprayed as compared to estimated target structures.	%	N/A	97,329	72.60%	88,490	87.75%	N/A	N/A	N/A	N/A
2. Number of people residing in houses sprayed/number of people protected against malaria with IRS	Refers to people reported as residing in sprayed structures and protected from mosquito bites.	Number	N/A	670,000	364,349	379,127	321,919	N/A	N/A	N/A	N/A

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
3. Number of structures sprayed with residual insecticide with U.S. govt. funds	Refers to house units or structures where people sleep, including group dwelling quarters (e.g., schools dormitories, hospitals, barracks) but excluding stores, churches, shops, classrooms, and other buildings found in a family compound.	Number	N/A	134,000	97,329	88,490	77,647	N/A	N/A	N/A	N/A
4. Number of districts sprayed in each spray round	In FY 2011, the target districts were scaled back to one. In FY 2012, SOW shifted from direct implementation to capacity building of the NMCP.	Number	N/A	2	2	1	1	N/A	N/A	N/A	N/A
5. National IRS Guidelines developed with the NMCP	Guidelines to support standard implementation of IRS activities in Malawi	N/A	N/A	0	0	1	1 (Draft)	1	1 (Revised Draft)	1	1 (Final)
IR 4: Provide Regular Monitoring and Evaluation for IRS Programs in Enhanced Coverage											
6. Number of IRS materials printed and disseminated to target communities	Brochures	Number	Type	230,000	253,000	115,000	62,965	N/A	N/A	N/A	N/A
	Posters			0	800	0	180	N/A	N/A	N/A	N/A
	Banners			0	14	0	0	N/A	N/A	N/A	N/A
	Door stickers			0	253,000	0	104,329	N/A	N/A	N/A	N/A
	T-shirts			0	220	0	0	N/A	N/A	N/A	N/A
	Polo shirts			0	25	0	0	N/A	N/A	N/A	N/A
	Caps			0	220	0	0	N/A	N/A	N/A	N/A

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
7. Number of people reached with IRS messages)	Based on number of houses reached by mobilizers where they have discussions and distribute information, education, and comms. materials during door-to-door mobilization campaign. Extrapolated based on avg. number of people per household minus number of children younger than 5.	Number	N/A	335,000	446,000	379,127	259,887	N/A	N/A	N/A	N/A
PHASE 2: The indicators and data listed below reflect those that remained applicable throughout the life of the project.											
IR 1: Capacity of NMCP and public and private sector strengthened at all levels to plan and monitor IRS logistics and operations toward the goal of long-term sustainability of IRS programs in Malawi.											
8. Number of TOT workshops facilitated	Training workshops for district health office staff to build pool of IRS trainers.	Number	Cadre, gender	2	2	1	1	3	3	N/A	N/A
9. Number of personnel trained in malaria with U.S. govt. funds (segregated by gender)**	Refers to NMCP staff, district health and environmental health staff trained through in-service training on various skills to deliver IRS activities.	Number	Cadre, gender	991 (Two districts)	1,992 (M=1,418 F = 574)	1,000 (One district)	943 (M=605 F = 338)	600 (Seven districts)	765 (M=597 F=168)	N/A	N/A
10. Number of institutions incorporating IRS in their curricula	Institutions that review their pre-service training curriculum to incorporate IRS.	Number	N/A	N/A	N/A	3	3	3	3	N/A	N/A

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
11. Number of private and public sector organizations involved in IRS	Private and public institutions that contribute to the malaria control interventions technically or financially as part of corporate responsibility.	Number	N/A	N/A	N/A	1	1	1	5	N/A	N/A
12. National curriculum for IRS developed in collaboration with the NMCP	Guidelines to support standard implementation of IRS activities in the country.	N/A	N/A	0	0	0	0	3	3	N/A	N/A
IR 2: Environmental Compliance with all Malawi and (USG) environmental regulations and best practices.											
13. Number of storage facilities and stores renovated	Facilities to ensure proper secure storage of the insecticide and disposal of waste in accordance with national, FAO, and WHO guidelines.	Number	Theme and number	12	14	9	9	12	12	10-15	11
14. Number of environmental compliance assessments conducted	Pre-, mid-, and post-spray environmental compliance assessments in accordance to local and international environmental laws and WHO guidelines.	Number	Number and purpose	2 (pre- and mid-spray)	N/A	N/A					
15. Number of staging sites constructed	The soak pits and wash areas at each operational site used to facilitate progressive rinsing.	Number	N/A	12	12	7	7	N/A	N/A	N/A	N/A

