



UGANDA INDOOR RESIDUAL SPRAYING (IRS) PROJECT PHASE II ANNUAL PERFORMANCE REPORT

JUNE 26, 2012 THROUGH SEPTEMBER 30, 2013

October 2013

This publication was produced for review by the United States Agency for International Development. It was prepared by Uganda IRS Project, Abt Associates.

Recommended Citation: *Uganda Indoor Residual Spraying (IRS) Project Phase II Annual Performance Report: June 26, 2012 through September 30, 2013, Uganda Indoor Residual Spraying Project Phase II, Abt Associates Inc.*

UGANDA INDOOR RESIDUAL SPRAYING (IRS) PROJECT PHASE II ANNUAL PERFORMANCE REPORT

Contract/Project No.: AID-617-C-12-00004

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Acronyms

BCC	Behavior Change Communication
CAO	Chief Administrative Officer
CBO	Community Based Organization
CBM	Capacity Building Manager
CDC	Centers for Disease Control and Prevention
CDFU	Communications for Development Foundation Uganda
COP	Chief of Party
COR	Contracting Officer's Representative
DCOP	Deputy Chief of Party
DEO	District Environment Officer
DHI	District Health Inspector
DHO	District Health Office
DHT	District Health Team
DIT	District IRS Team
DLG	District Local Government
DSO	District Supply Officer
DVCO	District Vector Control Officer
ECO	Environmental Compliance Officer
HAs	Health Assistants
HO	Home Office
FC	Field Coordinator
FY	Financial Year
GIS	Geographic Information System
GPS	Global Positioning System
HMIS	Health Management Information System
HOD	Head of Department
IEC	Information, Education and Communication
IEE	Initial Environmental Examination
IR	Intermediate Result
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
KI	Key Informant
LC	Local Council
LM	Logistics Manager
M&E	Monitoring and Evaluation
MFP	Malaria Focal Person
MOH	Ministry of Health
MOP	Malaria Operational Plan
NDA	National Drug Authority
NID	National Immunization Days
NMCP	National Malaria Control Program
NU-HITES	Uganda Health Integration to Enhance Services

ODK	Open Data Kit
PMI	President's Malaria Initiative
PMP	Performance Management Plan
PSC	Pyrethrum Spray Collections
RDC	Resident District Commissioner
SBCC	Social Behavior Change Communication
SEA	Supplementary Environmental Assessment
SK	Store Keeper
SM	Store Manager
SMS	Short Messaging System
SMT	Senior Management Team
SO	Spray Operator
TA	Technical Assistance
TOT	Trainer of Trainers
UPCA	Uganda Pest Control Association
USAID	U.S. Agency for International Development
USF-IPHC	University of South Florida - Integrated Public Health Consortium
VCO	Vector Control Officer(s)
WHO	World Health Organization

Table of Contents

Acronyms.....	i
Table of Contents.....	iii
List of Tables.....	iv
List of Figures.....	v
Executive Summary	I
1. Background.....	3
2. Project Activities /Achievements.....	4
2.1 Achievements by Intermediate Result.....	4
2.2 Result 1: High Quality IRS Program implemented	5
2.2.1 Result 1 Activities by Intermediate results for Year One, phase II.....	5
2.2.2 Accomplishments of Year One, phase II	8
2.3 Result 2: Capacity building and innovative approaches in IRS implemented.....	25
2.3.1 Result 2 activities by intermediate results for Phase II, year one.....	25
2.3.2 Accomplishments for Result 2, Phase II, Year One	27
2.4 Result 3: Comprehensive Monitoring and Evaluation of the IRS Program performed.....	30
2.4.1 Result 3 Activities by Intermediate results for Year One, phase II.....	30
2.4.2 Accomplishments of Result 3 for Year One, phase II	32
Annex - Success Stories	45

List of Tables

Table 1: Target and actual results for result I indicators in Year I, phase II, June 26, 2012-September 30, 2013.....	6
Table 2: Micro-planning implementation schedules and number of participants, August 2012 to August 2013.....	9
Table 3: Number and category of spray team members recruited, for round one, 2012.....	10
Table 4: Spray teams recruited, round two, April-June, 2013.....	10
Table 5: IRS round one spray schedule.....	11
Table 6: IRS round two spray schedule.....	11
Table 7: Summary of IRS round one output indicators for the 10 districts in year one, October-November 2012.....	15
Table 8: Summary of IRS round two output indicators for the 10 districts in in year one, April-May 2013.....	17
Table 9: Number of people reached per IRS project district through social mobilization, April – June2013.....	22
Table 10: Key findings of community diagnosis in 4 project districts, Apac, Gulu, Kitgum & Nwoya, February 2013.....	25
Table 11: Result 2 Indicators for IRS phase two, year one.....	26
Table 12: Participants of the private pest controllers’ workshop by gender, February 2013.....	29
Table 13: CBO/NGO Partners organizations promoting IRS in the 10 project districts as of March 2013.....	29
Table 14: Result 3 Indicators for IRS phase two, year one, FY2012.....	31
Table 15: Comparison of IRS solid wastes collected after Phase II, round one and round two.....	39
Table 16: Data management and supervision tools.....	40
Table 17: The number of data clerks used during IRS project phase II, round one and two.....	41
Table 18: Short term tchnical assistance and project visits.....	Error! Bookmark not defined.
Table 19: Reports submitted to USAID by IRS phase II, October 1, 2012 to September 30, 2013.....	Error! Bookmark not defined.

