



INDOOR RESIDUAL SPRAYING FOR MALARIA CONTROL

Malawi IRS Activity Annual Report

October 1, 2011 – September 30, 2012

Indoor Residual Spraying 2 (IRS2) IQC No.GHN-I-00-09-00018-00
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ACRONYMS

ACT	Artemisinin-based Combination Therapy
BCC	Behavior Change Communication
CDC	U.S. Centers for Disease Control and Prevention
COP	Chief of Party
COTR	Contracting Officer's Technical Representative
EAD	Environmental Affairs Department
DC	District Coordinator
DEHO	District Environmental Health Officer
DCGL	Dwangwa Cane Growers limited
DHMT	District Health Management Team
DHO	District Health Office
EIA	Environmental Impact Assessment
EHO	Environmental Health Officer
EMMP	Environmental Mitigation and Monitoring Plan
FY	Fiscal Year
GIS	Geographical Information System
GOM	Government of Malawi
GPS	Global Positioning System
GR	Geographical reconnaissance
HSA's	Health Surveillance Assistants
IE&C	Information, Education, and Communication
IQC	Indefinite Quantity Contract
IPTp	Intermittent Preventive Treatment of Malaria during Pregnancy
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Bed nets
IVCC	Innovative Vector Control Consortium
KRA	Key Result Area
LLIN	Long-Lasting Insecticide Treated Nets
MAC	Malaria Alert Center
MOH	Ministry of Health
MOA	Ministry of Agriculture
MOP	Malaria Operational Plan
NMCP	National Malaria Control Program
PIR	Project Intermediate Result
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
RBM	Roll Back Malaria
SEA	Supplemental Environmental Assessment
SO	Strategic Objective
SOP	Standard Operational Procedures
STTA	Short-Term Technical Assistance
TOT	Training of Trainers
USAID	United States Agency for International Development
WHO	World Health Organization
WHOPES	World Health Organization Pesticide Evaluation Scheme

1.0 Introduction

The President's Malaria Initiative (PMI) supported the Ministry of Health (MoH) in 2007 in exploring the feasibility of introducing indoor residual spraying (IRS) as a malaria prevention strategy in Nkhhotakota district, Malawi. PMI successfully piloted three rounds of spraying in Nkhhotakota from 2007 – 2009. Using the lessons learned from the pilot studies, the MoH scaled up IRS implementation in 2010 to six highly endemic districts along the lakeshore and in the Shire valley. Chemonics International was awarded a three-year Task Order Contract by USAID Malawi for the implementation of the Malawi IRS Activity effective July 12, 2010. Under this contract, Chemonics implemented IRS in Nkhhotakota and Salima districts in 2010. However, due to financial constraints in 2011, IRS was only implemented in Nkhhotakota district the following year.

This report covers the progress made over the period from October 1, 2011 through September 30, 2012. The report begins by presenting a summary of the accomplishments and results and then gives an in-depth analysis of progress towards the achievement of program objectives. The report further discusses the major challenges encountered and the solutions that were identified and implemented to overcome them. Lastly, this report highlights lessons learned, success stories, and recommendations for future IRS programming.

1.1 Project Details

Project name	Malawi Indoor Residual Spraying (IRS) Activity
Reporting period	October 1, 2011 – September 30 2012
Project Duration	3 base years, 2 option years
Evaluation Dates	None
Person Responsible	Chief of Party (COP)
Project Objective	To contribute towards reducing malaria related mortality by 50%

1.2 Executive Summary

The Malawi IRS Activity successfully completed implementation of the 2011 spray season and registered a number of achievements during the planning, implementation, and review stages of the second year of the project period from October 1, 2011 to September 30, 2012. During the third quarter of 2012, Malawi IRS's scope of work shifted from direct IRS implementation to capacity building of the MoH in IRS operations and management. In view of this development, Chemonics conducted consultative meetings with the PMI Malawi team and the National Malaria Control Program (NMCP) to identify priority areas and implemented a number of activities aiming to strengthen the capacity of NMCP and MoH in implementing IRS in the seven IRS districts.

Spray campaign planning and implementation: Chemonics procured 47,508 liters of insecticide (Actellic 50 EC) and pre-positioned it in the district storage facilities in readiness for the 2011 spray campaign in Nkhhotakota. The project successfully implemented the pre-spray phase activities, including the rehabilitation of storage and washing facilities, procurement of transport for the operations, and pre-positioning of the equipment and commodities to the designated seven spray operation sites. The pre-spray activities also included pre-spray environmental compliance inspection, pregnancy testing, and mapping of ecologically sensitive areas along the forest, game reserves and water bodies. In collaboration with NMCP and DHO, Chemonics organized and facilitated joint planning and training workshops for 885 IRS implementers in preparation for the 2011 spray operations, which included spraying techniques, IEC/BCC, supervision and data management, and environmental compliance to enhance environmental compliance and human safety. In partnership with various stakeholders, Chemonics supported the DHO

by conducting spraying and closely supervised and monitored the IRS activities. The project sprayed 77,647 (94 percent) of the structures reached by the spray operators and 87.7 percent of the 88,490 target structures, protecting 321,919 residents, of which 62,032 (19.3 percent) were children less than 5 years old and 8,397 (2.6 percent) were pregnant women. The project utilized a total of 37,190 liters of Actellic 50 EC to treat the surfaces of the 77,647 structures, a ratio of 2.08 structures to one liter.

Post-spray phase: The project incinerated a total of 37,190 empty plastic insecticide bottles weighing 3,347 kg at St. Gabriel's Hospital, Namitete in Lilongwe as well as a total of 2,410 kg worth of other contaminated materials at Nkhotakota District Hospital. As all seven spray operation sites were decommissioned, the commodities and equipment were moved from the satellite storage facilities to the district store, and the stores were cleaned and reverted back to the owners. Chemonics, in collaboration with the DHO, conducted a community beneficiary satisfaction review to assess community perceptions on the IRS campaign. The results indicated that the majority of the respondents (91.7 percent) appreciated the 2011 spraying operations, citing it as the best campaign they had witnessed. They also reported that spraying had immediate visible effects on mosquitoes, that there fewer incidences of malaria in comparison to previous years, and that they were happy with the conduct of mobilizers and spray operators.

Capacity building of the MoH and NMCP to implement and sustain IRS: Chemonics places major emphasis on building the capacity of NMCP and MoH staff to implement IRS in the seven IRS target districts. Project staff assisted district-level MoH staff in conducting training workshops to equip the MoH staff with knowledge and skills on IRS operations, environmental compliance, post IRS beneficiary satisfaction review, behavior change and communication, commodity management, data management, and program supervision and monitoring. Chemonics, in collaboration with NMCP, also reviewed and finalized several national the IRS Policy Guidelines, the IRS Training Manual and the national IEC/BCC Strategy.

In addition to the MoH capacity building initiatives above, the project worked with the NMCP on an exit strategy that ensures IRS sustainability in Malawi. In collaboration with the Malawi College of Health Sciences, and the Polytechnic of the University of Malawi, the team worked to develop IRS modules that were incorporated in the curriculum for both the pre-service Environmental Health Assistants training and the Environmental Health Officers training, respectively. The training modules cover IRS management and operations and aim to establish a solid IRS managerial and operational foundation for the students. Following the incorporation of IRS training modules into the curricula, Chemonics organized and facilitated Training of Trainers for twelve lecturers from Malawi College of Health Sciences and the Polytechnic of the University of Malawi in IRS operations and management. This training helped establish a pool of personnel capable of conducting training of preservice students in IRS responsibilities, thereby sustaining IRS human resources in Malawi.

Challenges: The challenges that the project faced included: resistance by beneficiaries to have their houses sprayed; fuel shortage during the 2011 IRS campaign resulting in a two week delay in starting the campaign; disposition of remaining Actellic 50 EC; change of project scope of work; and devaluation of the Malawi Kwacha. Chemonics developed innovative solutions to address the challenges. To address the challenge of resistance by beneficiaries, the project worked in collaboration with the DHO and community leaders to intensify implementation of IEC activities to convince communities to accept their structures to be sprayed. This required frequent visits in to the communities to meet with local and district leaders. Although this was time consuming, it helped convince some community members to allow spraying of their structures. To address the fuel shortage, Chemonics and the DHO partnered with Illovo Sugar Company and Total Malawi for bulk supply and storage of fuel. For the remaining Actellic, Chemonics and NMCP agreed to use the insecticide to spray part of Salima district during the 2012 spray campaign. In the development of the new scope of work, Chemonics engaged NMCP, USAID, and PMI

in a series of consultative discussions to obtain clear definitions for roles and responsibilities. This led to the identification of priority areas for the revised scope of work and the later development of a revised work plan for the period January 2012 to July 2013. Chemonics further organized a capacity building workshop for Malawi IRS project staff to review and develop materials required to adequately provide technical support to the NMCP in the new capacity building role. In response to the currency devaluation, Chemonics engaged the PMI/USAID in reviewing the options, and following guidance from USAID, staff salaries were adjusted.

Lessons learned: The project documented and shared major lessons learned during the period under review. Notable lessons learned include successes made through private partnerships that helped to solve the fuel shortage; joint planning, implementation, monitoring and supervision with DHO staff which was instrumental for achieving high IRS coverage, building systems for program ownership, and sustainability; integration of mass sensitization through the radio and community meetings and door-to-door interactive discussions that resulted in high community response to the messages and IRS acceptance; and the development and use of improved data tools (forms, checklists and database) that enabled IRS implementers to collect and analyze data to produce timely performance reports to inform program decisions.

The lessons learned from the 2011 IRS campaign and capacity building interventions, along with the experiences from previous project initiatives, will be used to improve future programming and decision making for effective IRS campaigns towards the overall goal of the Malawi Malaria Strategic Plan (2011 – 2015), that aims to achieve to reduce malaria morbidity and mortality by half in Malawi by 2015.

1.3 Project Achievements

The Malawi IRS Activity registered several achievements during the year under review. The major project achievements included the following:

Spray Campaign Planning and Implementation

- Timely procurement of 47,508 liters of insecticide (Actellic 50 EC) from Arysta Life Sciences and subsequently pre-positioned it to the district storage facilities in readiness for the 2011 spray campaign in Nkhotakota.
- Successfully implemented the pre-spray activities, including rehabilitation of storage facilities and staging sites, procurement of transport for the operations, pre-positioning of the equipment and commodities including the PPE to the designated seven spray operation sites in Nkhotakota.
- Built the capacity of the MoH through joint planning and training in preparation for 2011 spray operations. This assisted the program to have adequate numbers of trained staff for IRS implementation, monitoring and supervision.
- Implemented mitigation activities to enhance environmental compliance and human safety to prevent human exposure, accidental environmental contamination and to ensure accountability of commodities. These activities include pre-spray environmental compliance inspection, pregnancy testing for all female participants, partnership with the district Environmental Affairs Department in mapping of ecologically sensitive areas along the forest, game reserves, and bodies of water that were to be excluded from spraying, training of various cadres of IRS implementers in environmental compliance, and community mobilization and sensitization for IRS, to increase the beneficiary knowledge on IRS and environmental compliance and human safety, thereby reducing human exposure and increasing acceptability and uptake.
- Strengthened partnerships with various stakeholders to provide support to the IRS activities. The stakeholders included: the district level department of community development, NMCP, Illovo Sugar Company, Total Malawi, Dwangwa Cane Growers Limited (DCGL), Nkhotakota District

Assembly, Nkhotakota community radio, local leaders (chiefs and religious leaders) and Christian Health Association of Malawi (CHAM).

- Strengthened quality control in order to comply with best management practices in IRS interventions through training, logistics management, supportive supervision and monitoring at all levels.
- Intensified IRS supervision, focusing on spraying operations, environmental compliance, data management, waste management processes, and strengthening systems for the management of insecticide poisoning.
- Sprayed 77,647 (94 percent) of the structures reached by the spray operators and 87.7 percent of the 88,490 target structures, protecting 321,919 residents, of which 62,032 (19.3 percent) were children less than five years old and 8,397 (2.6 percent) were pregnant women.
- Utilized a total of 37,190 liters of Actellic 50 EC to treat the surfaces of the 77,647 structures, giving a ratio of 2.08 structures to one liter.

Post-Spray Phase

- Incinerated a total of 37,190 empty plastic insecticide bottles weighing 3,347 kg at St. Gabriel's Hospital, Namitete in Lilongwe from February 6-10, 2012 and other contaminated materials weighing a total of 2,410 kg at Nkhotakota District Hospital.
- Decommissioned all seven spray operation sites, moved all the commodities and equipment from the seven satellite storage facilities to the district store, cleaned the stores and reverted the buildings back to the owners. The soak pits and washing bays were covered with plastic sheeting and dirt to preserve them for re-use in subsequent spray campaigns.
- Trained seven DHO staff (four interviewers, one data entry clerk and two supervisors) for two days on how to conduct a community beneficiary satisfaction review.
- Chemonics in collaboration with the District Health Office conducted a community beneficiary satisfaction review between January 24 and February 01, 2012. The review showed the majority of the respondents (91.7 percent) expressing appreciation of the 2011 spraying operations, citing it as the best campaign they had experienced. They also reported that spraying had immediate visible effects on mosquitoes, there were fewer incidences of malaria in comparison to previous years, and that they were happy with the conduct of mobilizers and spray operators.
- Concluded the Geographical Reconnaissance (GR) consultancy with Chancellor College of the University of Malawi and submitted the report to PMI on March 1, 2012. The GR results indicate that Nkhotakota has a population of 411,077 people living in 101,829 structures, of which, 91,646 (90 percent) are structures used for sleeping. Of the sleeping structures, 817 (0.9 percent) are not eligible for IRS due to their proximity to ecologically sensitive areas. This gives a total of 90,829 structures that are eligible for IRS with a 2 percent statistical margin of error. As such, the eligible structures range from 88,490 to 93,168 structures. The maps and data that were generated during the geographical reconnaissance will be used to quantify commodity logistics and human resource requirements, establish the spraying implementation schedule, and facilitate monitoring and evaluation of the IRS campaigns.
- Held individual feedback meetings with the six Area Development Committees (ADCs) in the district to provide feedback from the community beneficiary satisfaction review, and solicit further input from the traditional leaders to improve future spray rounds. Like the responses from the beneficiaries, the ADCs reported great satisfaction with the spraying.
- Reviewed and finalized the documentary covering the 2011 IRS which was produced by Tenacious Multi Media Firm, a media consulting firm. The documentary will serve as source of IRS information for advocacy and resource mobilization.