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
16. Number of "model" staging sites constructed	The model soak pits constructed at each of the IRS collaborating institutions to offer practical training.	Number	N/A	N/A	N/A	N/A	N/A	2	2	N/A	N/A
17. National guidelines for disposal of insecticide waste products and package material.	Guidelines for management of waste products and package material.	Number	N/A	N/A	N/A	N/A	N/A	1	1	N/A	N/A
IR 3: Regular M&E for IRS Programs in Malawi Enhanced											
Data management system											
18. Number of IRS IEC/BCC reviews and assessments conducted	Reviews carried out before and after a spraying round to assess community perceptions of and receptiveness to IRS. Reviews done jointly with partners and with communities.	Number	N/A	1	1	1	1	2	2	N/A	N/A
19. IRS data quality control and quality assurance system established	Refers to tools for collection, storage, and analysis of IRS data and commodity tracking. Includes forms, checklists, database, and charts.	N/A	N/A	1 Develop forms, checklists & database	1 Forms, checklists & database developed and used	1 Revise Forms, checklists and database.	1 Forms, & checklists revised; new database developed and piloted.	1 (Revise forms & database)	1 (Forms & database Revised)	N/A	N/A

Indicator	Definition	Unit of Measure	Disaggregated by	2010 Baseline Target	2010 Actual	2011 Target	2011 Actual	2012 Target*	2012 Actual*	2013 Target	2013 Actual
20. Number of reports completed	Quarterly and annual project performance reports for submission to PMI/USAID.	Number and content	Focused activity; qualitative and quantitative.	4 quarterly and 1 annual	1 quarterly and 1 end of project	1 quarterly and 1 end of project					
Entomology (vector mapping)											
21. Number of entomological kits procured	Refers to basic kits for entomological monitoring of vector density, insecticide decay on sprayed surfaces after the spray campaign or vector susceptibility to insecticide, and changes in vector behavior.	Number	Number and purpose	0	0	0	0	7	7	N/A	N/A

*The 2012 indicators were modified when the project scope of work shifted to capacity building. This led to some indicators no longer being applicable, as shown with “N/A.”

**The “Number of personnel trained in malaria with U.S. government funds (segregated by gender)” indicator includes all cadres of personnel trained by the project as shown in Exhibit 5 (next page).

Exhibit 5. Trained Personnel

Training Type	2010		2011		2012		Total
	Male	Female	Male	Female	Male	Female	
TOT for spray operators	87	3	17	3	93	5	208
TOT for Malawi College of Health Sciences and Polytechnic of the University of Malawi lecturers	0	0	0	0	10	2	12
Spray operations	505	161	211	144	0	0	1021
Supervision for team supervisors	46	3	1	36	0	0	86
Supervision for team leaders	96	26	51	20	0	0	193
TOT for IEC/BCC mobilizers	20	4	19	1	21	2	67
IEC/BCC for mobilizers	533	351	210	103	0	0	1,197
Insecticide poisoning preparedness for clinicians	36	16	20	4	0	0	76
Data management for supervisors and data entry clerks	3	5	13	10	14	13	58
Data management TOT for supervisors	0	0	0	0	7	0	7
Geographic Reconnaissance data management for enumerators and supervisors	0	0	25	11	0	0	36
Warehouse management and pump maintenance	34	5	20	4	60	30	153
Warehouse management TOT	0	0	0	0	20	5	25
Mosquito collection for EHOs	0	0	0	0	22	5	27
IRS management and operations for Malawi College of Health Sciences and Polytechnic of the University of Malawi students	0	0	0	0	37	19	56
Environmental compliance inspection for EHOs and DHOs	0	0	0	0	11	2	13
Environmental compliance for Bunda College students	0	0	0	0	42	53	95
National implementation planning	0	0	0	0	27	2	29
District micro-planning	58	0	18	2	233	30	341
Total Trained	1,418	574	605	338	597	168	
Total Trained (Male and Female)	1,992		943		765		

M&E CHALLENGES AND SOLUTIONS

Accessibility of Targeted Villages

Challenge. Some areas in the districts were difficult to access due to bad terrain and poor road conditions. In Lupachi, Nkhotakota district, for example, some areas could not be reached by a car or motorcycle. Spray operators had to walk long distances, sometimes taking up to six hours, to reach structures for spraying and/or data collection. As a result, most spray operators were not able to meet their daily target of 10 structures and, on average, sprayed about eight structures per day.

Solution. Spray operators were recruited from Lupachi because, as community members, they were used to the difficult terrain and knew the area well. Teams also camped in the hard-to-reach areas to be close to their assigned spray sites the following day.

IRS Data Management

Challenge. The nature of a spray campaign demands generating data on a daily basis for immediate analysis. This helps determine coverage trends and tracks insecticide utilization rates to inform decision-making. During the 2012 spray campaign, the districts experienced challenges in rapid movement of completed data forms from the field to the district hospitals for entry and analysis. This culminated in data piling up at operational sites for days. This was due largely to inadequate transport for supervisors to operational sites, because the supervisors carried the forms to entry points as they carried out routine supervisory trips.