List of Figures

Figure 1: Uganda IRS project Phase II target districts.....	3
Figure 2: IRS coverage for round one and two, IRS phase II.....	13
Figure 3: Percentage of population protected in round one and two, IRS phase II.....	13
Figure 4: Insecticide utilization rate, round one & two, and round 6 phase I.....	13
Figure 5: Houses sprayed by SO per day round I & II, and round 6 phase I.....	13
Figure 6: Samples of the posters in local language and English.....	20
Figure 7: Summary of capacity assessment results based on the dashboard tool, June 2013.....	28
Figure 8: Pader district updated PSCs results from August 2009- July 2013.....	32
Figure 9: Apac district updated PSCs results from, August 2009- July 2013.....	32
Figure 10: Kitgum district updated PSCs results from, August 2009- July 2013.....	33
Figure 11: Oyam district updated PSCs results from, August 2009- July 2013.....	33
Figure 12: Amuru district update PSCs results from , August 2009- July 2013.....	33
Figure 13: Gulu district updated PSCs Result from, August 2009- July 2013.....	34
Figure 14: Pader district monthly bio assay test results from July 2010 – September 2013.....	34
Figure 15: Apac district monthly bio assay test results from July 2010 – September 2013.....	35
Figure 16: Amuru district monthly bio assays tests results from July 2010 – September 2013.....	35
Figure 17: Summary of bionomic study using indoor HLC at sentinel sites, Apr-Sept 2013.....	36
Figure 18: Summary of bionomic study using outdoor HLC at sentinel sites, Apr-Sept 2013.....	36
Figure 19: Summary of bionomic study using PSCs at sentinel sites, Apr-Sept 2013.....	37
Figure 20: Summary of bionomic study using LTCs at sentinel sites, Apr-Sept 2013.....	37
Figure 21: Preliminary results of National Insecticide susceptibility, September 2013.....	38
Figure 22: Uganda IRS Phase II, Round I district IRS coverage map, October – November 2012.....	43
Figure 23: Slide positivity rates, St. Joseph’s Hospital-Kitgum, 2006- 2013.....	44
Figure 24: Slide positivity rates, Anyeke HC IV –Oyam district 2006- 2013.....	44
Figure 25: Slide positivity rates, Aduku HC IV –Apac district 2006- 2013.....	44
Figure 26: Slide positivity rates, Kitgum General Hospital 2006- 2013.....	44

Executive Summary

Abt Associates Inc. (Abt), as the prime contractor entered into a five year contract, (contract no. AID-617-C-12-00004) with the United States Agency for International Development (USAID) to implement Phase II of the Uganda Indoor Residual Spraying (IRS) Project, to achieve the President's Malaria Initiative (PMI)/Uganda targets in IRS while contributing to IR.8.1: Effective use of social sector services through three project outputs: 1) High quality, safe and effective IRS program implementation; 2) Capacity building and innovative approaches in IRS implementation; and (3) Comprehensive monitoring and evaluation of the IRS program. The Uganda IRS project Phase II, which is a continuation of Phase I, will run from June 26, 2012 to June 25, 2017.

Abt, as the prime contractor of this program, manages and directs all technical component activities in support of IRS planning, procurement, implementation, monitoring, and capacity building, while the two other main subcontractors; Communications for Development Foundation Uganda (CDFU) and EnCompass LLC, provide expertise and support for the project's information, education and communication (IEC)/social behavior change communication (SBCC) activities and development of training materials, respectively.

This report presents the project's performance during the first year of the IRS project Phase II, (June 26, 2012 – September 30, 2013). During this time, the project has made significant achievements, and learnt important lessons for improving performance. During this period, apart from effectively completing all the startup activities, the project also completed two successful spray rounds in each of the ten target districts of Agago, Amuru, Apac, Gulu, Kitgum, Kole, Lamwo, Nwoya, Oyam and Pader during the peak malaria transmission seasons: October/November 2012 and April/May 2013. In these two spray rounds, the project, achieved above target coverage of 92.3 and 96.5 percent respectively, and protected more than 2.5 million people. These achievements were the result of numerous innovations that included among others; use of short messaging system (SMS) for transmission of real time data for prompt action on identified challenges, resulting in cost savings due to discontinuation of motorcycles for data collection. Other innovations included rotational team leader for improved mobilization and IRS compliance, and performance based payment of spray teams for enhancing motivation.