Other Capacity Building Interventions

- In collaboration with the NMCP, Chemonics organized three consultative capacity building workshops to finalize the IEC Communication Strategy and the IRS Training Manual on June 18-22. The participants were drawn from the seven districts implementing IRS: Karonga, Nkhata Bay, Nkhonkhotakota, Salima, Mangochi, Chikwawa and Nsanje. Twenty-two District Health Office (DHO) staff members participated in the first two-day workshop to review the IEC Communication Strategy. Twenty-nine DHO staff members participated in the second two-day workshop on procurement processes, while nine participated in the one-day workshop to review the IRS Training Manual.
- Organized and facilitated a workshop from March 29-April 1 to incorporate Integrated Vector Management (IVM) that includes IRS, Long Lasting Insecticide Treated nets (LLINs) and Larval Source Management (LSM) modules into the pre-service Environmental Health Science Modular Curriculum for the Malawi College of Health Sciences. Nine participants drawn from the Ministry of Health (3), District Health Office (2), and Malawi College of Health Sciences (4) participated and Chemonics led and guided the review process. The Deputy Director for Communicable Diseases in the Ministry of Health also participated in the workshop.
- Organized and facilitated an IRS TOT workshop for three lecturers from the Malawi College of Health Sciences. The lecturers will train the Environmental Health Assistance students on IRS as a process of human resource development for IRS sustainability in Malawi. Chemonics also constructed a model staging site for the college for the training purpose.
- The project held further discussions with the Dean and senior lecturers from the Department of Environmental Health at the Polytechnic of the University of Malawi on April 4 to advocate for institutionalizing IRS in the training of the Environmental Health Officers.
- Developed a revised scope of work and work plan for the period September 2011–September 2012 in line with the shift from direct IRS implementation to providing technical assistance to NMCP in IRS.
- Contributed to the PMI malaria operation plan (MOP) for 2013.
- The project team developed a draft concept note to expand private sector involvement in malaria control country-wide. The concept note was then discussed with NMCP and the Malawi Confederation of Chambers of Commerce and Industry (MCCCI). The final version of the concept note will be presented to MCCCI members during the 2012 FY for their consideration.
- The project developed and shared with the NMCP and other stakeholders a concept note on schools and agriculture malaria data initiative (SAMADI) to assess the feasibility of using malaria burden in education and agriculture institutions to evaluate the impact of IRS and other interventions on malaria transmission. This initiative is planned to be piloted in the 2012 FY.
- In view of the change in scope of work from direct IRS implementation to the provision of technical support in building capacity of the MoH, Chemonics organized an internal capacity building workshop to orient the Chemonics field technical staff to their new role of capacity building of the NMCP. A Human Resource and International Training Consultant from the Chemonics Home Office provided STTA from July 9-19, 2012 to the field technical staff in capacity building. The main outputs of the capacity building workshop were course design documents and instructor guides for training of spray operators, mobilizers, warehouse managers, supervisors/team leaders, mosquito collectors and data management personnel. The process to finalize the tools is under way and is expected to be completed in early 2013.
- Organized and facilitated an IRS TOT workshop for eight lecturers from the Department of Environmental Health at the Polytechnic of the University of Malawi from August 20-24, 2012. The lecturers will be training the Environmental Health Officer students on IRS as a process of human resource development for IRS sustainability in Malawi. Chemonics also constructed a model staging site for the Polytechnic of the University of Malawi for the training purpose.
- In collaboration with MoH, Chemonics reviewed and finalized three key national level documents: the IRS Training Manual, the IRS Communication Strategy and IRS Policy

Guidelines. The final versions of the documents were further edited and submitted to the MoH for review and endorsement.

- Organized a one-day consultative capacity building workshop with DHO staff from the seven IRS implementing districts to review IRS data collection and supervisory tools on July 30, 2012.
- Organized a four-day planning workshop for DHO staff to prepare the seven IRS implementing districts for the 2012 spray campaign. The workshop was conducted from July 31 to August 4, 2012. A total of twenty-six District Health Office staff members drawn from the seven districts implementing IRS: Karonga, Nkhata Bay, Nkhatakota, Salima, Mangochi, Chikwawa and Nsanje, participated in the planning workshop. At the end of the workshop, district calendar of events implementation plans were developed to guide the 2012 spray campaign. Organized and facilitated two six-days training sessions for ninety eight spray operator trainers to equip them with knowledge and skills to train spray operators in their respective districts. The trainees were drawn from DHO staff from the seven IRS implementing districts. The training sessions were conducted on September 3-8 and 10-15, 2012, respectively.
- Organized a three-day capacity building training on environmental compliance for thirteen Environmental Officers drawn from district-level Departments of Health and Environmental Affairs in all the seven IRS implementing districts. Training equipped the officers with skills to conduct pre and mid spray compliance inspections and to monitor and supervise environmental compliance during IRS campaigns. The training was conducted by a consultant on September 10-12, 2012.
- Conducted a two-day training on warehouse management and pump maintenance for fourteen store managers/ store assistants and fourteen pump maintenance technicians on August 3-4, 2012.
- Organized capacity building workshops for DHO staff from the seven IRS implementing districts on IRS data management so as to improve quality IRS data on September 18-21, 2012.
- Conducted pre-spray storage facility assessments in all the seven IRS implementing districts to determine maintenance/repair needs. The assessment was carried out using a standard storage assessment checklist. The information obtained helped to determine maintenance/repair requirements for the storage facilities in each of the six districts.

2.0 Project Activities

The following section presents a detailed description of the project activities including the achievements, challenges, solutions and recommendations for improving future IRS activities:

2.1 Capacity Building through Targeted Training of Ministry of Health Staff

Chemonics continued to support the NMCP in capacity building activities under the Malawi IRS program. Project staff assisted the MoH in organizing and facilitating training activities for MoH staff in Nkhatakota district in order to enhance the quality and effectiveness of IRS interventions. Training included: training of trainers (TOT) of spray operators; training of trainers (TOT) for mobilizers; training of mobilizers on IRS-specific IEC/BCC; training of spray operators; training on data management, monitoring and supervision of the operations; and environmental compliance assessment. In addition, other categories of IRS implementers were trained to effectively participate in IRS operations. These included: clinicians, pump maintenance technicians, stores/warehouse management staff, wash persons, and drivers. Lastly, the key district community leaders were sensitized on IRS operations in order to obtain their participation.

The above-mentioned trainings provided an opportunity for piloting the draft IRS training manual, which was developed by Chemonics in collaboration with NMCP. The pilot provided inputs which were

incorporated in the final version of the training manual. The training manual is an adaptation of WHO guidelines for IRS best management practices.

In preparation for the spraying campaign in 2012, various trainings were conducted. A summary of all persons trained broken down by type of training, the category of the participants segregated by gender and the dates when the trainings were conducted is provided:

2.1.1 Training of Trainers (TOT) of Spray Operators

A six day training of trainers for the spray operator's course was conducted from October 8-13, 2011 in which 22 Environmental Health Officers from Nkhonkhotakota district participated. An external trainer from Arysta Life Sciences, the supplier of Actellic 50 EC, provided leadership in facilitating the workshop, in collaboration with Chemonics. The participation of a trainer from Arysta Life Sciences is part of the supplier's corporate practice to ensure quality control measures in the use of the insecticide. This had no cost implications to the IRS program.

The training content covered a wide variety of topics including: the basics of malaria vector and malaria transmission; IRS operational strategy; insecticides used in IRS; environmental compliance; safety of the population and environment; mitigation measures, worker health and safety; emergency preparedness; IEC and social mobilization; data collection and reporting tools; commodity tracking; M&E and quality assurance; logistics management; spray pump handling and maintenance; IRS field operations; and spraying techniques.

After participation, the trainers used the knowledge and skills gained to conduct the spray operator training, with support from Chemonics staff.

2.1.2 Spray Operators Training

Chemonics provided technical support and guidance to the trainers who conducted the six-day spray operators training in Nkhonkhotakota district from October 24- 29, 2011. A total of 503 seasonal workers from Nkhonkhotakota district were trained. This included 10 spray operators employed fulltime by the Illovo Sugar Company, and who participated in the IRS as part of their corporate social responsibility efforts in Nkhonkhotakota district. Training sessions were conducted simultaneously in six operational sites, (Dwangwa, Dwambazi, Nkhonkhotakota Boma, Mwansambo, Benga, and Mkaika). The training included two days of theory and four days of practice on spraying techniques. A pre-test was administered to measure their knowledge level on IRS before training.

On the last day of training, a post-test on theory and a practical test was administered. Based on each individual performance, the trainees were categorized into various IRS roles. Sixty nine trainees who demonstrated the best skills in theory and practice were selected as team leaders, 355 participants were selected as spray operators, while the rest were either assigned other duties, such as washing, or put on reserve.



2.1.3 IE&C/BCC Mobilizers' TOT Training

A two day TOT training for mobilizers was conducted from October 3-4, 2011 for 20 environmental health officers. Selection was based on their participation in other health activities in the district involving

working directly with the communities. The training was guided by the IRS communication strategy which Chemonics developed in 2011 in collaboration with NMCP. The topics included: the principles of communication, communication skills; key messages in IRS; the role of mobilizers, communities, and traditional leaders in an IRS campaign; how to complete the mobilization forms; and monitoring and supervision of community mobilization activity. The lessons from previous spray rounds were discussed to improve the strategies and messages shared with the communities. The trainers later used these skills to facilitate the mobilizers training.

2.1.4 IE&C/BCC Mobilizers' Training

A one-day mobilizers' training was conducted for 313 participants, including 234 Health Surveillance Assistants and 79 community volunteers. Volunteers were recruited to fill the gap in areas which were too vast for the HSAs to cover. This strategy ensured that target households were reached with IRS messages through the interactive door-to-door sensitization campaign.

The trainees were split into eight groups to ensure a manageable number of participants per training session and to maximize skills acquisition. Grouping also reduced transport expenses by ensuring that mobilizers travelled short distances from their homes to the training venues. These sessions were held concurrently on October 15-17, 2011 in eight locations. Table 1 below presents the number of participants per venue:

Table 1: Number of Mobilizers Trained

Training Venue	Health Service Assistants		Community Volunteers		Total
	Male	Female	Male	Female	
1 DHO	36	27	4	2	69
2 Kasitu	14	6	9	4	33
3 Benga	22	9	15	1	47
4 Mkaika	36	13	15	2	66
5 Lupachi	3	0	6	4	13
6 DCGL	3	10	3	2	31
7 Liwaladzi	16	4	3	2	12
8 Msenjere	3	15	5	2	42
Total	133	84	60	19	313

2.1.5 Clinician Training

The district identified 21 clinicians and trained them for one day on October 25. Each health facility was represented by one clinician. The course focused on identification of insecticide poisoning and emergency management, to enable them to effectively respond to cases that presented with adverse effects from exposure to insecticide. The training was co-facilitated by a doctor from Illovo Sugar Company in Dwangwa and a clinician from Nkhotakota district hospital.

2.1.6 Supervisors Training

Supervision in IRS is essential for quality assurance of the operations. A one-day training on supervision was conducted on October 31st in addition to the six day spray operator training which was mandatory for anyone assuming a key leadership position. Participants included 7 site managers, 37 team supervisors, and 71 team leaders. The training focused on site management, leadership, supervision skills, use of a checklist, and commodity accountability. The training equipped them with skills which enabled them to effectively manage the sites and to guide and monitor IRS field operations and coordinate with district and local leaders. This contributed to the increased accountability and responsibility during the IRS operations.

2.1.7 Stores Management Training

Twenty five store keepers were trained for one day on October 20, 2011, on store management with emphasis on commodity record keeping. As a result, storage facilities maintained proper accounting systems of daily stocks and distribution. This also facilitated smooth storage and movement of commodities from the main warehouse, the district stores and to the different operational sites, as well as transport within the operational sites.

2.1.8 Training in Data Management and Reporting

A three-day training on data management was conducted for 23 data clerks on October 20-22. Five of the participants were from Nkhosakota district (four were selected from the community and one was the district statistician), while the other 18 were from the other 6 MoH-funded IRS implementing districts (Salima, Nkhata Bay, Karonga, Mangochi, Chikwawa and Nsanje). The 18 trainees from the six districts were selected from district hospitals. The training was hands-on experiential training on data collection, cleaning and entry, and reporting, using project tools for data management (forms and a Microsoft Access database). Training topics included: filling the IRS data collection forms; data quality assurance i.e. detecting errors on raw data and appropriate corrective measures; data entry into the IRS database; and roles and responsibilities of various players in data collection, verification, entry, analysis, and reporting. The training helped to strengthen capacity of government supported IRS districts and build a pool of personnel capable of managing IRS data (collection, analysis and reporting).

2.1.9 Other Categories of Personnel Trained

The following support personnel were also trained to effectively support the IRS campaign:

- Twelve store keepers (11 males and 1 female) were trained for one day October 12, on pump maintenance. This helped to provide immediate minor maintenance and repair on the spray cans during the operations.
- Twenty four persons were trained on stores management (8 store managers and 16 assistant store keepers).
- Twenty four store personnel (20 males and 4 females) were also trained for one day on November 9, 2011 on first aid. Twenty eight wash persons (9 males and 19 females) were trained for one day on the handling of insecticide contaminated commodities. This training was in addition to the six day spray operator training. The purpose of the training was to enhance environmental compliance and minimize chances of insecticide poisoning.
- Thirty five drivers were trained for one day on November 13, 2011 on handling of insecticide contaminated commodities, safety of humans and transportation of harmful products. .
- Thirty four supervisors (33 males and 1 female) were trained on first aid for one day on November 20, 2011.

Table 2: Trained Personnel, 2011 Spray Campaign

	Type of Training/Cadre	Nkhosakota District (PMI/USAID)		Other 6 Districts (Government funded)		Total
		Male	Female	Male	Female	
1	TOT spray operators	17	3	0	0	20
2	Spray operators	211	144	0	0	355
3	Team supervisors	1	36	0	0	37
4	Team leaders	51	20	0	0	71
5	TOT mobilizers (IEC/BCC)	19	1	0	0	20
6	Mobilizers (IEC/BCC)	210	103	0	0	313
7	Clinicians	18	4	0	0	22
8	Store keepers and managers	20	4	0	0	24

9	Data clerks	3	2	10	8	23
	Total	550	317	10	8	885

2.2 Geographical Reconnaissance

Chemonics project staff collaborated with the Chancellor College of the University of Malawi to finalize the geographical reconnaissance (GR) report which was submitted to PMI on March 1, 2012 and was approved on June 25, 2012 for sharing with partners and stakeholders. The report details the number of IRS eligible structures, their distribution throughout the district, and their respective populations. Seven maps, one for each of the six Traditional Authorities and one for the entire district, were produced, indicating the distribution of the geo-coded structures. The maps indicate that the structures are more concentrated around trading centers, access roads, and along the lake. The maps also show a moderate concentration of structures in low-lying lands and a sparse concentration in higher grounds or hilly areas.

The GR results indicate that Nkhotakota has a population of 411,077 people living in 101,829 structures, of which 91,646 (90 percent) are structures used for sleeping. Of the sleeping structures, 817 (0.9 percent) are not eligible for IRS due to their proximity to ecologically sensitive areas such as water bodies, forests and game reserves, or they are constructed of materials not suitable to be sprayed. This gives a total of 90,829 structures that are eligible for IRS with a 2 percent statistical margin of error. As such, the eligible structures range from 88,490 to 93,168 structures.

The maps and data that were generated during the geographical reconnaissance exercise will be used to quantify commodity logistics and human resource requirements, establish the spraying implementation schedule, and facilitate monitoring and evaluation of the IRS campaigns.

2.3 Environmental Compliance

Environmental compliance in IRS is essential to prevent human exposure to the insecticide and reduce environmental contamination. Several mitigation measures were undertaken in preparation of the IRS activities in Nkhotakota district.