Another challenge was that the data entry staff were not working full time on IRS data because they had other hospital responsibilities. As a result, their time was divided among the various hospital data management functions, thereby leading to inadequate time allocated for data entry. This led to delays in data entry, analysis, and reporting of IRS performance to inform early decision-making.

Solution. The project hired additional occasional labor to assist with data entry throughout the districts.

Insecticide Calculation

Challenge. In 2010, the project staff had no reliable figures of sprayable structures or surface areas in the targeted districts to use during the planning phase. The initial data available was determined to be inaccurate, resulting in an under-quantification of insecticide, leading the team to cover only a portion of the structures targeted by the malaria operational plan. Because additional insecticide could not be procured before the onset of the rainy season, the spray season ultimately ended early.

Solution. In anticipation of the 2011 spray campaign, the project conducted geographic reconnaissance exercises and geo-coding activities to measure the size of sprayable surface areas and the number of structures in the target area. This assessment was used for the quantification of insecticide and other IRS resources for the 2011 campaign and beyond.

CHAPTER III. BEST PRACTICES

Materials and Resources

- *Procure early.* Initiate the procurement process in May, after a needs assessment is conducted based on the geographical reconnaissance. Identify and procure appropriate and adequate equipment and supplies for operations to ensure high-quality and timely spraying. These actions will prevent any delays in spraying due to late shipments of materials.
- *Partner locally.* When faced with a logistical obstacle, try to partner with local firms that can support continued operations. Malawi faced a countrywide fuel shortage, which affected the supply and price of the fuel for IRS implementation. In response, the project partnered with two local firms, Illovo Sugar Company and Total Malawi, for bulk fuel supply and storage. This partnership helped mitigate the effect of the shortage on the campaign.
- *Establish an adequate number of operational sites.* Ensure proper logistic assessments and pre-spray inspections are completed well in advance of the campaign to allow time for adjustments and corrective measures. These assessments will help the team determine if a proper number of operational sites are located within reasonable distances of the targeted areas. Daily coverage of structures will increase, because fuel, transport, and occasional labor costs will decrease.
- *Identify storage facilities early.* Collaborate with district officials to identify and renovate unused government structures to make them available for use in IRS campaigns. This will lead less administrative, labor, and financial burden on staff to renovate inadequate structures to bring them up to regulation code.
- *Hire locally.* Build the capacity of and train spray operators in the targeted village to spray the structures in their community. This leads to greater community support and decreased operational costs on items such as fuel, transportation, and occasional labor, because the reduced commute would enable the spray operators to have more time to spray targeted structures.

Community Mobilization

- *Conduct mobilization campaigns early.* Utilize a well-planned strategy and conduct intensive mobilization campaigns as early as possible, involving village heads and pre-existing community structures. The full involvement of village leaders will encourage the community to participate and to fully comply with procedures. Saturate communities with information well in advance to allow them time to respond. Mobilizers then have a greater ability to react and counter myths and misconceptions in advance of the campaign, further preventing pockets of resistance. In addition, it is important to diversify the avenues through which IRS information is shared. Community gatherings and door-to-door interactive discussions are just as important as radio announcements and vibrant posters with catchy slogans.

- *Ensure household preparedness.* Intensify community sensitization campaigns to ensure that mobilizers and team leaders inspect the targeted structures before the spray operators arrive. Some families did not understand that they had to remove all items from their households before spraying could begin, which delayed implementation. Incorporating time in community mobilization campaigns to speak with community members on this topic leads to smoother implementation.

Budget

- *Budget for unforeseen circumstances.* Put mechanisms in place for automatic adjustments of costs in view of unforeseen economic circumstances and subsequent pricing changes. Malawi experienced a currency devaluation of 10 percent in August 2011 and a further 49 percent devaluation in May 2012. The project adjusted staff salaries through a one-time cost-of-living adjustment in an effort to curb the negative impact on employees.

CHAPTER IV. FINANCIAL OVERVIEW

Please see attachment.

ANNEX A. SUCCESS STORIES

Please see attachment.

ANNEX B. LIST OF IRS MATERIALS PRODUCED

1. IRS Guidelines
2. IRS Training manual
3. IRS Communication Strategy
4. IRS TOT Training
5. Data Management Training
6. Spray Operator Training
7. Mosquito Collectors training
8. Mobilizes and Team Leader Training
9. Warehouse Manager and Security Guard Training
10. Training Handouts and IRS Management Tools
11. Malawi IRS Budgeting Template

ANNEX C. IRS PLANNING PROCESS

Please see attachment.

ANNEX D. IRS IMPLEMENTATION PROCESS

Please see attachment.