In addition to spraying, the project implemented capacity building activities namely: training at national and district levels, training private sector pest-control practitioners, developing and piloting a capacity assessment tool – the capacity building dashboard. In year one, the project carried out a comprehensive gender assessment study, the recommendations from which will be an integral part of project interventions and communication activities. Moving forward, the project will continue to encourage greater participation of women on on-going IRS activities and be attentive to gender equity issues.

Entomological monitoring was done consisting of monthly bionomic studies, pre and post IRS pyrethrum spray collections (PSCs) and bioassay tests for assessing the quality of spraying. These studies showed that IRS has reduced vector mosquito densities. Outpatient data from selected health facilities shows significant reduction in the slide positivity rates. Entomological susceptibility studies were conducted in six sentinel sites across Uganda (including two IRS project districts, Apac and Kitgum). These studies have shown that Bendiocarb I is still effective in the IRS project districts, but other insecticides, especially pyrethroids and organochlorines have shown varying resistance to the malaria vectors.

In year one, the main challenges faced by the project include heavy rainfall making roads impassable, indisciplined spray team members engaging in insecticide pilferage, few individuals decampaing

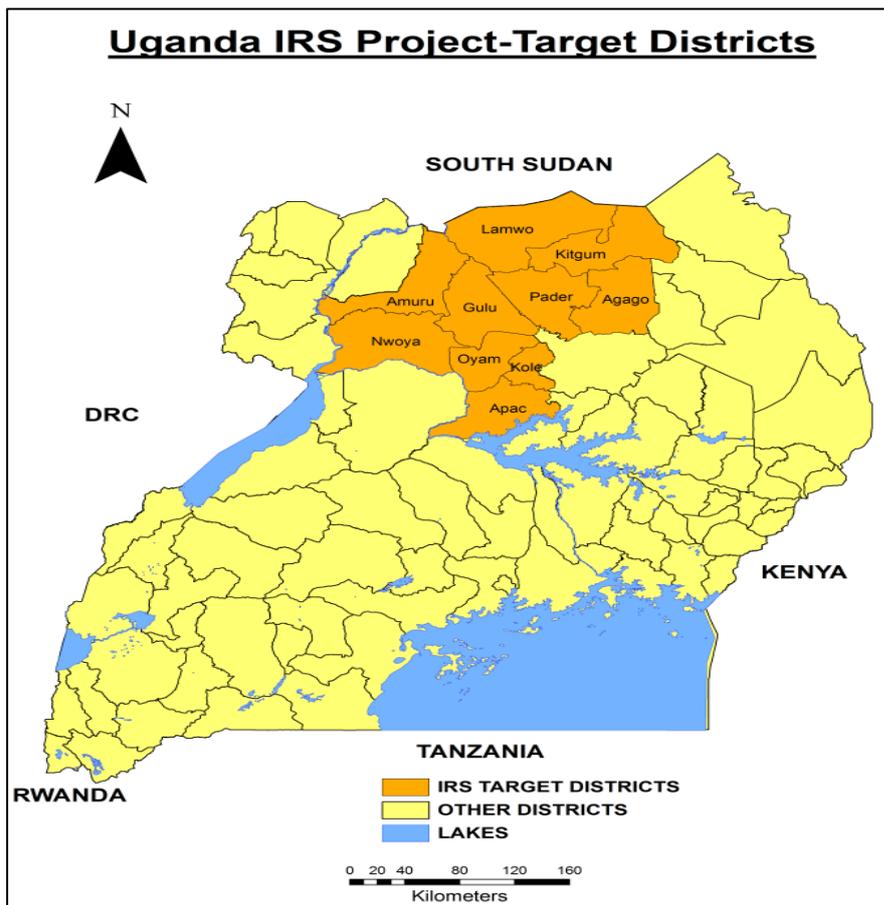
against IRS, weak on the ground supervision by majority of Health Assistants (HAs). The project made careful note of all these challenges and took appropriate actions to mitigate them. Details regarding the challenges and appropriate actions taken are provided in the report.

I. Background

On June 26, 2012, Abt Associates Inc. (Abt), entered into a five year contract, (contract no. AID-617-C-12-00004) USAID/PMI to implement Phase II of the Uganda Indoor Residual Spraying (IRS) Project. The PMI goal is to halve the burden of malaria in 70 percent of the at-risk populations of sub-Saharan Africa (SSA), thereby removing malaria as a major public health problem. PMI/Uganda has a five-year strategic plan and an annual Malaria Operational Plan (MOP) which guide current implementation and scale-up of activities. IRS is the largest component of the MOP and is the cornerstone of the PMI/Uganda program.