2.3.1 Identification and Preparation of the Storage Facilities

A total of nine storage facilities were identified and rehabilitated in compliance with the FOA standards for the stores of pesticides. A new store in Dwambazi was identified and rehabilitated, while the

Nkhotakota Boma storage facility was expanded to occupy a larger space in accordance with the large number of the spray operators. The central warehouse in Lilongwe was used as the main storage facility, while the Nkhotakota district store was rehabilitated to supplying the satellite stores in each of the seven operational sites. The Government contributed three storage facilities (Nkhotakota, Lupachi, and Mwansambo) while all the other stores were rented from private owners.

2.3.2 Construction of Staging Sites

Seven staging sites were prepared in accordance with WHO environmental guidelines. These sites were Benga, Mkaika, Boma, Dwangwa, Dwambazi, Mwansambo, and Lupachi. At each of these sites, a soak pit and washing area slab, and bathing shelters were constructed and fenced in to prevent entry of



unauthorized personnel. Of the seven sites, only Dwambazi and Lupachi staging sites were newly established.

2.3.3 Pregnancy Testing

All female participants (spray operators, team leaders, supervisors, washers and store keepers) were tested for pregnancy before training and halfway during the spraying campaign. Of the 144 female participants, 2 tested positive on both occasions. Those who tested positive were withdrawn from the IRS program to prevent fetal exposure.

2.3.4 Pre-Spray Environmental Compliance Inspection

Chemonics engaged a national environmental consultant to conduct pre-spraying environmental compliance inspection in all seven staging sites in Nkhotakota to ensure they met the environmental compliance standards. This was done from October 20-22, 2011. The inspection was carried out while renovations were underway and some final touches were still being put in place. The delay was due to shortage of fuel for transporting construction materials. However, the district store and all designated operational sites complied with IRS environmental standards.

2.3.5 Mapping of Highly Sensitive Ecological Areas

Environmental impact assessment guidelines for IRS recommend a buffer distance of 50 meters from water bodies and other ecologically sensitive areas such as parks and wildlife reserves and areas of communal grazing (GoM, Environmental Affairs Department, 2010).

Prior to commencement of the 2011 spraying campaign, and in compliance with the Malawi Environmental Affairs regulations, the Nkhotakota district Environmental Health Office with support from Chemonics, conducted a mapping exercise to identify structures located within 50 meters of the highly sensitive ecosystems i.e. the water bodies, game reserves, and forests. The assessment was conducted between November 5-9, 2011 and the purpose was to ensure that the structures within these buffer areas were not sprayed. A total of 411 structures in 103 villages were identified and marked.

2.3.6 Mid-Spray Environmental Compliance Inspection

Chemonics commissioned a mid- spray environmental compliance assessment between November 28 and December 4, 2011. The same national environmental consultant who conducted the pre-spray inspection was engaged. The primary objective was to assess compliance with the environmental standards as stipulated in the IRS Best Management Practices (USAID 2011), WHO (2006), and UN/FAO (1996) during the operations. The consultant visited all designated spray operation sites and supervised field operations in the district to check on status of pesticide storage, stock control and inventory, use of PPE by all implementers and management of liquid and solid wastes.

The results indicated full compliance with the recommended environmental standards. No areas of non-compliance on pesticide storage, stock control, and inventory were observed in any of the operation sites.

2.4 Logistics/Procurement

IRS is a highly logistics dependent activity. Chemonics successfully conducted pre-spray preparations for the 2011 spray campaign which included: procurement of various commodities; maintenance of storage and washing facilities; transportation of the pesticide spray pumps, and PPE to the designated spray operation sites in Nkhotakota; recruitment of IRS implementers and hiring of minibuses to transport spray teams to spray areas and back to operation sites. These activities are discussed in detail below.

2.4.1 Insecticide

From the preliminary GR report on the target structures in Nkhotakota district, the insecticide quantification was calculated based on the 102,314 eligible structures reported and the 105.43 average sprayable surface area. A total of 47,508 liters of Actellic 50 EC were procured from Arysta Life Sciences. The insecticide was procured and arrived in the country on October 14, 2011. In addition to the 47,508 liters procured, the program had a leftover stock of 172 liters from the 2010 spray campaign. This added up to 47,680 liters of Actellic 50 EC.

2.4.2 Spray Pumps

No additional sprayers were procured during this spray campaign as the program had adequate numbers from the previous spray campaign. The sprayers were maintained before the training of spray operators and throughout the spray campaign to ensure proper optimal pump performance required for quality spraying.

2.4.3 Personal Protective Equipment (PPE)

Additional personal protective equipment which included aprons, carrier bags, gloves and visors was procured overseas and arrived in the country in September 2011, in addition to the neck covers that were procured locally. The table below summarizes the PPE procured and when it was delivered to the program:

Table 3. PPE Procured and Delivered to Program

Item	Quantity	Comments
Gloves	2,748 pairs	Internationally purchased. Received on September 26, 2011
Visors	472	Internationally purchased. Received on September 26, 2011
Aprons	60	Internationally purchased. Received on September 26, 2011
Carrier Bags	440	Internationally purchased. Received on September 26, 2011
Carrier Bags	220	Locally purchased to cover the needs during the spraying period.
Cloth Hats	60	Procured on September 26, 2011
Visor connectors	397	Procured on September 24, 2011
Neck Covers	800	Locally made in September 2011

2.4.4 Transportation of IRS Implementers

The project hired 33 vehicles for the daily transportation of the spray teams to the field. Minibuses were identified through a competitive tendering, and they were subjected to intensive inspection by the traffic police to certify their roadworthiness. Vehicles were assigned to each of the operation sites based on the number of spray operation teams. The minibuses remained in the operations sites for the entire spraying period.

2.4.5 Procurement and Storage of Fuel

A countrywide fuel shortage began to worsen just before the commencement of the spraying campaign on November 1. This delayed the start date by two weeks to November 14 while the program searched for viable solutions. Chemonics, the District Commissioner (DC) and the DHO partnered with Illovo Sugar Company and Total Malawi for bulk supply and storage of fuel. Total provided fuel while Illovo provided storage facilities. Further discussions were held with the Malawi Energy Regulatory Authority (MERA), for a waiver to allow transportation of fuel in containers from the main storage facility in Dwangwa to the various operational sites in the district. This arrangement ensured the availability and constant supply of fuel for the IRS operations throughout the spray campaign.

2.5 Community Mobilization

Community sensitization is essential for increasing the communities' knowledge about spraying to ensure human safety, and to allow all the spray operators access into their houses for spraying, therefore increasing the IRS coverage. Sensitization contributes towards minimizing beneficiary refusals and unnecessary exposure to the insecticide, while informing them on the benefits of the intervention to develop a partnership with the program.

2.5.1 Development of IEC Messages and Materials

In collaboration with the IEC Sub Committee of the MoH, the project reviewed IEC materials used in the 2010 mobilization campaign and adapted them for the 2011 IEC campaign. In addition to leftover materials from the 2010 campaign, the program printed some additional materials consisting of 55 posters, 16,000 brochures and 99,529 door stickers used by mobilizers and spray operators. The IEC materials were distributed to target audiences in Nkhotakota district during the door-to-door visits and in community gatherings. The IEC materials raised the community awareness on IRS and increased communities' understanding and acceptability of the IRS activities.

2.5.2 Social Mobilization and Community Sensitization

The Chemonics team, in collaboration with the DHMT, conducted meetings with key groups in Nkhotakota district to prepare for the spraying campaign. One meeting was held with the District Executive Committee (DEC) in order to brief them on planned spray campaign activities, to seek their support and cooperation during the 2011 IRS spray round, and to identify and discuss further areas of collaboration. This DEC meeting took place on October 3, 2011. In addition, several other meetings were held with the Area Development Committees (ADCs) in each of the eight areas where they operate. These meetings took place from October 3-5, 2011.

Immediately after the training of the IEC and BCC mobilizers the community mobilization campaign commenced. The strategies used ranged from door-to-door interactive discussions with household members, the local radio announcements, and discussions with traditional leaders and community volunteers. The mobilizers travelled to the villages throughout the district in advance of spray teams to convince communities to accept IRS, and prepare the houses for the spray operators. This contributed to IRS acceptability among the community.

2.5.3 Door-to-Door Sensitization/Mobilization

The trained mobilizers (HSAs and volunteers) conducted door-to-door visits to the households in the district, each focusing on their respective catchment areas. Door-to-door mobilization activities started before commencement of the spray campaign (from October 17-30, 2011). The mobilizers interacted with family members and distributed brochures with IRS messages. The mobilizers alerted the communities to prepare for the spraying of their houses the day before the spray campaign in the village to ensure that they stayed home the following day and wait for the spray operators. Although the mobilization campaign was well planned, a few challenges were encountered during spraying, including some refusals to have their houses sprayed and absenteeism from their homes. The refusals were attributed to several factors including: receiving inadequate messages from the mobilizers, negative reaction from the villagers who did not receive mosquito nets during the mass distribution campaign, misconception from the villagers who had received mosquito nets and did not see the benefits of IRS. In a few villages, mobilizers did not inform villagers a day before spraying, and as a result, villagers had little time to prepare their houses for spraying when spray operators arrived.

2.5.4 Mass Sensitization

To reinforce sensitization of communities on IRS, the program collaborated with the district's community radio station to air daily messages that included schedules of villages to be visited as well as requested communities to report any skipped villages or structures where spraying had already been conducted. As

part of the radio's corporate social responsibility, they charged for their services at 50 percent of the actual commercial rates.

Furthermore, letters were distributed to all religious institutions and schools urging them to make announcements during gatherings and school assemblies. The content of the messages covered basic information that included: importance of IRS to communities, importance of following instructions given by mobilizers and spray operators; role of households before, during and after spraying; community contribution to a successful IRS campaign; and how communities can prevent insecticide pilferage, and reporting skipped villages and structures. Overall, the communities and their leadership were urged to avail themselves on the scheduled spray date and reminded of the importance of following instructions given by mobilizers and spray operators. This helped to increase community awareness and acceptance of IRS, and to achieve good spray coverage.

However, despite the community mobilization efforts, the campaign experienced some pockets of refusals resulting in some spray operators not reaching their daily targets. The main reasons for refusal included the following:

- Some households who did not receive the free mosquito nets issued a few months earlier by the NMCP under the universal net coverage program demanded to be given nets before they could allow their houses to be sprayed. Out of ignorance, the communities felt they were discriminated and they were therefore not interested to participate in any government program. The spray teams made efforts to convince them that spraying was to their advantage but it was difficult and frustrating.
- Some households who received the free mosquito nets issued a few months earlier by the NMCP under the universal net coverage program, did not see the added advantage in having their houses sprayed. Again this is a clear demonstration of ignorance and requires further dissemination of information for communities to have a clear understanding of the importance and complementarities of using multiple prevention strategies provided by implementers of the various malaria control programs.
- Some households did not benefit from the agricultural input subsidy from the agricultural program, and were upset with any government program. Although this is not related to IRS, it calls for the need for continued dissemination of information to enable communities to have a clear understanding of the importance and benefits of IRS, so that they can readily accept IRS despite other development challenges they are facing.
- Some households could not give any specific reason, and would not want to listen or engage in any interactive discussion even with their local leaders. When the spray teams tried to engage them in discussion to establish the reasons for their refusal, they became violent and even chased them away.

In view of this, IEC officers from Chemonics, the District Health office, and the district IRS technical committee intensified public mass sensitization by increasing radio messages and using Ministry of Information vans that drove around in the villages providing messages through the megaphone. Moreover, the district commissioner's office was involved in addressing the local leaders (traditional authorities and their chiefs). In this respect, the District Commissioner's office called all traditional leaders to a meeting where they discussed the progress of IRS implementation and the various challenges faced, and asked the chiefs to take an active and more participatory role during the spraying in their respective villages. This included: accompanying the spraying teams in the villages to ensure that the community members were convinced. This helped convince some community members who initially resisted and later allowed spray operators into their homes. Below is a summary of reasons given in the few instances the campaign experienced resistance and refusals from community members.

Table 4. Reasons given for refusals in some villages

Operational Site	# of villages	Reason for resistance and refusal	Comments
Boma	20	Nets not given; Agriculture input subsidy coupons not given Chieftaincy/leadership conflicts Inadequate information given to communities by mobilizers Burden of removing household effects	The reasons given for refusal were documented qualitatively in the process of spraying. This was an unforeseen occurrence and therefore unplanned for during the design/tool development stage. As a result there is no statistical analysis available as a backup. Solution: Data collection tools have since been revised to be able to capture such data in future IRS campaigns.
Dwangwa	30	Nets not given Nets available so don't see any reason for spraying. Inadequate information given to communities by mobilizers Burden of removing household effects	
Mkaika	4	Nets not given Agriculture input subsidy coupons not given Religious beliefs (Zion community)	
Dwambazi	7	Some nets not given Some nets given so don't see any reason for spraying	

2.6 Spraying Campaign Performance

The 2011 spraying campaign in Nkhotakota district was conducted between November 14 and December 19, 2011. As indicated earlier, the campaign started two weeks later than initially planned as a result of fuel scarcity in Malawi, which the program managed to overcome through partnerships with Illovo Sugar Company and the Total fuel service provider. The 2011 campaign registered a number of achievements during planning and implementation which have provided the district with valuable experience in IRS implementation. This will contribute to implementation of effective interventions in future spraying rounds which in turn will contribute towards IRS sustainability. The achievements included:

2.6.1 Planning and Preparatory Activities

- Conducted successful pre-spraying preparations that included the maintenance of storage facilities to ensure compliance with FAO guidelines for pesticide storage, accountability of commodities, rehabilitation and establishment of washing facilities to enhance environmental compliance to prevent unnecessary human exposure and reduce environmental contamination.
- Built the capacity of the MoH through joint planning, training, supervision and monitoring...
- Supported the district Environmental Affairs Department to conduct mapping of ecologically sensitive areas along the forest, game reserves and water bodies that were to be excluded from spraying.
- Implemented social mobilization and community sensitization which increased acceptability and coverage of the IRS activities.
- Strengthened partnerships with various stakeholders (such as community leaders, government personnel from Ministries of Agriculture and community development and private companies) who provided support to the IRS campaign in supervision and provision of transport for the supervisors.