The IRS Phase II project implements activities in full collaboration with the Uganda National Malaria Control Program (NMCP) and the district local governments (DLGs) in all of the 10 project districts – Amuru, Nwoya, Gulu, Kitgum, Lamwo, Pader and Agago (*Acholi sub-region*) Apac, Kole and Oyam (*Lango sub-region*), which are in a post-conflict recovery situation (Figure I).

Figure I: Uganda IRS project Phase II – target districts



2. Project Activities /Achievements

This report presents the project's performance during the first year of the IRS project Phase II, (June 26, 2012 – September 30, 2013). During the first year of implementation, the project made tremendous achievements, and learned important lessons which it used to progressively improve performance.

During the period June 26 – September 30, 2012, the main focus was on project start up activities, namely; project management and administrative issues, involving acquiring office space (Gulu and Kampala), recruitment of all project staff, setting up the necessary communication and office equipment required for timely implementation of project activities.

In addition to spraying, the project implemented capacity building activities including training at national and district levels, training the private sector pest-control practitioners and development and piloting of a capacity assessment tool (the dashboard). Entomological monitoring consisting of monthly bionomic studies, pre and post IRS PSCs and bioassay tests for assessment of the quality of spraying was completed during this time frame. Entomological susceptibility studies were conducted in six sentinel sites across Uganda (including two IRS project districts; Apac and Kitgum). The project continued to support the Gulu University and the MOH/VCD insectaries to rear susceptible *Anopheles gambiae* s.s *Kisumu* strain mosquitoes for conducting wall bioassay tests. The project strengthened the supply chain management infrastructure (storekeeping, movement of commodities) with emphasis on tracking usage of the insecticide to ensure efficiency and minimize pilferage in the target districts. The project apprehended spray team members that engaged in insecticide pilferage, maintained a detailed record of such cases and where possible, ensured that follow up action was taken against those who were apprehended. The project also focused on strengthening data usage for supervision and management decisions, details of which are provided in this report (Section 2.4.2.7).

During year one, the project's management continued to build national and local capacity to plan and implement high-quality IRS programs and provide overall project accountability for programmatic and financial reporting and contract compliance. The project team collaborated with USAID, PMI, NMCP/MOH, districts, and other key stakeholders to develop appropriate annual district spray schedules, which are based on relevant local environmental, operational and political factors as well as malaria transmission patterns. Early in Phase II, the project worked with NMCP/MOH and the districts, guided and supported them to establish district IRS teams, each of which is led by the District Health Officer (DHO) and includes the: District Vector Control Officer (VCO), Malaria Focal Person (MFP), District Health Inspector (DHI), District Environmental Officer (DEO), District Health Educator (DHE), District Health Supplies Officer (DHSO), District Biostatistician. During the year, the project also met with the NMCP and MOH officials to keep them abreast about the IRS activities in the 10 target districts. The project also shared project reports with the NMCP and MOH on a regular basis.

2.1 Achievements by Intermediate Result

During year one, the project successfully conducted two spray rounds in each of the 10 target districts of Agago, Amuru, Apac, Gulu, Kitgum, Kole, Lamwo, Nwoya, Oyam and Pader during the peak malaria transmission seasons, October/November 2012 and April/May 2013. In both spray rounds, the project exceeded the USAID set target coverage of 90 percent, and more than 2.5 million people were protected. The following sections provide details about the achievements under results 1-3.

2.2 Result I: High Quality IRS Program Implemented

2.2.1 Result I Activities by Intermediate Results for Year One, Phase II

Table I shows target and actual results for selected indicators for monitoring Result I as indicated in the Performance Management Plan (PMP).

Table I: Target and actual results for result I indicators in year I, phase II, June 26, 2012-September 30, 2013

** The annual targets and actuals are averages of the quarterly targets and actuals

Table I: Target and actual results for Result I indicators in Year I, phase II, June 26, 2012-September 30, 2013

INDICATOR	June - Sept 12		Quarter 1		Quarter 2		Quarter 3		Quarter 4		Annual	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Number of district level planning and introductory meetings conducted	10	10	0	0	10	10	0	0	0	0	20	20
Number of district assessments conducted	10	10	0	0	10	10	0	0	0	0	20	20
Number of spray personnel trained to deliver IRS in the IRS target districts.	-	-	3,300	3,266	150	615	0	0	0	0	480	991
Number of IRS print materials printed and disseminated in the IRS target communities.	0	0	0	0	20,000	0	0	20,000	0	0	20,000	20,000
Number of community members sensitized on IRS	0	0	21950	660	21950	429	21950	25,631	0	0	21950	26720
Number of radio talk shows conducted	0	5	40	58	0	5	40	54	0	0	80	122
Number of radio spots messages or announcements on IRS SBCC aired	0	73	400	308	0	84	400	507	0	0	800	972
Number of districts sprayed in last spray cycle	0	0	10	10	10	0	0	10	0	0	20	20
Number of occupied households/houses in the IRS program target area sprayed (Fully and Partially)	0	0	767,682	858,415	0	0	0	870,943	0	0	869,474	864,679
Number of Credible CBOs and NGOs identified and trained	0	0	0	0	10	7	0	0	0	0	10	7

2.2.2 Accomplishments of Year One, Phase II

Strategy: IRS programs planned in collaboration with the NMCP/MOH and other stakeholders

2.2.2.1 Consultation with district authorities and district IRS teams

In August 2012, the project's Chief of Party (COP) conducted consultation meetings with district authorities after the launch of the new project. Apart from discussing issues related to the new project, the COP introduced the new senior staff, Deputy Chief of Party (DCOP) and Entomologist/Vector Control Specialist to the district teams.

In preparation for the upcoming round of spraying, the project's field team met and discussed detailed plans with the district IRS teams (DITs), and shared ideas for innovations in the coming spray round. This past one year, the project conducted 30 such consultative meetings. During these consultations, the field coordinators (FCs) delivered district work-plans, budgets and other official communications regarding the upcoming spray rounds. The Resident District Commissioner (RDC), Chief Administrative Officer (CAO), District Health Officer (DHO), Secretary of Health, Local Council V (LCV) Chairperson and Malaria Focal Persons (MFP) were the key persons involved in these meetings. In year one, many important decisions were either made and/or reaffirmed which helped improve the project's interventions. These included: involvement of the district leaders in recruitment and supervision of spray teams' training, ensuring that all spray team members recruited were Village Health Team (VHT) members, involvement of the police to track down cases of insecticide pilferage and reprimanding SOs who encouraged insecticide pilferage. Keeping in mind, the need to strengthen on the ground supervision, in year one, the project also replaced the non performing HAs that were not effectively carrying out their supervision responsibilities during the spray operations. Moving forward, the project in collaboration with DHTs will recruit and train other cadres for example VHT focal persons and community development officers, at the sub-county level to carry out supervision.

2.2.2.2 Micro-planning workshops

In preparation for spray round one, the project conducted micro-planning meetings in all the 10 project districts from August 21 - September 4, 2012. A total of 497 participants attended the micro-planning workshops.

The district IRS teams led these meetings which focused mainly on, planning for the upcoming spray round and orientation of store keepers. The usual participants for these micro-planning meetings included but were not limited to District Health Teams (DHTs), Environment Officers (EOs), parish storekeepers (SKs) and sub-county supervisors. Similarly, from February 12 -15, 2013 and August 26 - 30, 2013 another series of these meetings was conducted, in preparation for round two (April- May 2013).

The concurrent micro-planning meetings which were held prior to rounds one and two, in both group A and B districts helped reduce the time usually spent on this activity. The FCs played the coordination role and provided technical support, while members of the DITs planned and implemented this activity. During these micro-planning meetings, the project conducted pre- and post-training capacity assessments for all sub-county supervisors and SKs. These assessments revealed that in general, SKs performed better and also learned faster than sub-county supervisors. The areas assessed for knowledge and skills transfer included: operations, planning and spraying techniques, social mobilization, environment compliance, SMS data transmission and general data management.

Table 2: Micro-planning implementation schedules and number of participants, August, 2012 – August, 2013

S/No	Micro-planning in preparation for:	Date	Number of participants
1	Round One	August 21 - 4th September, 2012	497
2	Round Two	February 12 - 15, 2013	475
	Total		972

2.2.2.3 Logistics distribution and retrieval

In year one, the project's Logistics Manager (LM) and Store Managers (SMs), in collaboration with the District Supply Officers (DSOs), successfully managed logistics distribution and retrieval to and from the parish stores respectively during the two rounds of spraying. In comparison to year one of Phase I, where the SMs transported the insecticide and supplies to the parish stores, in the year under review, the parish SKs travelled to the district IRS stores, received their supplies and brought them back to their respective stores. Insecticide tracking logs, delivery notes, store ledgers and stock cards/stack cards were used to keep correct records of logistics at all levels. These procedures and tools were established to reduce items being lost or misplaced. Additionally the spray teams were made accountable for the items put under their care. Any spray team member who lost or damaged any equipment out of negligence, or was unable to account for all insecticide sachets received, was made to pay for the missing and/or damaged items. This cost recovery strategy helped deter spray teams from stealing and ensured proper use of project assets. At the end of every cycle of distribution and retrieval, the project team collected assorted IRS wastes from the stores, and took inventory of all assets and consumable supplies to identify gaps. The project used this gap assessment to plan procurement for upcoming spray rounds.