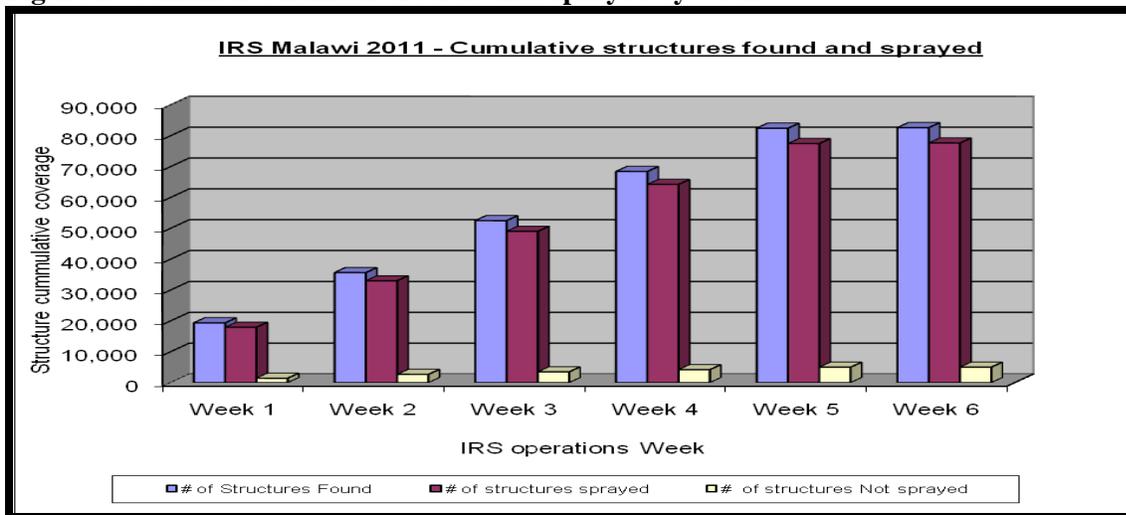
- Strengthened quality control and environmental protection and safety in compliance with IRS best management practices through training, supportive supervision, and monitoring at all levels.

2.6.2 IRS Campaign Performance

The 2011 spraying campaign in Nkhotakota district was conducted between November 14 and December 19, 2011 and lasted 32 days. Data collected by the spray operators was analyzed on a daily basis. The spray performance report on structures sprayed and population protected was generated. The following sections show the achievements:

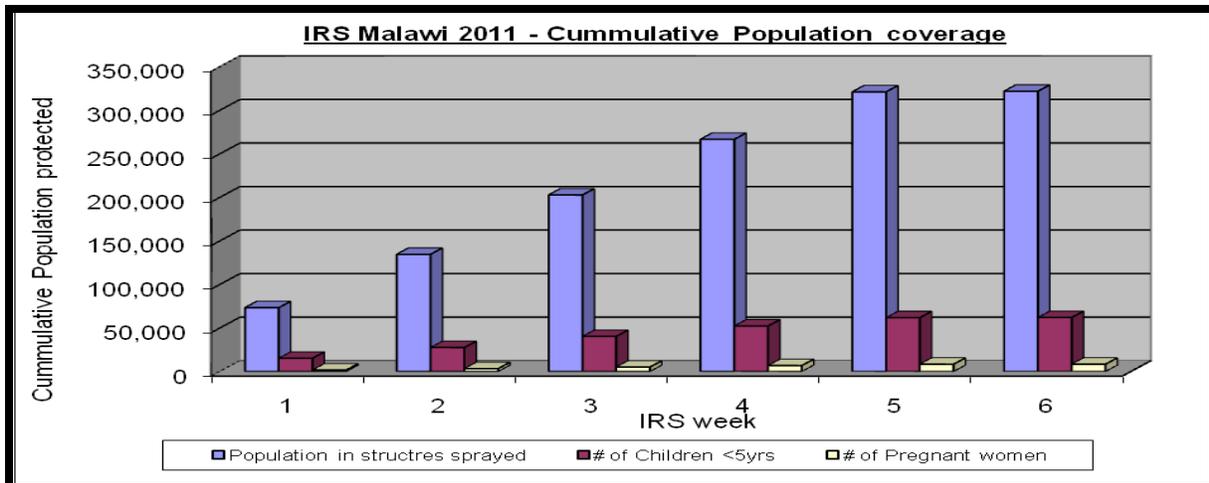
Structure Coverage: During this campaign period, the spray operators found 82,629 structures, of which 77,647 were sprayed, accounting for 94 percent of the structures found/reached, and 87.7 percent of the target 88,490 eligible structures. Some of the structures found were not sprayed because the owners were away attending to other personal needs, while others refused. The operations encountered pockets of refusals especially within the main business towns and along the lake. The refusals were associated with other non-IRS community issues which also reflected an unfortunate degree of ignorance on the part of the communities, as discussed previously. The last week of spraying was spent “mopping up” (i.e. revisiting areas already sprayed, identifying unsprayed structures, and spraying them). Figure 1 below summarizes the cumulative number of structures sprayed. (Sources: 2011 IRS database and 2011 GR report).

Figure 1: Cumulative number of structures sprayed by week



Population Protected: The total population protected by IRS is derived from the number of people living in the sprayed structures. A total of 321,919 residents were reported to live in 77,647 structures that were sprayed. Of the 321,919 residents protected, 62,032 (19.3 percent) were children aged less than 5 years and 8,397 (2.6 percent) were pregnant women. Figure 2 below illustrates the cumulative population protected. (Source: 2011 IRS database).

Figure 2: Cumulative weekly number of people protected.



Number of children < 5 years protected is the number of children aged <5 years reported living in the sprayed structures. The percentage of protected children <5 years is calculated by dividing the total number of children living in the sprayed structures by the population reported living in the sprayed structures. Number of pregnant women protected is the number of pregnant women reported living in the sprayed structures. The percentage of protected pregnant women is calculated by dividing the total number of pregnant women reported living in the sprayed structures by the total population reported living in the sprayed structures.

Insecticide consumption: The program procured 47,508 liters of Actellic 50 EC. In addition, the program had in stock 172 liters left over from the 2010 spray campaign, totaling 47,680 liters overall. For the 77,647 structures sprayed, a total of 37,190 liters were used, giving a ratio of 2.08 structures to 1 liter of Actellic 50 EC.

2.7 Post Spray Activities

After the successful completion of the spray campaign, the following post-spraying activities were carried out: the decommissioning of operational sites, transferring all commodities and equipment to the main warehouses; taking inventory; cleaning and maintenance of the equipment; conducting the community beneficiary satisfaction reviews; disposing of the solid waste and writing the End of Spray Performance Report.

Inventory and stock taking: Upon completion of the spraying campaign, Chemonics project staff conducted a thorough stock-taking exercise. All the commodities from the satellite and operational stores were transferred to the main district store. The PPE and the spray pumps were cleaned, and segregated into usable and non-usable. The solid waste was segregated by type, organized, and secured for incineration. The inventory is used to determine the commodities and equipment to be procured for the next spray season. (Refer to annex B: IRS Inventory).

Decommissioning of the operations sites. All the commodities and equipment were moved from the seven satellite storage facilities to the district warehouse. The stores were cleaned and the buildings were reverted back to the owners. The fencing around the stores and staging sites was removed and the soak pits and washing bays were covered with plastic sheeting and dirt to preserve them for re-use in subsequent spray campaigns.

Incineration of solid waste: All waste generated during the operations was collected, separated by category, counted, and stored until the campaign ended. It waste was disposed of using the appropriate facilities and in compliance with EIA and SEA requirements. A total of 37,190 empty plastic insecticide

bottles, weighing 3,347 kg, were incinerated at St. Gabriel's Hospital, Namitete in Lilongwe from February 6-10, 2012. This incineration facility meets all the requirements for the disposal of toxic waste, including the gases released during the incineration of the plastic bottles. St. Gabriel's is a non-profit mission hospital, and they charged a fee for the use of the incineration facility, which the project paid.

All other solid waste, including gloves, nose masks, packaging materials, and other contaminated materials weighing 1,298 kg was incinerated at Nkhokotakota District Hospital. The initial incineration started on December 17, 2011 but stopped due to a broken incinerator thermostat. The spare part could not be found locally and was sourced from outside the country, delaying the incineration. The remaining solid waste (1,112 kg) was incinerated from February 29 to March 10, after the thermostat was replaced. While the Chemonics paid no incineration charges, they provided funds for the repairs, maintenance, and fuel for the hospital.

Disposal of solid waste from government supported IRS districts. Chemonics supported the NMCP to dispose of accumulated Solid Waste (empty bottles of Mokrid) which was generated from the 2010 spraying campaign in four districts: Nsanje, Chikwawa, Mangochi and Nkhata Bay. The project transported the empty bottles from the four districts to St. Gabriel Hospital in Namitete – Lilongwe, for incineration. A total of 2,139kgs were collected from the four districts: 361.9kgs from Nsanje, 1189.9kgs from Chikwawa, 1080kgs from Mangochi, and 94 kgs from Nkhata Bay. The incineration was conducted from July 19 – 21, 2012 under the supervision of Chemonics staff.

Disposal of Actellic 50EC. In 2011, the project procured 47,508 liters of Actellic 50 EC and had in stock 172 liters left over from the 2010 spray campaign. The project used 37,190 liters, leaving a total of 10,490 liters in stock. Chemonics conducted a series of discussions with the NMCP on the future use of 10,487 liters Actellic 50EC. The discussions resolved to use Actellic to spray an area in Salima during the 2012 spray season under very close supervision by Chemonics and NMCP.

Insecticide Storage Facilities. Chemonics provided temporary storage of insecticide for the NMCP until August 30, 2012, when the storage facility was handed back to the landlord. A total of 4,444 cartons of Alpha-cypermethrin (Fendona), were stored in the main warehouse in Lilongwe. Chemonics and NMCP jointly conducted an assessment of the storage facilities in Nkhokotakota from August 6-7 with a view to renovate them in preparation for the transporting of the insecticides and other IRS commodities from Lilongwe to Nkhokotakota. Chemonics renovated the warehouses and all IRS commodities that were stored in Lilongwe warehouse were moved to Nkhokotakota, while waiting for the PMI approval to hand over to the NMCP. Chemonics also supported the NMCP to transport the 4,444 cartons of Alpha-cypermethrin (Fendona) to the six IRS implementing districts.

Community Beneficiary satisfaction review (Nkhokotakota). Chemonics led a two-day workshop for seven DHO staff (four women and three men) on how to conduct the community beneficiary satisfaction review. Participants included four interviewers, one data entry clerk and two supervisors. The training focused on community approach, interview techniques (focus group discussions and individual interviews), data collection and analysis. The training helped staff to effectively conduct community interviews in selected villages in Nkhokotakota district. Following the training, Chemonics and the DHO conducted a beneficiary satisfaction review in Nkhokotakota between January 24 and February 1 to assess community satisfaction and acceptability of IRS and identify their concerns about the campaign as a malaria control intervention. A total of 24 focus group discussions in 24 communities and 96 interviews with individuals randomly selected from the community members were conducted across the district. Communities made several recommendations and suggestions. Below is a summary of the major findings:

Key findings

Satisfaction: The majority of the respondents (91.7%) expressed appreciation of the 2011 spraying operations, citing it as the best campaign they had experienced. They also reported that spraying had immediate visible effects on mosquitoes, fewer incidences of malaria in comparison to previous years, and were happy with the conduct of mobilizers and spray operators.

IEC & BCC Source of Information: A total of 300 participants were interviewed to establish where they heard IRS messages from and their preferred sources. Approximately 95.8% of the participants (287 of 300) from all the 24 focus group discussions stated that they heard about IRS from the Nkhotakota Community Radio, 62.5% from community leaders, 70.8% from mobilizers and another 70.8% from health facilities. When asked about the preferred sources of information, the community members indicated several sources, as shown in Table 5 below.

Table 5: Preferred source of IRS information

Source of information about IRS	# of respondents on preferred source of information (out of 300)	Percentage
Nkhotakota Community Radio	290	96.7%
From Mobilizers	250	83.3%
From Health facility	212	70.8%
From Trad. leaders/village heads	200	66.7%

Note: The 300 participants from the 24 focus groups discussions were expected to give more than one response regarding the communication media/channel they preferred.

Conclusion: The data above indicates that the use of radio produced better results and it is also the preferred channel of communication by the community in Nkhotakota.

2.7.1 Feedback Meetings for Area Development Committees (ADCs)

Following the survey, Chemonics and the DHO organized nine meetings with Area Development Committees (ADCs) from February 14 - 16 to provide feedback from the community satisfaction reviews to the ADC members and also to obtain further input. The views presented by the ADC were same as the ones raised by the communities and were addressed during the 2012 IRS planning and training of IRS implementers.

2.7.2 Community IRS Perception Baseline Study

Chemonics in collaboration with NMCP and DHOs carried out a study to determine community perception on IRS in six IRS implementing districts (Karonga, Nkhata Bay, Salima, Mangochi, Chikwawa and Nsanje), where no IRS IEC baseline data was ever collected. The study aimed to generate information to guide future IEC/BCC programming to increase IRS acceptability and uptake, and to provide a basis for evaluating the performance of IEC/BCC interventions for IRS.

Objectives: The objective of the study was to assess community perceptions on IRS as a malaria control strategy and its implementation processes in order to generate information to guide future IEC programming to increase IRS acceptability and uptake.

Methodology: Chemonics, NMCP and the DHOs conducted a total of 96 focus group discussions (FGDs) and 384 interviews with individuals randomly selected from the community members in 16 villages under 16 GVHs across the six targeted districts. Staff members from DHOs were trained on how to conduct focus group discussions and interviewing key informants as well as how to analyze qualitative data. Under the guidance and supervision of Chemonics, the trained staff conducted the study from July 23-28, 2012 using pre-tested checklist and questionnaires.

Key Findings: The majority of the respondents ranked malaria as the most important health problem in their communities. In all the study areas, mosquitoes were mentioned as vectors of malaria. Poor environmental management around homes was also mentioned as a strong contributor to malaria transmission. Regarding the source of information on IRS, most members reported hearing about IRS campaign from health surveillance assistants (HSAs), the village heads, health facilities and radio, in that descending order.

- When asked why some of the structures reached were not sprayed, the respondents gave a number of reasons some of which are listed below:
- Most household were not sure of what the intervention was all about since inadequate mobilization activities were done in some districts particularly in Chikwawa and Nsanje.
- Some refused to have their structures sprayed because they did not receive free farming subsidy coupons.
- Some cited that removing household items was a tiring exercise, hence did not want to be burdened.
- Some household owners were away for other engagements such as farming, fishing, market, attending to funerals.
- Other community members thought and believed that the insecticide was for family planning purposes and therefore were afraid to become infertile.

During the study communities were asked to suggest roles they may play to improve the IRS program. Below are the suggestions on the roles that they and other stakeholders may play in IRS intervention:

- To set up community peer mobilization where fellow community members would voluntarily sensitize others on IRS;
- Traditional leaders to guide spray operators to ensure all eligible structures are sprayed and pilferage of insecticide is prevented.
- With support from local leaders, to recruit spray operators locally, as they are familiar with the area;

Recommendations: From the analysis of the findings and suggestions made by communities, Chemonics made the following recommendations for NMCP and DHOs to consider in preparation for the 2012 IRS campaign;

- IRS is a new strategy in Malawi. The NMCP should invest more resources for advocacy and IEC;
- The community source of information about IRS varied from one district to the other. The NMCP should consider local district community situations when selecting IEC method/s for IRS.
- The communities in Malawi are well informed about mosquito nets as a method to control malaria. With the introduction of IRS, it is important that the NMCP intensifies education on the continued using of the nets in combination with IRS.
- The NMCP should engage local leaders in the recruitment of spray operators;
- NMCP should ensure that spraying starts and finishes before the farming season to minimize community farming disruptions and optimize coverage.
- The NMCP should define community roles during IRS operations and educate the communities on the same.
- Some reasons that were given for some householders' refusal to have their houses sprayed included fear of death and infertility owing to the insecticide. The NMCP should educate communities to dispel the misconceptions and fears.

2.8 IRS Documentary

Chemonics engaged Tenacious Multimedia consulting firm on October 24, 2011 to produce a documentary covering the 2011 IRS campaign using field shots and interviews with key players from the IRS Malawi team. The documentary features the entire process from the training, community mobilization, implementation, supervision, and monitoring of the spray campaign activities. Chemonics later reviewed the final draft of the documentary which depicts achievements, challenges, and lessons learned through interviews conducted with stakeholders at all levels. This documentary was used during TOT training for spray operators in August 2012 and will continue to be used for training and also for advocating IRS to policy makers, donor partners, private institutions and other stakeholders.

2.9 Incorporating IRS in Institutions' Curriculum

Chemonics continued to support the NMCP in capacity building activities under the Malawi IRS project. The project carried out a number of initiatives as part of the process to build a pool of skilled health workers capable of managing and sustaining the IRS program in Malawi. One of the strategies Chemonics initiated is the incorporation of IRS training modules into the pre-service Environmental Health Modular Curricula for Malawi College of Health Sciences, the Polytechnic of the University of Malawi and Bunda College of Agriculture. The training modules cover practical IRS management and operations that aim to establish a solid IRS managerial and operational foundation for the students. The following are the major initiatives carried out during the year:

Development of IRS modules to incorporate into existing curricula. The project held discussions with staff from the College of Health Sciences, Department of Environmental Health Sciences, to advocate for the incorporation of IRS into their pre-service training curriculum. Chemonics developed IVM training modules, which were discussed with NMCP and the Malawi College of Health Sciences at a four-day workshop from March 29-April 1, 2012 which Chemonics organized. The workshop was attended by nine participants drawn from NMCP (3), District Health Office in Salima (1) and Nkhotakota (1), Malawi College of Health Sciences (4), and Chemonics (2). The Deputy Director of Communicable Diseases also participated and commended the team for the innovation. The workshop reviewed the existing curriculum and incorporated IVM modules into the specific areas of the curriculum. Following this workshop, the college went on a retreat to review the whole curriculum and later shared their input with Chemonics and NMCP. The College plans to start training the first group of students during the 2012 academic calendar. Graduates from the college who take this course will be part of a pool of experts who will be leaders of IRS implementation in Malawi.

The project met with the Dean and senior lecturers from the Department of Environmental Health at the Polytechnic of the University of Malawi on March 23 to advocate institutionalizing IRS in the training of the Environmental Health Officers. The Environmental Health Officers are the senior managers of IRS activities at the district level. The Department of Environmental Health expressed interest in incorporating IVM into their curriculum. The department is already teaching malaria vector control, but it needed updated information on IRS. A follow-up meeting was conducted on April 4, 2012 with the chairman and other department staff

The project met with the National Environmental Affairs Officer responsible for IRS environmental compliance to advocate for the inclusion of IRS in the Environmental Sciences pre-service curriculum. The Environmental Affairs Officers are responsible for EIA and supervision of environmental compliance mitigation and monitoring in the districts. The officers are trained at the Bunda College of Agriculture as well as at the Polytechnic. Chemonics contacted the course manager at Bunda College who expressed an interest in incorporating IRS in the course.

The College was also in the process of updating its curriculum and this offers an opportunity to introduce IRS into their curriculum and start using it within the year. One of their lecturers, who has previously trained on IRS and has been conducting IRS compliance inspections for the project, was tasked with the responsibility of detailing all the steps and requirements for environmental compliance, mitigation, supervision, and monitoring. This lecturer is collaborating with the Chemonics field team to develop the curriculum. This process was continued in the 2012 FY.

Public/private Partnerships: Chemonics reviewed opportunities for public/private partnerships through the Corporate Social Responsibility (CSR) departments at various companies. It met with the Malawi Confederation of Chambers of Commerce and Industry (MCCCI) to present the idea and the Lilongwe representative of MCCCI expressed interest. He asked for a concept paper detailing the history of malaria in Malawi, the MOH activities and plans, major gaps, and also potential activities they could support. The project met with NMCP to jointly develop this concept paper so that it accurately reflects the needs of the NMCP. NMCP wrote the first draft, which Chemonics refined before presenting to MCCCI. The final version of the concept note will be presented to MCCCI members during the FY2012 for their consideration.

Malawi College of Health Sciences: Chemonics, in collaboration with the NMCP, organized and facilitated a TOT workshop for three lecturers (1 female and 2 male) from the Malawi College of Health Sciences. The TOT aimed to build their capacity to effectively train students in IRS management and operations. The training followed the successful incorporation of IRS modules into the College curriculum. The five-day training workshop covered all aspects of IRS management, operations, spraying techniques and environmental mitigation, and compliance topics. Chemonics provided reference materials and conducted a pre-test, post test and evaluation of the course. The training was very successful and the lecturers demonstrated high capacity to train the students. Training of students is planned to start in October 2012.

The Polytechnic of the University of Malawi: Chemonics held discussions with the Dean and senior lecturers from the Department of Environmental Health at the Polytechnic of the University of Malawi on April 4. The discussions were a follow up of previous meetings aimed at incorporating IRS modules into training curriculum of the Environmental Health Officers. The Environmental Health Officers are the senior managers of IRS activities at the district level. The college was receptive to incorporate IRS into the curriculum because they see the benefits to their graduates.

Chemonics organized a one-day workshop with three lecturers from the Department of Environmental Health of the Polytechnic of the University of Malawi on July 5, 2012. The workshops incorporated IRS modules into the Environmental Health curriculum of the Polytechnic.

Following the successful incorporation of IRS modules into the College curriculum, Chemonics, in collaboration with the NMCP, organized and facilitated a TOT workshop for eight lecturers (1 female and 7 male) from the Malawi Polytechnic which took place from August 20-24, 2012. The TOT aimed to build their capacity to effectively train students in IRS management and operations. The five-day training workshop covered all aspects of IRS management, operations, spraying techniques and environmental mitigation, and compliance topics. Chemonics provided IRS reference materials. The training was very successful and the lecturers demonstrated a lot of enthusiasm and commitment to train students. Training of students is planned for later this year, starting with the class graduating in November, 2012.

2.10 IRS Capacity Building Workshops

Chemonics, in collaboration with the NMCP, organized three consultative and capacity building workshops attended by 29 DHO staff (two women and twenty-seven men) drawn from the seven IRS

implementing districts. The group was comprised of district IRS coordinators, District Environmental Health Officers (DEHOs), IEC Officers and Malaria Coordinators. The following are the details of the various workshops:

IEC/BCC workshop: A two-day workshop from June 18-19, 2012 was conducted to review and finalize the draft IEC Communication Strategy. A total of 23 participants attended the workshop (IRS coordinators, IEC officers and Malaria Coordinators). The participants provided constructive input to the strategy; shared IEC related challenges faced in the previous IRS campaign and; reviewed existing IRS IEC material. The participants also developed action plans for the 2012 IRS season based on lessons learned from the previous campaign. The action plans included the following:

- Conduct briefing meetings for the DEC members, ADC's and VDC's on the IRS campaign
- Refresh HSAs and volunteers on IRS campaign and messages
- Mentor and conduct drama performances on IRS issues
- Launch district IRS campaigns
- Conduct village meetings and door-to-door visits to disseminate IRS messages
- Distribute letters to churches, mosques, and schools with IRS messages
- Publicize IRS messages through community warners (criers) and community radios
- Distribute IEC materials
- Collect baseline information on community knowledge and perception of IRS in all IRS districts
- Supervise IRS mobilization campaigns
- Conduct post spray feedback meetings with DEC, ADC's, VDC's and communities
- Conduct post spray district review meetings

Procurement planning process workshop: Twenty-nine participants (IRS coordinators, DEHO's, IEC Officers and Malaria Coordinators) attended the two-day workshop from June 20–21, 2012 to discuss IRS procurement processes. The workshop introduced participants to geographical reconnaissance for IRS planning, methods used for quantification of IRS commodities, the procurement planning process/cycle, and transportation and inventory management (storage) of IRS commodities.

Review of the IRS Training Manual workshop: A one-day workshop held on June 22, 2012 reviewed the final IRS Training Manual draft. Seven IRS district coordinators and two DEHO's participated in the workshop. The final version will be edited and submitted to the MoH for review and endorsement. The participants made the following recommendations to the NMCP to ensure improved quality IRS in Malawi:

- Geocoding of sprayable structures should be carried out in all seven IRS implementing districts.
- Indoor residual spraying should be started and completed before the peak transmission of malaria (before the seasonal rains).
- Districts need to have adequate storage facilities for IRS commodities and supplies.
- Districts should include IRS activities in District Implementation Plans.
- All IRS implementers to be trained using the standard national training manual.
- Districts should be proactive in sourcing entomological monitoring reports from MAC and NMCP.
- Build the capacity of the districts to conduct entomological surveillance.
- NMCP to provide leadership and guidance on procurement of WHO recommended IRS equipment and insecticides.
- Revamp vector control activities in the context of IVM at the district level.
- Districts to strengthen tracking and sharing of both clinical and confirmed malaria trends.

Data Collection and supervisory tools. In collaboration with NMCP, Chemonics organized a one-day consultative capacity building workshop on July 30, 2012 to review IRS data collection tools including supervisory checklists. Twenty-six District Health Office staff members drawn from the seven districts implementing IRS: Karonga, Nkhata Bay, Nkhotakota, Salima, Mangochi, Chikwawa and Nsanje, participated in the one-day workshop. The participants comprised seven district Health Environmental officers, seven district IRS coordinators, seven IEC/BCC officers, three district malaria coordinators and one NMCP IRS coordinator. The participants reviewed mobilizer data collection form, spray operator data collection form, supervisors'/team leaders' checklist and environmental compliance checklist. The tools will be used for the 2012 IRS campaign.

Project Field Technical Staff capacity building. In view of the change in scope of work from direct IRS implementation to the provision of technical support in building capacity for the MoH, Chemonics organized a 10 days capacity building workshop August 6-19 to orient the five Chemonics field technical staff to their new role of capacity building of the NMCP. A Human Resource and International Training Consultant from the Chemonics Home Office provided STTA from July 9-19, 2012 to the field technical staff in capacity building. The main outputs of the capacity building workshop were course design documents and instructor guides for training of spray operators, mobilizers, warehouse managers, supervisors/team leaders, mosquito collectors and data management personnel. The process to finalize the tools is still under way and is expected to be completed in the next quarter (October - December 2012). A consultative workshop is planned in the first quarter of the 2012 FY to familiarize NMCP with the capacity building tools.

Planning for the 2012 IRS campaign. In collaboration with NMCP, Chemonics organized a four-day capacity building workshop from July 31 to August 4 to prepare the seven IRS districts for the 2012 spray campaign. Twenty-six District Health Office staff members drawn from the seven districts implementing IRS (Karonga, Nkhata Bay, Nkhotakota, Salima, Mangochi, Chikwawa and Nsanje), participated in the four-day planning workshop comprised seven District Environmental Health officers, seven district IRS coordinators, seven IEC/BCC officers, three district malaria coordinators and one NMCP IRS coordinator. The workshop covered the following topics:

- Experience and lessons learned from previous spray rounds
- Procedures for determining and recruiting seasonal workers
- Development of district calendar of events for 2012 IRS campaign
- Community mobilization for 2012 IRS campaign
- Management and tracking of IRS commodities including insecticide during spraying
- Supervision and monitoring during spraying
- Factors to consider when developing a spraying schedule
- Logistics (stores & transport etc.) preparedness at district level

At the end of the four days, district calendar of events/ implementation plans were developed and the participants agreed on the following urgent action points:

- The NMCP to verify district storage facility capacity prior to distribution of insecticides to the various districts.
- The districts to ensure that pump maintenance is conducted by 3rd week of September.
- NMCP in collaboration with Chemonics to conduct the following training workshops between August and September, 2012 for district Health office staff:
 - Workshop to review capacity building tools
 - Workshop to train Trainers for spray operators
 - District meetings to develop district implementation schedules
 - Data management and mobilizers' training workshops

- NMCP in collaboration with Chemonics to discuss and agree on areas to be sprayed with Actellic 50 EC left over from the 2011 spray campaign.

District IRS implementation planning. Following the national level microplanning workshop from July 31 to August 4, all the seven IRS districts conducted five-day workshops to develop district IRS implementation schedules for the 2012 IRS campaign. During the workshops, participants achieved the following: shared lessons learned from previous spray campaign, gathered data required for preparing detailed plans for conducting IRS, developed calendar of events for 2012 spray campaign, identified district IRS logistic and human resource needs, identified hard to reach areas and developed mechanisms on how to reach such areas, developed a list of community mobilization activities and implementation plan. Table 6 shows the number of participants who attended the workshops.

Table 6: Participants to District IRS Implementation Planning Workshops

District	Date(s) of training	Number of people trained		
		Total	Male	Female
Nkhotakota	August 8-12, 2012	36	31	5
Nsanje	September 8-12, 2012	36	34	2
Chikhwawa	September 8-12, 2012	36	32	4
Salima	September 8-12, 2012	31	30	1
Karonga	September 8-13, 2012	40	33	7
Mangochi	September 11-15, 2012	55	46	9
Nkhata Bay	September 20-24, 2012	29	27	2
Total		263	233	30

Training of Trainers (TOT) for Spray Operators: A six day training of spray operator trainers was conducted for DHO staff from the seven IRS implementing districts. Experienced facilitators from the NMCP, Nkhotakota DHO, Illovo Sugar Company in Nkhotakota and Chemonics field office facilitated the training. The training was divided into two sessions to reduce the number of participants so as to ensure proper management and acquisition of knowledge and skills. The first session was conducted from September 02-8, 2012 in which forty five Environmental Health Officers participated while the second session was conducted from September 10 – 15 in which fifty three Environmental Health Officers participated. Participants gained knowledge on: the basics of malaria vector and transmission, IRS operational strategy, the insecticides used in IRS, environmental compliance in IRS, the safe storage, transportation, and disposal of insecticide, emergency preparedness, IEC and social mobilization, data collection and reporting tools, monitoring, supervision and quality assurance, commodity tracking and logistics management and gained skills in pump preparation, handling, and maintenance, and spraying techniques.

Environmental Compliance Assessment Training. Chemonics, in collaboration with the NMCP, organized a capacity building training on environmental compliance assessment. The training was attended by thirteen Environmental Officers drawn from departments of health, and environmental affairs in all the seven IRS implementing districts. The three-day training held on September 10-12, focused on supervision and monitoring of environmental compliance in IRS before, during and after IRS campaigns. The workshop comprised of theory and field practical and was facilitated by an external consultant and a lecturer from Bunda College of Agriculture. The lecturer from Bunda had previously been trained on IRS and conducted IRS compliance inspections for the Malawi IRS project on behalf of the Environmental Affairs Department. Participants gained knowledge in Environmental Health Impact Assessment, Malawi Environmental Compliance Regulations, Environmental best practices and monitoring IRS implementation for environmental compliance.