2.2.2.4 Inspection and certification of district IRS Stores by NDA

In April 2013, the National Drug Authority (NDA) staff from the regional office in Lira, accompanied by the project's ECO inspected the 10 districts stores and the central store located in Gulu district. The NDA's independent report showed that all 10 district stores and the central store complied with NDA regulations and were certified as fit to store the IRS insecticide and other related items.

2.2.2.5 Spray teams recruitment and training

In year one, spray round one, 3,335 SOs (including team leaders) were trained, of whom 585 were new, and 508 were women (Table 3).

Table 3: Number and category of spray team members recruited, for round one, 2012

SNo.	District	Team Leaders		Spray Operators		New Spray Members	TOTAL
		F	M	F	M		
1	Amuru	3	52	7	209	7	271
2	Gulu	20	101	98	398	179	617
3	Nwoya	0	27	9	98	31	134
4	Kitgum	5	52	49	158	38	264
5	Lamwo	2	44	29	186	30	261
6	Pader	10	59	68	214	20	351
7	Agago	11	71	71	255	25	408
8	Apac	4	62	101	167	153	334
9	Kole	0	47	51	216	77	314
10	Oyam	5	72	25	279	25	381
	Total	60	587	508	2,180	585	3,335

A total of 3,264 SOs participated in round two of whom, 456 (14 percent) were women and 698 (21.4 percent) were new entrants (Table 4). In round two, 3,264 SOs were recruited, of whom, 456 were women and 698 were new. In the two rounds, the proportion of new SOs recruited was more than the expected 10 percent due to the need to replace those indisciplined SOs who were dismissed for misconduct in the previous round, and those that did not show up during the recruitment exercise.

Table 4: Spray teams recruited, round two, April-June, 2013

District	Phase II, round two					
	SO	WP	SK	SC	SP	Total
Kitgum	255	39	31	62	12	399
Oyam	377	50	25	50	13	515
Nwoya	136	19	14	28	8	205
Lamwo	269	40	31	62	10	408
Gulu	607	80	34	66	19	806
Kole	257	36	16	32	6	347
Apac	334	47	30	60	10	481
Agago	408	56	34	68	15	581
Pader	347	52	31	62	12	504
Amuru	274	39	27	48	12	400
TOTAL	3,264	458	273	538	117	4,646

SO –Spray Operators; WP-Washpersons; SK-Storekeepers; SC-Security Persons; SP-Subcounty Supervisors

2.2.2.6 Spray team refresher training/orientation

In round one, the project conducted refresher training for all recruited members of the spray team at sub-county levels. The sub-county spray teams and DITs took the lead in these trainings. The project staff provided technical backstopping when required. The refresher training for spray round two involved pre- and post- assessment of participants. Pre--and post-tests were administered to

the supervisors and SKs (during micro planning) to assess their knowledge of IRS. The districts took the lead in reviewing and analyzing the test results which were then submitted to the project's Capacity Building Manager (CBM) and subsequently used to populate the capacity building dashboard tool. This tool is being used to assess the capacity of the districts where IRS is being implemented.

2.2.2.7 Spraying operation schedule for rounds one and two

The project completed two rounds of spraying during its first year of implementation. Spray round one commenced on October 1, 2012 and was concluded by October 30, 2012. Whereas in group B districts, spraying begun on October 22, 2012 and was completed by November 30, 2012 (Table 5). The overall performance of all 10 districts was 92.3 percent exceeding the project IRS target coverage of 90 percent. Individually four districts; Apac, Gulu, Kitgum and Nwoya, did not attain the IRS target coverage of 90 percent, while the remaining six districts met or exceeded their target.

Table 5: IRS round one spray schedule

Group	Districts	Spraying	
		Start date	End date
A	Apac, Gulu, Kitgum, Nwoya and Pader	October 1, 2012	October 30, 2012
B	Agago, Amuru, Kole, , Lamwo and Oyam	October 22, 2012	November 30, 2012

In year one, the project also completed round two spraying, covering all the 10 project districts. The spray operations began with group A districts on April 2, 2013 as scheduled, and ended by May 8, 2013. Group B districts commenced spraying on April 22, 2013 and concluded by May 28, 2013 (Table 6). Round two showed an improvement in performance from the previous round. Details regarding spraying are provided below in section 2.2.2.8.

Table 6: IRS round two spray schedule

Group	Districts	Spraying	
		Start date	End date
A	Apac, Gulu, Kitgum, Nwoya and Pader	April 2, 2013	May 8, 2013
B	Agago, Amuru, Kole, , Oyam and Amuru	April 22, 2013	May 28, 2013

2.2.2.8 Summary of spray round one and two results

In spray round one, the project sprayed a total of 858,415 households, and achieved an overall coverage of 92.3 percent. While districts of Lamwo, Pader, Agago, Kole, Oyam, and Amuru achieved the project's target coverage of 90 percent, Apac, Gulu, Kitgum and Nwoya did not meet this target. The project also protected 2.57 million people constituting 93.2 percent of the population found, of which 51 percent and 49 percent were female and male respectively. A total of 547,084 children aged less than 5 years and 74,116 expectant mothers were protected. The insecticide utilization rate was 2.6 houses sprayed per sachet and each SO on average sprayed 11 houses per day (Table 7).

During round two, a total of 870,943 households were sprayed in the 10 project districts giving an overall coverage of 96.5 percent. The households that were not sprayed decreased from 7.9 percent in round one to 3.5 percent in round two. The greatest reduction in the number of households not sprayed occurred in Kitgum district (from 16.4 to 4.4 percent). During this spray round, the IRS coverage improved from the 92.3 percent (achieved in Phase II round one) to 96.5 percent with all the 10 districts achieving the 90 percent target. There was increase in coverage across all the project

districts with Kitgum, Apac, Nwoya and Gulu recording the highest increments. This increase in coverage is considered to be a direct result of the project's efforts based on lessons learned from the previous round of spraying. These efforts included: enhanced mobilization using the rotational team leader approach, and enhanced supervision at all levels. At the end of spraying in round two, the project protected 2.58 million people. The population protected consisted of 49.2 percent males and 50.8 percent females. The target group protected included 538,264 children aged 0-5 years, and 81,218 pregnant women. Figures 2-5 show the IRS coverage for rounds one and two. Table 8 summarizes the key indicators for round two.