TOT for Warehouse Managers and Training of Pump Maintenance Technicians. Chemonics in collaboration with NMCP organized a two-day stores management and pump maintenance training workshop in preparation for the 2012 spray campaign. Fourteen stores supervisors and 14 pump maintenance assistants drawn from seven IRS implementing districts participated in the workshop. The training was carried out from August 3-4, 2012. The first day focused on stores management for 14 stores supervisors and the second focused on pump maintenance for the same 14 stores supervisors joined by 14 pump maintenance assistants.

Warehouse management training: Following the TOT for warehouse managers, Chemonics supported DHO staff to conduct one day warehouse management training for district personnel (warehouse assistants) in all the seven IRS implementing districts. The purpose of the training was to equip participants with knowledge and skills to transport, store and distribute IRS commodities as well as orient them on IRS wastes management; pump care and proper management of PPE. The table below summarizes the number of personnel trained in warehouse management in each district:

Table 7: District personnel trained in warehouse management

	District	Number of personnel trained		
		Total	Male	Female
	Nsanje	16	10	6
	Chikhwawa	11	8	3
	Mangochi	21	15	6
	Salima	14	11	3
	Nkhotakota*	0	0	0
	Nkhata Bay	13	6	7
	Karonga	15	10	5
	Total	90	60	30

*Note: Nkhotakota will not spray in 2012 owing to resource constraints.

Training in IRS data management. In collaboration with NMCP, Chemonics organized two two-day training sessions of capacity building workshops on IRS data management for HMIS Officers and data clerks from seven IRS implementing districts. The training aimed to improve quality of data; ensure adequate documentation, analysis and sharing data on performance of IRS; and increase accountability of IRS programs to various stakeholders.

The first session, held on September 18-19, was a TOT for seven Health Management Information System (HMIS) officers drawn from all the seven districts implementing IRS: Karonga, Nkhata Bay, Nkhotakota, Salima, Mangochi, Chikwawa and Nsanje. The overall purpose of the training was to provide knowledge and skills on how to conduct training on IRS data management and how to supervise and monitor data management during an IRS campaign. The second session, held on September 20-21 was for twenty seven data entry staff drawn from all the seven districts implementing IRS. The training was to provide them with knowledge and skills on IRS data management during an IRS campaign.

Participants to both workshops gained knowledge on basic concepts of IRS, the importance of IRS data collection and reporting and key IRS indicators that are collected. Participants further gained skills in filling IRS data collection forms, checking data forms for accuracy and completeness, monitoring data flow, entering and analyzing data, and producing basic IRS performance reports. Participants to the TOT workshop co-facilitated the training of data entry staff under the supervision of the NMCP and Chemonics staff as part of further building their skills as trainers.

The table below provides a summary of persons that were trained broken down by type of training, as well as the category of the participants segregated by gender:

Table 8: Trained Personnel

	Type of Training/Cadre	All 7 districts implementing IRS		
		Total	Male	Female
1	IEC/BCC Strategy Review Workshop	23	21	2
2	Procurement planning workshop	29	27	2
3	Training Manual Review workshop	29	27	2
4	Data collection and supervisory tools review workshop	26	24	2
5	Micro planning workshop	26	24	2
6	District implementation planning workshops	263	233	30
7	TOT (Malawi College of Health Sciences)	3	1	3
8	TOT (Polytechnic)	8	7	1
9	TOT (Spray Operators)	98	93	5
10	TOT (Data Management)	7	7	0
11	Data clerks training	27	14	13
12	TOT (warehouse management)	25	20	5
13	Environmental Compliance Assessment	13	11	2
14	Warehouse management	90	60	30
	Total	667	569	99

Pump maintenance. Chemonics contracted two pump technicians to repair and service faulty spray pumps. The technicians worked for 12 days in Lilongwe warehouse and repaired/ serviced a total of 413 pumps. A total of 187 pumps required to be repaired. Of the 187, 169 required minor parts such as tube O rings and Teflon washers. Fifteen pumps have broken triggers, two (2) have broken handles and one (1) needs panel beating. The following parts are needed to repair all the 187 pumps (Table 9). The 187 pumps were the faulty ones from the 2010 procurement, and which were replaced by Hudson.

Table 9: Spare parts needed to repair 187 pumps

Type of spare part	Quantity
Valve body assembly	15
Supply tube	187
Supply tube O-rings	187
Teflon washers	187
Pump oil, pratley and sand paper	

Storage facility assessment: Chemonics in collaboration with DHO staff conducted storage facility assessment in all the 7 IRS implementing districts to determine maintenance/repair requirements and also to know the quantity of essential storage facility equipment required. The assessment was carried out using a standard storage assessment checklist. The information obtained helped to determine maintenance/repair requirements for the storage facilities in each of the six districts.

2.11 Review of the Impact of IRS in Nkhotakota

IRS has been implemented in Nkhotakota District since 2007, but there are concerns regarding the availability of quantitative data documenting the impact. A PMI technical supervisor recommended that

an impact review be conducted in the district to determine the impact on agriculture and education. The Chemonics team visited Nkhotakota from March 20-23 to follow up with the schools and the agricultural department and record quantitative information on IRS impact since the inception of the spraying. Separate meetings with the district education officer and the agricultural officer were held to obtain their concurrence for Chemonics to carry out the visits. A total of five randomly selected primary schools were visited and discussions held with the head teachers to review school attendance, especially absenteeism due to health related causes. They also visited three district agricultural extension offices and reviewed the agricultural production and whether the officer could link production to the incidence of malaria.

Preliminary findings: The officers explained there has been improved school attendance and work on the farms since IRS commenced.

Agriculture department – There was a common impression that IRS had improved the agricultural production due to reduced malaria incidence, although there was no tangible information to support this response. The officers stated that while improved agricultural inputs and good weather had positively impacted the increased crop production, the reduced malaria attacks on families had significantly improved work in the field with timely planting, weeding and harvesting. In previous years, they had recorded high absenteeism in farmers’ meetings and poor weeding time with crops being left uncared for when farmers were either sick with malaria or at the hospital to care for a sick relative. These incidents have been greatly reduced since IRS started, and they have continued to decline. However, they could not give any quantitative figures since it was not recorded, nor did they follow up with families to establish the actual illness that lead to absenteeism during meetings.

Schools – Of the five schools identified to be visited, only four schools were reviewed with one having no teaching staff in the compound during the visit. The four schools did not keep records stating the actual health problem that led to the absenteeism; they only indicated that the pupil or teacher was away due to illness. Only one school had some scanty records of the cause, but it was from the verbal report of the teacher or the person who noted the absenteeism, not medical records. Although the head teachers explained that there had been reduced cases of absenteeism due to illness since IRS started, they based it on personal experience. They said that they noted a large reduction in malaria incidence.

Conclusion: Apart from the entomological data collected by MAC in Nkhotakota and epidemiological data collected by Illovo at its Matiki Clinic, there is no quantitative information available in the education and agriculture sectors on the impact of IRS in reducing malaria morbidity. There is, however, the potential to build the capacity within these institutions to maintain records on malaria and other illnesses contributing to absenteeism and reduced agricultural activities. All the participants in these reviews agreed that it would be very helpful to know the causes and also to solicit support from the health facilities to manage these diseases. Chemonics will discuss these findings and recommendations with the DHOs and the NMCP for potential action with the District Health Management Teams (DHMT).

2.12 Strengthening Monitoring and Quality Assurance

The project developed and implemented activities in monitoring and quality assurance to ensure that IRS activities are implemented efficiently, adhere to high quality standards, are cost effective, and are compliant with environmental protection and human safety requirements. The activities included the development of supervision and monitoring plan; a review of the spray operator data collection form; a review and improvement of the insecticide accountability forms and commodity distribution form; the review of the supervision checklist; and the development and pretesting of an Access database. The Access database has since been finalized and will replace the Excel datasheets used in previous spray campaigns. These efforts, complemented by other initiatives such as IRS guidelines, development of IRS

training manual, and communication strategy, helped to enhance IRS quality. The following are the major M&QA activities carried out during the year:

2. 12.1 Development of a Plan for Enhanced Supervision

Chemonics developed a supervision plan for the 2011 spray campaign which guided the day-to-day IRS supervision and monitoring support. This plan was created and implemented to ensure spray teams and all others support teams adhered to standard procedures, techniques, and environmental compliance guidelines; to provide appropriate and adequate information to household owners; and to collect complete, accurate, and reliable spray performance data.

The supervision plan involved following up with the spray operators and observing the spray operations in the villages; discussing the success of the intervention with randomly selected households in areas where spraying had taken place; discussing the progress of the spray campaign with local leaders and identifying their concerns regarding the IRS activity; and conducting spot checks and review of completed spray operator data forms and insecticide usage in the field.

Furthermore, supervision and monitoring involved close observation and follow up of all IRS operations to ensure that they were being implemented in accordance with standard procedures listed below:

- Spraying implementation schedule and coverage
- Availability and appropriate use of PPE
- Spraying techniques
- Progressive rinsing
- Commodity tracking/insecticide management.
- Community mobilization- acceptance, resistance, refusal and the effectiveness of the methods used
- Data collection, quality and analysis
- Transport and fuel consumption

Supervision and monitoring activities were organized and implemented at various levels as follows:

Field level:

Supervision of spray operators by team leaders. The 71 team leaders directly supervised the 355 spray operators, who were in turn supervised by the 37 team supervisors. Each team supervisor was assigned 2 teams consisting of 12 members (2 team leaders and 10 spray operators).

Supervision of spray operations by site managers. Site managers were responsible for managing the whole operation in their sites including field monitoring and supervision of the IRS performance. Site managers also followed up with spray operators and observed their spray operations in the villages. The key areas of supervision were:

- Appropriate use of PPE
- Spraying techniques
- Commodity tracking/insecticide management.
- Community mobilization- acceptance, resistance, refusal and the effectiveness of the methods used.
- Data collection (filling in of forms)

Meetings held by site managers. Site managers convened team meetings at the site level on a daily basis to review each day's operations and plan for the next day's mobilization and spray plans. During the site meetings, teams discussed issues on coverage, compliance (use of PPE and progressive rinsing), and

community mobilization and approach. Some challenges identified were resolved at site level, while those beyond the capacity of the site were reported to the district for further support and decision making.

Supervision of spray teams by communities. Communities also provided supervision support by observing the actions of spray operators to ensure that spray operators mixed the insecticide properly. Communities also communicated with supervisors on how the spray operators were conducting the spray operations. This ensured that spray operators conducted themselves professionally and complied with the recommended guidelines.

District level:

Supervision of spray operations by district supervisors (daily field spot checks). A senior level of supervisors from the district and national level provided additional supportive supervision to all the teams to ensure adherence to IRS principles and guidelines. They made daily field visits to all sites ensuring that the teams were aware of the high level of supervision. Teams changed areas of supervision frequently to ensure they provided the much required supervision.

District supervisors were constantly coordinating/collaborating with site teams. This was done through following up with the spray teams in the field and discussing with them any observations made. The district supervisors, site managers, team supervisors and team leaders were also provided with airtime for their mobile phones to ensure frequent communication at all levels. This ensured that issues once reported were instantly handled on spot.

IRS progress review. Weekly IRS progress reviews were held at the district level to assess and share progress of IRS campaign, lessons learned, challenges and address issues faced by the spray teams. The meetings were headed by the District IRS Coordinator, from the DHO staff. Participants to the review meetings included DHO staff, site managers, team supervisors, and Chemonics staff.

National level:

Supervision by Chemonics staff. National level supervisors also provided ongoing supervision of the spray operations through follow up of the spray teams and providing them with guidance, as well as participating in district weekly review and planning meetings. The national level supervisors included: the Chemonics Chief of Party, Finance Manager, Logistics Officer, Office/Administration Manager, IEC/Capacity Building Officer, and M&E Officer. The Chemonics team temporarily relocated to Nkhoskoti during the training and implementation period. In addition, the PMI/USAID national team and NMCP Program Manager provided supervision during the operations.

International supervision. In addition, supervisors from international level also provided valuable support supervision to the field teams from time to time. These included staff from PMI (DC), and the environmental inspector from GEMES.

2.12.2 Data Quality Assurance

Several measures were conducted to ensure data was collected in a timely, efficient, and high-quality manner. The following are some of the accomplishments:

- Conducted a two day pre-spraying planning meeting with data entry clerks on November 10-11 to refresh their skills on data entry in the access database.
- Conducted further review and modification of the data collection and analysis tools (spray operator data collection form and database) in consultation with USAID/PMI and in collaboration with NMCP in order to ensure a common understanding of the data collection tools and consistent IRS indicators.
- Trained 23 data clerks on data management and reporting on October 21-23, 2011 in preparation for the 2011 spray campaign. The data clerks were drawn from all the seven IRS implementing

districts in the country, of which five (5) were from Nkhosokota. Eighteen were from the other six government supported districts. The training was organized and financed by Chemonics. The content focused on: filling the data forms; data quality assurance including detection of errors and appropriate corrective measures to take; data entry into the IRS database, roles and responsibilities of various players in data collection, verification, entry, analysis and reporting.

- Piloted the new database developed using the MS Access & MySQL softwares using the actual data collected during the IRS campaign and also entered the same data into the Excel database. The double entry served as a quality control measure. Once the new data base is revised and finalized, the NMCP plans to use it countrywide in all the seven IRS implementing districts. This database is expected to significantly improve analysis of IRS data and generation of reports, thereby strengthening IRS data management and quality assurance;
- Developed a supervisory checklist for all the levels of the IRS supervisors;
- Compiled and analyzed coverage reports on a daily and weekly basis. The coverage updates were shared with PMI and other stakeholders.
- The project carried out further cleaning of the 2011 IRS coverage data in MS Access for accuracy. This involved a critical review of the data in the IRS database and checking conformity with the raw data in the hard copies, and re-entering it in an excel sheet for quality assurance. The MS Access & MySQL software was developed and used for the first time during the 2011 spray campaign and was subjected to quality control through the double entry in the excel sheet. The final data was used to generate the End of Spray Performance Report.

3.0 Challenges and Solutions

Throughout implementation, Chemonics and DHO staff continuously documented and shared progress and experiences on IRS activities. Challenges faced were discussed and solutions were identified to address them and to inform decision-making. The following were the major challenges experienced during the IRS implementation:

3.1 Accessibility

Some areas in Nkhosokota are difficult to access because of bad terrain and poor condition of the roads. In Lupachi, for example, some areas cannot be reached by a vehicle or motorcycle. Spray operators therefore had to walk long distances over long hours (6 hours) to reach structures for spraying. As a result, most spray operators were not able to meet their daily target of 10 structures. On average, most spray operators were spraying a maximum of 8 structures per day.

Solutions. In the case of Lupachi, a motorcycle was made available to transport spray operators closer to some of the target areas where a vehicle could not reach. As this was an expected hardship discussed during the pre-spray preparation period, spray operators were recruited from Lupachi since they are used to the difficult terrain, and know the area well. Teams also camped in the very hard to reach areas such as Mataliyana in Lupachi operational site, Namakwati in Mkaika operational site, Malowa in Mwansambo operational site, Chauma in Dwangwa operational site, Nakutuwa and Galeta in Benga operational site, Makhenjera, Kalirangwe and Kawerenga in Boma operational site.

3.2 Resistance by Beneficiaries

Despite the various efforts carried out to mobilize communities for IRS, the campaign experienced some resistance and refusal in some areas, mainly within the main trading centers and along the lakeshore strip. Some communities refused to have their structures sprayed mainly due to ignorance and did not relent even with the intervention of the district commissioner's office. Others refused because they did not

receive free LLINs distributed by NMCP under the universal net coverage program or because their households did not benefit from the agricultural input subsidy coupons. The major areas where refusal was encountered included: Vinjenje, Mgomba, Mbaluko and Malasa in TA Malengachanzi (Boma operational site); Mbuna and Kanyenda villages in TA Kanyenda (Dwangwa operational site); Bango, Mtalanje, Kanyangale and Chopera villages in TA Mwadzama (Mkaika operational site); Chimweyo and Linkhumba villages in TA Kafuzira (Dwambazi operational site); and Mangulenje village in TA Mwansambo (Mwansambo operational site).

Solution. The project intensified implementation of IEC activities to convince communities to accept their structures to be sprayed. Chemonics staff worked together with the District Health Office and the district IRS technical committee to air messages through the local radio and used motorcycles and vans fitted with megaphones and drove around in the villages providing IRS messages. In addition, Chemonics organized meetings with the District Commissioner and the DHO, who in turn held meetings with community leaders. The community leaders further held various meetings with their subjects in their respective areas. This helped convince some community members who then later allowed spray operators to spray their structures.

3.3 Fuel Shortage

Malawi experienced an acute countrywide fuel shortage that threatened the implementation of the spray campaign. IRS is highly dependent on transport, and any shortage can gravely affect the implementation of the spray campaign. This delayed the start of the spraying by two weeks from November 1st to 14th as the team searched for alternative options.

Solution. Chemonics partnered with Illovo Sugar Company and Total Malawi for bulk supply and storage of fuel. Total provided fuel while Illovo provided storage facilities within the company premises. The fuel was then supplied from Illovo storage to vehicles in the various operational sites on a daily basis. The Malawi Energy Regulatory Authority (MERA) gave approval for the fuel transportation in containers. This arrangement was a clear demonstration of the effectiveness of partnership and corporate social responsibility.

3.4 Insecticide Pilferage

With the intensive training and supervision in place before and during the IRS implementation, compliance was in general very good among various IRS implementing cadres in all the sites. However, there were two isolated incidents of insecticide pilferage that were reported and followed up as follows:

One incident involved a spray operator at Mwansambo operational site who sold one liter of insecticide to a community member. One of the supervisors overheard the community member talking about the insecticide which he had bought from a spray operator. The site manager followed up on the issue and reported to police who instituted further investigations. The spray operator had emptied the insecticide in another container and accounted for all the insecticide bottles he had received on the particular day. The suspected spray operator disappeared as soon as the investigations were instituted and is still at large. It was, however, revealed that the suspected spray operator had a previous criminal record. The police are still tracking the suspect.

Another incident involved a spray operator in Katimbira (under Boma operational site). A community police member reported a spray operator who was suspected of selling insecticide. The matter was reported to police who conducted an investigation and found six liters of undiluted Actellic emptied from the original bottles into other containers in the house of one of the spray operators. The spray operator was apprehended and the police are still following up on the case. The program withheld payments to the

spray operators implicated in both incidents and both of them have been blacklisted and will not be eligible for recruitment in future IRS operations.

Considering the quantities involved in the above pilferage incidents, this clearly demonstrates the positive impact of the intensified training provided to implementers and the enhanced supervision and monitoring mechanisms that were put in place during IRS implementation. In addition, it shows the added value when the program partners with the community. However, this still calls for increased monitoring and supervision of spray operations by various stakeholders in order to prevent insecticide pilferage in future IRS campaigns. In view of this, Chemonics will continue to support district stakeholders and local communities to develop strategies on how to prevent this malpractice and put in place mechanisms for tracking the culprits so that they can face justice as a lesson and deterrent to others.

3.5 Supervision Negligence

In another isolated incident, the site manager for Mwansambo was negligent in his duties as he allowed one team leader to work without adequate PPE. The district supervision team warned the site manager and team supervisor, and advised them to ensure that all IRS implementers are appropriately dressed in full PPE as per guidelines. One week after this incident, supervision by the district team revealed that the same supervisor and his team members were found operating without adequate PPE. The issue was reported to the DHO who relieved both the supervisor and site manager of their IRS duties immediately.

3.6 Poor Commitment by Mobilizers

During supervision of mobilization and actual spraying, it was noted that some HSAs were not committed to their IRS mobilization roles to the effect that they did not conduct the door- to -door mobilization in their respective catchment areas as required by the program. In view of this, the majority of the concerned communities were not aware of the dates when spray operators would spray in their homes and therefore resisted to have their structures sprayed. The major areas affected were Nkhongo and Kalebe villages in TA Malengachanzi under Mkaika operational site, and Chisaka village in TA Mwadzama under Benga operational site.

Solution. IEC officers from Chemonics and the District Health office used motorcycles and a vehicle fitted with a megaphone and drove through the villages providing IRS messages. In addition, meetings were convened with local leaders who in turn held meetings with the concerned village heads and urged them to take a leadership role in sensitizing people under their respective areas and ensuring that all community members agree to have their structures sprayed. Following these interventions, a majority of the village members welcomed the spray operators and agreed to have their structures sprayed.

3.7 Change of Scope of Work

The major challenge faced during this period was the shift in the scope of work from directly implementing spraying to capacity building of the NMCP. This required many discussions with USAID and PMI that resulted in revised contractual scope of work in July, 2012. Official confirmation in the change of the scope of work was delayed, and orienting staff to their new roles and responsibilities was also a challenge. The main objective of the revised SOW is to build the capacity of the NMCP and public and private sector to implement an effective and sustainable IRS campaign in an environmentally sound manner. The new approach means that the NMCP becomes the primary driver of IRS, with technical assistance from the project. This poses a challenge in that some of the project activities will greatly depend on the NMCP's ability to provide human, financial, and programmatic resources required to implement these activities.

Solution. Chemonics engaged NMCP, USAID, and PMI in a series of consultative discussions to obtain clear definition of the new scope of work. The Project Director and Project Associate from the Chemonics Home Office based in Washington, D.C., visited Malawi in May to participate in discussions on the new scope of work. Priority areas for the revised scope of work were identified and a work plan for the period May–September 2012 was developed. Chemonics is very confident that it will be able to strengthen the capacity of NMCP to carry out the 2012 IRS campaign. Chemonics further sent a Human Resource and International Training Consultant from Home office to train Chemonics project staff in skills they needed in their new role of providing technical support to NMCP.

3.8 Disposition of Actellic 50 EC

The disposition of Actellic 50 EC continued to pose a serious challenge. In 2011, the project procured 47,508 liters of Actellic 50 EC and had in stock 172 liters left over from the 2010 spray campaign. The project used 37,190 liters to spray 77,647 structures in 2011, leaving a total of 10,490 liters in stock. Leftover insecticide was to be used in the following year's campaign, but the change of scope from direct implementation to building capacity of the NMCP created a disposition problem. The challenge was compounded by PMI contractual rules and the fact that the selected insecticide is not commonly used for IRS. The insecticide expires in May 2013 and must be used between now and May 2013.

Solution. Four options were explored: (1) to give the insecticide to the NMCP to use it for the 2012 IRS campaign; (2) to ask the supplier to repossess the insecticide; (3) to send it to programs in Ghana or Nigeria, who have expressed interest in using it; or (4) to sell it to a local agricultural company. The first option appears to be the best option and the NMCP has indicated some interest in using the insecticide. The second and third options failed because the supplier was not willing to take back the chemical, and the two countries thought the chemical was the long-lasting type, and declined. USAID and NMCP discussed further and settled for the option of using the insecticide to spray part of Salima district in the 2012 spray season.

3.9 Office Space

There has been change of ownership of the building complex where Chemonics was housed. The new owner wanted to use the whole building and all tenants were asked to vacate the building. Given the improved relations with the donor community, NGOs who had left the country are now returning and occupying office space in Lilongwe.

Solution. The project identified two offices in Lilongwe and negotiated with the owners, then relocated to one of the buildings (Casa de Shez) in the heart of the city center.

3.10 Devaluation of Malawi Kwacha

Another key challenge is managing the devaluation of the Malawi kwacha. The kwacha was devalued by 49 percent on May 7, 2012. This followed an initial devaluation of 10 percent in August 2011. In addition, the foreign currency exchange market was liberalized. As a result of the liberalization, the Malawi kwacha further depreciated by 20% between May and October, 2012. This has led to escalation of commodity prices by various margins of up to more than 100 percent. The inflation resulted in increased cost of living.

Solution. Chemonics with guidance from the USAID reviewed the situation in August and adjusted staff salaries through a one-time cost of living adjustment, in an effort to curb the negative impact of the devaluation. Chemonics will continue to observe the economic situation and take appropriate measures, as needed, in consultation with the USAID.

4.0 Lessons Learned, Best Practices and Success Stories

The project documented experiences and shared lessons on an ongoing basis. This helped to inform timely decision making, thereby contributing to more effective IRS implementation. Below are some of the major lessons learned during the period under review.

4.1 Lessons Learned

4.1.1 Enhanced partnership contributes to smooth and effective IRS operations.

Chemonics made efforts to strengthen partnerships with various stakeholders (Government, private, and community) who provided support towards the success of the IRS campaign. Examples include:

- Private partnership with Illovo: Chemonics held a series of discussions before partnering with Illovo Sugar company and Total for bulk supply and storage of fuel. Total provided fuel while Illovo provided storage facilities. The arrangement helped to ensure that fuel was available throughout the spray campaign.
- Community partnerships: Community partnership through increased involvement of volunteers, and traditional and religious leaders during the IRS planning and implementation enhanced monitoring of IRS, early reporting of suspicious behavior and malpractice; and helped to build sense of ownership among various district stakeholders. Partnership with Community Policing forums, Chemonics and DHO's office entered into a partnership with Nkhotakota Police office with the purpose of tracking spray operators to prevent insecticide pilferage. In all districts in Malawi, communities with support from the District Police Offices, are required to establish community policing forums whose main responsibility is to prevent and / or to report theft cases in their catchment areas to the police. As such, Chemonics in collaboration with DHO and the District Police office, mobilized community volunteers who are members of the community police forum and conducted sensitization meetings on their role in monitoring IRS implementation, especially with regard to tracking of IRS commodities in general and insecticides in particular. These sensitization meetings took place on December 4 & 5 and involved a total of 130 community members in all the 6 TAs in the district as follows: Mwangambo (20 members), Mwadzama (28 members), Mphonde (15 members), Kanyenda (27 members), Kafuzira (20 members) and Malengachanzi (20 members). This arrangement helped to strengthen commodity tracking during spraying in Nkhotakota and reduced potential insecticide pilferage.

4.1.2 Joint planning, supervision and monitoring, instrumental for building program ownership and sustainability.

There was enhanced involvement of the district health team and other stakeholders during the 2011 IRS planning, implementation, supervision and monitoring, as follows:

- The DHO provided leadership in planning IRS activities, held discussions with local leaders to sensitize communities about IRS, recruited and trained various cadres of IRS implementers, and conducted ongoing supervising and monitoring of the spray operations. Further, the DHO's office and department of community development provided motor cycles for supervision and 2 warehouses for storage of commodities. The local radio (Nkhotakota community radio) continuously aired messages on IRS implementation prior to and throughout the spray campaign. The district commissioner's office convened further meetings with local leaders to convince communities to allow spray operators carry out spray operations.

- A trainer from Illovo Sugar Company facilitated the training of 21 clinicians selected from each of the health facilities in preparedness for responding to insecticide poisoning. The Illovo management, provided facilities for bulk storage of fuel, and further provided 8 spray operators and 2 supervisors throughout the spray campaign.
- Chemonics further conducted a logistics needs assessment and procurement of insecticides and other commodities and arranged logistics for transporting the various commodities to the district and operational sites. Chemonics also participated in and gave guidance to development of district IRS plans, supported training of the various cadres of IRS implementers, and provided support to the district team in supervising and monitoring IRS operations for quality assurance. The joint efforts enhanced IRS quality and insecticide accountability. Involvement of and leadership from the district teams in IRS activity planning, implementation, and monitoring are key steps in building their sense of ownership to ensure sustainability.

4.1.3 Strategic community mobilization enhances IRS acceptability.

There was a well-planned strategy for community mobilization prior to spraying. This involved a combination of mass sensitization through the radio and community meetings; and door-to-door interactive discussions, where mobilizers went around the villages and discussed with community members about IRS in their respective homes. As a result, the community responded very well to the messages by the mobilization team, by allowing the spray operators access into their houses in most areas, and this contributed to smooth implementation of spraying activities. Mobilizers were involved as advance team to check household's preparedness before arrival of spray operators and this proved to be time saving particularly where the households complied with the messages. However, in some areas, the door-to-door strategy did not work out successfully as some mobilizers did not visit the individual homes. It is recommended that in future spray rounds, other mobilization strategies be explored and implemented to improve further IRS acceptability among communities.

4.1.4 Systematic data collection and reporting enhances IRS quality.

The project developed and implemented various activities in data management and quality assurance to ensure that IRS data collection and reporting is of high quality. The activities included the development of a supervision and monitoring plan; a review of the spray operator data collection form; a review and improvement of the insecticide accountability forms and commodity distribution forms; a review of the supervisory checklist; and the development and pretesting of an access database. IRS implementers were able to collect and analyze data and produce performance reports timely to inform program decisions. The access database has been finalized and will replace the excel datasheets used in previous spray campaigns. These efforts, complemented by other initiatives such as development of IRS training manual helped to enhance quality of IRS data and reports.

4.2 Best Practices

The project developed a code of conduct for participants in the 2011 IRS campaign, taking into account that IRS requires that the implementer interacts with community members with different temperaments, economic classes and religious beliefs; and that IRS activity requires high levels of discipline and commitment for the achievement of the program goals. Each spray operator was given and signed a copy of the code of conduct to abide to his/her roles and responsibilities. This helped to maintain the interaction between the spray teams, communities and the program management at all levels and to ensure that the key spray operations team members (Spray Operators, Team Leaders and supervisors) were responsible for ensuring professionalism, human safety and environmental compliance and maintaining good relationships with the communities. It also served to support disciplinary measures taken as each spray operator and team leader signed and agreed to comply.

4.3 Success Stories

The project managed to complete the incineration of the waste through the good partnership with the St. Gabriel's Mission Hospital and the private partnership with Illovo Sugar Company.

The large majority of IRS beneficiaries (almost 92 percent) expressed great satisfaction with the 2011 spraying campaign. *"We are all eager to continue having our houses sprayed because we have seen the benefits. Malaria cases have now reduced. We are ready to open our doors even if you say you are coming back tomorrow"*. FGD participant, Tepetu village, GVH Lowani, T.A. Kanyenda. February, 2012.

The project made major achievements in incorporating IRS training modules into the pre-service Environmental Health Modular Curricula of Malawi College Health Sciences and the Malawi Polytechnic of the University of Malawi. This provides an opportunity for establishing a pool of personnel trained in IRS operations and management for sustainability. The Malawi College of Health Sciences and the Polytechnic will train Environmental Health Officers who, upon graduation, become IRS district coordinators while Bunda College will train Environmental Officers who supervise and monitor environmental compliance in IRS before, during, and after IRS campaigns. The Assistant Registrar of the Malawi College of Health Sciences is very excited about the initiative, stating:

"As a college, we are very delighted to be the first institution to incorporate IRS in the training curriculum. We are optimistic that this initiative will strengthen IRS management which, in the long run, will certainly contribute to the reduction of malaria in Malawi."

The project is developing a documentary which will provide useful insights for a successful IRS campaign and will serve as a best practice resource material to guide planning and implementation of IRS campaign. Chemonics engaged a media consulting firm (Tenacious Multimedia Firm) to shoot a documentary during the 2011 spray campaign. The field shooting covered the entire process of the spray campaign from the trainings, community mobilization, actual spraying, supervision and monitoring of the spray campaign activities and involved various stakeholders at the community and district levels which included IRS implementers, local leaders, beneficiaries and policy makers (NMCP), and PMI/USAID. The documentary will serve as a training and IEC tool for IRS implementers and will also be useful for advocating IRS to policy makers, donor partners and other stakeholders.

Partnership gets IRS integrated into college curricula. Realizing that sustainability of IRS as a malaria prevention strategy relies heavily on creating a pool of Malawians with skills in IRS, Chemonics initiated the incorporation of IRS training modules into the pre-service Environmental Health Modular Curricula for Malawi College of Health Sciences, the Polytechnic of the University of Malawi and Bunda College of Agriculture. The training modules cover practical IRS management and operations that aim to establish a solid IRS managerial and operational foundation for the students. To date, Chemonics supported NMCP in building its capacity through incorporating IRS training modules into the pre-service Environmental Health Modular Curricula of higher training institutions in Malawi. So far, capacity of the Malawi College of Health Sciences and the Polytechnic of University of Malawi has been enhanced to effectively train students in IRS management and operations. No wonder, during the trainings, the lecturers demonstrated a lot of enthusiasm and commitment to train students having undergone through both theory and practical components of IRS.

"We are ready to start offering IRS module to our students and to demonstrate this, we will start with the final year students who are graduating this coming November just to make sure they gain knowledge and skills in IRS management and operations before leaving the university" - Head of Environmental Health Department of the Malawi Polytechnic

Monitoring of IRS Environmental Compliance made simple. As environmental compliance is a critical component of any IRS campaign, Chemonics, in collaboration with the NMCP, organized a capacity building training of key staff involved in environmental compliance monitoring and inspection at district level, namely environmental district officer and district environmental health officer. The major focus/emphasis of the training was on supervision and monitoring of environmental compliance in IRS before, during and after IRS campaigns. With the skills acquired, all the districts implementing IRS have now the capacity to adequately conduct environmental compliance monitoring and inspection on their own.

Lessons from Lupachi: programming based on learning from previous campaigns is highly effective. The landscape of Nkhokota district is made up of varied terrain. Most of the eastern part bordering the lake and almost half of the southern part bordering Salima are generally very flat. However, the opposite is true for a greater part of the northwestern area. One particular case is the Lupachi area, in traditional authority Kafuzira, which is one of the most hard to reach areas in the district.

The terrain in Lupachi has deep valleys and sharp hill ranges. For a spray operator to reach Mataliana and Jasitani villages, he has to walk for over six hours in the hot scorching sun, carrying all his commodities for spraying. By the time the spray operator reaches the village, the whole body is sore and he is very tired to spray. He will need to rest and start spraying the following day. After completing spraying, he treks back the same route and distance to the nearest location accessible by vehicle. As a result of proper planning, the villages in Lupachi were all sprayed despite the hardships experienced. The project recruited spray operators who were indigenous to the area and were thus used to the difficult terrain. The commitment of the spray operators and the intensive monitoring and supervisors were also critical factors in ensuring success in the spraying of Lupachi.

5.0 Management and Administration:

5.1 Partnership and Collaboration:

Chemonics made efforts to strengthen partnership with various stakeholders in planning, community mobilization and logistics management. These include: Government departments (community development), NMCP, Illovo Sugar Company, Total Malawi, Dwangwa Cane Growers Limited (DCGL), Nkhokota District Assembly, Nkhokota community radio, local leaders (chiefs and religious leaders) and Christian Health Association of Malawi (CHAM) and Environmental Affairs department (EAD). The IRS stakeholders provided support to the IRS program and this contributed to the success of the IRS campaign. Examples include: DHO and District Commissioner's offices took leadership in community mobilization; Partnership with Illovo Sugar company and Total for bulk supply and storage of fuel. Total provided fuel while Illovo provided storage facilities. Chemonics participated in quarterly PMI partners meetings to share experiences and challenges in malaria control interventions.

The project conducted meetings with District Health Office throughout the year for planning and implementation of post spray activities.

Chemonics participated in quarterly malaria technical working group (TWG) meetings organized by the NMCP and shared technical issues on malaria control.

The project held ongoing discussions with the NMCP to identify IRS gaps that require strengthening, and to plan for the 2013 MOP. The NMCP needed an additional 2,000 sets of PPE and sprayers, temporary storage for 450,000 sachets of alpha-cypermethrin, financial resources to train spray operators, to conduct GR in six districts, to renovate district warehouses, and to dispose of solid waste generated during 2010

IRS campaign. Chemonics provided storage space for the insecticide, supported TOT of spray operators, renovated selected district warehouses and assisted with disposal of solid waste. However, due to financial and contractual limitations, the project was not able to train spray operators, support GR, and purchase PPE and sprayers for the NMCP.

Chemonics participated in the PMI MOP presentation partners' meeting on June 4, 2012 and shared the following achievements and challenges in IRS implementation in Nkhokotakota. The project sprayed 87.7 percent of the 88,490 target structures and protected 321,919 residents, of which 62,032 (19.3 percent) were children less than 5 years old and 8,397 (2.6 percent) were pregnant women. The major challenges during implementation included fuel shortage and refusal of some isolated households to have their houses sprayed. The project resolved the challenges by entering into partnership with a fuel company and intensified community mobilization, respectively. The project shared with participants its new scope of work from direct implementation to capacity building of the NMCP in IRS management and operations.

Chemonics participated in the quarterly malaria technical working group (TWG) meeting held on May 8, 2012 and shared technical experience in malaria control in Nkhokotakota. Members were impressed with the successful IRS operations and learnt valuable lessons which can be replicated in other IRS implementing districts.

The Peace Corps Volunteers organized and facilitated a two-week educational school camp for high school girls at Lilongwe Girls' High School. The high school girls were drawn from districts in Malawi. The Peace Corps volunteers provided training to the girls in many topics including prevention and control of communicable diseases. Chemonics was asked by USAID/PMI to give lectures on malaria to the girls and the Peace Corps volunteers. A representative from Chemonics gave lectures on malaria for two days from July 23-24, 2012. Seventy four girls and four Peace Corps volunteers participated. The lectures covered the definition of malaria, mosquito life cycle, malaria transmission, malaria burden in Malawi, and malaria treatment and prevention. The lectures were well received and the girls and the volunteers will pass on the knowledge to other students in their towns and villages.

5.2 Internal Managerial Input/Technical Support

- Chemonics identified the TOC who joined the Chemonics field team on January 1, 2012.
- The Malaria Consortium was given a stop order for active involvement in the IRS campaign due to funding limitations and reducing the target districts from two to one.
- Staff from Chemonics' home office provided short term technical support to the program before and during the spraying campaign. The support greatly contributed to the smooth logistical and administrative arrangements in preparation for the campaign.
- The project conducted ongoing planning and review meetings with district staff throughout the year in order to ensure adequate preparedness for the IRS campaign and enhance implementation effectiveness.
- In view of the shift of the scope of work, Chemonics organized an internal capacity building workshop to orient the five Chemonics field technical staff to their new role of capacity building of the NMCP. A Human Resource and International Training Consultant from the Chemonics Home Office provided STTA from July 9-19, 2012 to the field technical staff in capacity building.
- Project staff from the Chemonics Home Office provided STTA in developing the revised scope of work and work plan. They visited the project district of Nkhokotakota where they discussed with various stakeholders (district officials and community members), sharing experiences and successes of the IRS project. They were also able to have consultative meetings with USAID and PMI to obtain clarity on the revised scope of work. Equipped with clear information from the

consultative meetings, the two consultants provided support to the project to develop the scope of work and the work plan.

5.3 External Input/Technical Support

Environmental compliance in IRS is essential to prevent human and environment exposure to the insecticide. Several mitigation measures were undertaken in preparation for the 2011 IRS activities in Nkhotakota district. In addition several officers visited the field operations and conducted environmental audits.

6.0 Performance Management Plan (PMP)

In the 2011 IRS activities, PMI reduced the support to the NMCP from targeting two districts to one due to funding constraints. In view of this, Chemonics updated the PMP in 2011 to reflect the revised targets from two districts to only one. However, before the submission of the revised PMP, the project was asked to shift its scope of work from direct implementation to capacity building of the NMCP. The PMP is in the process of being revised further to take into account the revised scope of work. Table 12 provides Progress on Operational Plan Indicators for the period October 1, 2011 – September 30, 2012:

Table 12: Progress on Operational Plan Indicators

Indicators	FY09 Target	FY09 Actual	FY10 Target	FY10 Result	FY11 Target	FY11 Result	Notes/Explanation
Number of personnel trained to deliver IRS in the target districts (M/F) (<i>assuming 75% of participants are male</i>)	N/A	N/A	991 M =744 F=247	1884 M=1310 F=574	1,000	885 M=560 F=325	This refers to core IRS implementing staff excluding support staff such as drivers and washers
Number of structures sprayed with residual insecticide in the most recent round with USG funds	N/A	N/A	134,000	97,329	88,490	77,647	Coverage to provide protection
Proportion of structures targeted in specified districts fully sprayed (# of structures sprayed/# of structures in the district) (<i>At least 85%</i>)	N/A	N/A	104,099	93.50%	82,629	94.0 %	Percentage of the sprayed structures/found (operations process indicator)
			97,329	72.60%	88,490	87.75%	Percentage of the total sprayed /estimated target
Number of people residing in houses sprayed/ number of people protected against malaria with IRS	N/A	N/A	670,000	364,349	379,127	321,919	These are the people reported as residing in the sprayed structures. The target is based on GR data.
Number of districts sprayed in each spray round	N/A	N/A	2	2	1	1	Scaled back to one district
National curriculum for	N/A	N/A	1	N/A	1	1	Draft IRS training manual developed

IRS in collaboration with the NMCP							in 2011. Finalized in 2012. No separate curriculum developed. Instead, curricula of training institutions (MCHS and the Polytechnic) revised to incorporate IRS.
National IRS guidelines developed with the NMCP	N/A	N/A	1	N/A	1	1	Guidelines were reviewed and finalized. Sent the Ministry of Health for endorsement. Will be disseminated in FY 2012
Number of IRS materials printed and disseminated to target communities	N/A	N/A	230,000 Brochure	253,000 brochures	115,000	62,965 brochures	This is a combination of 16,000 procured in 2011 and 46,965 from 2010 spray campaign.
Number of people reached with IRS messages (at least 50% of the estimated 670,000 population)	N/A	N/A	335,000	446,000	379,127	259,887	Various channels were used to dissemination information (i.e. radio, mass gatherings and door to door).
Number of storage facilities/stores identified	N/A	N/A	13	15	9	9	7 satellite stores, 1 district store in Nkhotakota and 1 main warehouse in Lilongwe
Number of staging sites (wash areas and soak pits) constructed	N/A	N/A	12	12	7	7	One in each of the operational sites.

7.0 Annex A: Operational Plan Indicator and Results Table

Indicators	Quarter 1 Oct 1–Dec 31, 2011	Quarter 2 Jan 1–Mar 31, 2012	Quarter 3 Apr 1–Jun 30, 2012	Quarter 4 Jul 1–Sep 30, 2012
Number of TOT workshops facilitated	n/a	n/a	1	3
Number of storage facilities identified and renovated.	n/a	n/a	-	1
Number of institutions incorporating IRS in their curriculum	n/a	n/a	2	2
Number of private sector organizations involved in IRS	n/a	n/a	-	1
Geographical reconnaissance in IRS impact areas conducted.	1	n/a	-	-
Number of “model” staging sites (soak pits and wash areas) constructed	n/a	n/a	1	1
Number of IRS reviews/assessments conducted	-	1 (post IRS perception study)	1 (storage facility assessment)	1 IRS perception study 1 storage facility assessment.
Percentage of people in targeted areas demonstrating acceptance (receptiveness) to IRS	-	91.7 (Nkhotakot a district only)	-	
IRS data quality control and quality assurance system established	Draft working tools developed (forms, checklists and database)	Draft working tools revised (forms, checklists and database)	Further review of Draft working tools (forms, checklists and database)	working tools (forms, checklists and database) finalized and disseminated .
Number of structures sprayed with insecticide with USG support	77,647	n/a	n/a	n/a
Number of people trained in malaria prevention with USG funds	885	7 (beneficiary satisfaction review)	30 29 (procurement processes) 3 (TOT for MCHS)	
Number of Female	325	3	2	
Number of Male	660	4	28	
Number of people protected by IRS	321,919	n/a	n/a	n/a
Number of children under 5 protected by IRS	62,032	n/a	n/a	n/a

Proportion of structures targeted in specified districts fully sprayed (at least 85%)	87.75%	n/a	n/a	n/a
Number of pregnant women protected in sprayed structures	8,397	n/a	n/a	n/a
Number of districts sprayed in each spray round	1	n/a	n/a	n/a
National curriculum for IRS developed in collaboration with the NMCP	Development of IRS training manual & IEC strategy started.	Development of IRS training manual & IEC strategy underway.	Development of IRS training manual & IEC strategy finalized.	IRS training manual & IEC strategy finalized and sent to the MoH for endorsement . To be disseminated in FY 2012
	IRS training curriculum review initiated.	IRS training curriculum review underway.	IRS training curriculum review underway.	Training institutions finalized review of their curricula to incorporate IRS
National IRS guidelines developed with the NMCP		IRS guidelines revision underway	IRS guidelines revision finalized	IRS guidelines review finalized and sent the MoH for endorsement . To be disseminated in FY 2012.
Number of IRS materials printed and disseminated to target communities				
Brochures	62,965	n/a	n/a	n/a
Posters	180	n/a	n/a	n/a
Banners		n/a	n/a	n/a
Door stickers	104,329	n/a	n/a	n/a
T shirts	-	n/a	n/a	n/a
Polo shirts	-	n/a	n/a	n/a
Caps	-	n/a	n/a	n/a
Number of people reached with IRS messages (Number of people residing in sprayed structures minus number of children younger than 5 years (i.e. 321,919-62,032 = 259,887)	259,887	n/a	n/a	n/a

Note: Some of the indicators in the initial SOW are no longer relevant during the last two quarters of the FY (i.e. April - September 2012) due to the shift in project activities in the SOW. However they are maintained in the reporting OP table for purposes of continuous tracking of project performance throughout the FY.

8.0 Annex B: Annual Inventory Report

Please see attachment.