Figure 2: IRS coverage for round one and two, IRS phase II

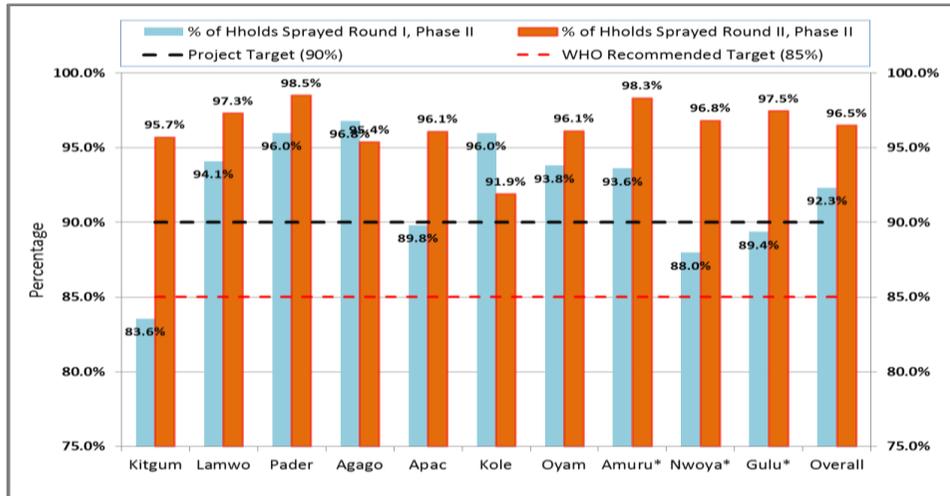


Figure 3: Percentage of population protected in round one and two, IRS phase II

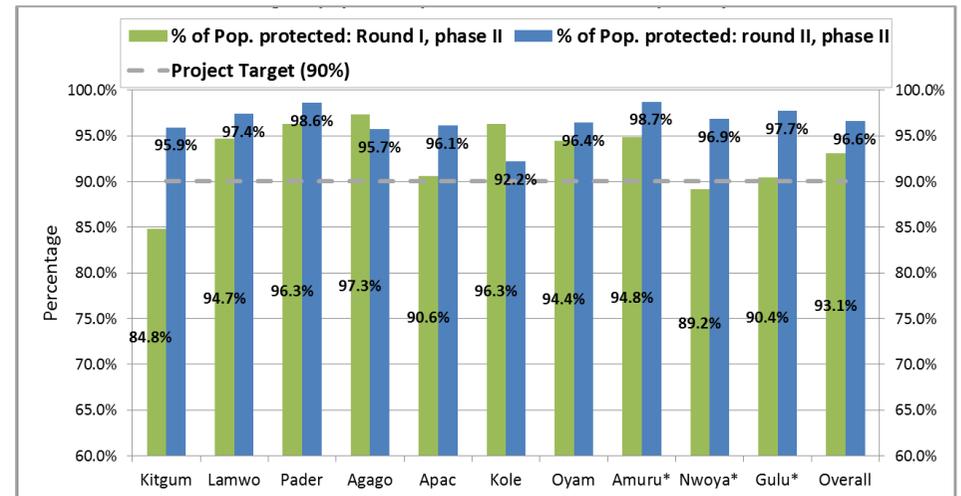


Figure 4: Insecticide utilization rate, round one & two, and round 6 phase I

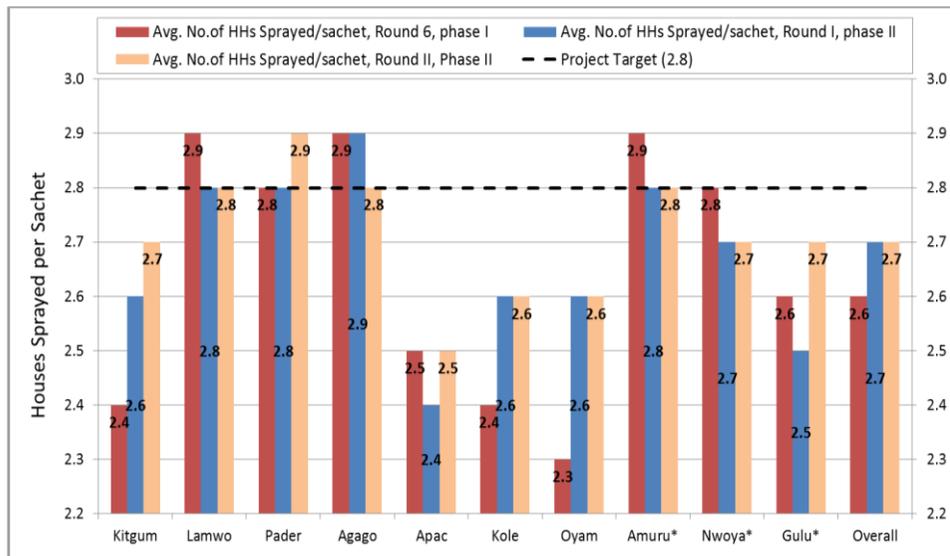


Figure 5: Houses sprayed by SO per day round I & II and round 6 phase I

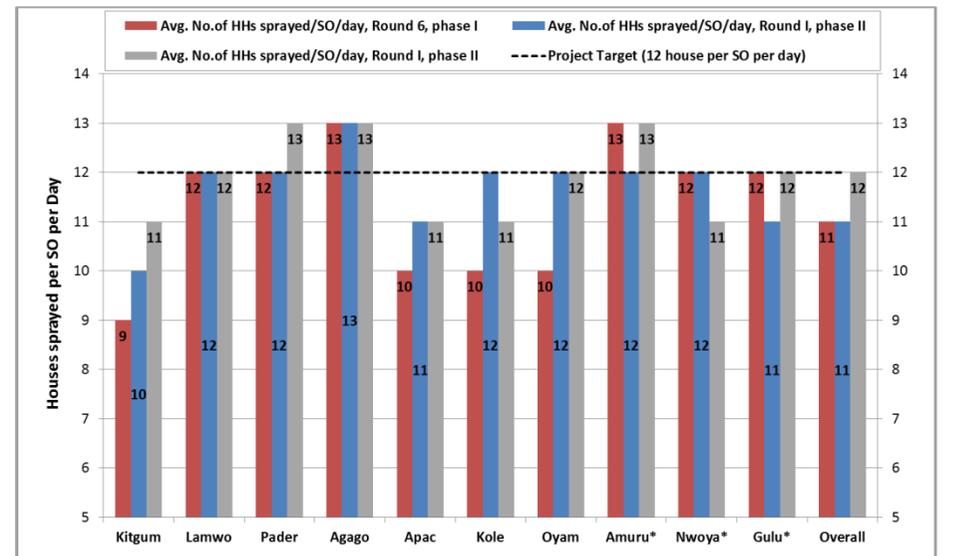


Table 7: Summary of IRS round one output indicators for the 10 districts in year one, October-November, 2012

SNo	INDICATOR	DISTRICTS										TOTAL
		Kitgum	Lamwo	Pader	Agago	Apac	Kole	Oyam	Amuru	Nwoya	Gulu	
1	No of districts sprayed	1	1	1	1	1	1	1	1	1	1	10
2	Targeted households	63,027	74,093	94,235	113,456	74,439	67,900	100,962	86,382	40,073	138,413	852,980
3	Total households Found	74,622	73,984	97,076	120,764	94,266	71,602	110,114	80,914	39,223	167,168	929,733
4	Households fully sprayed	61,847	69,595	93,182	116,859	81,483	66,214	100,496	75,629	34,401	148,203	847,909
5	Households partly sprayed	513	14	8	31	3,179	2,522	2,805	123	110	1,201	10,506
6	Total households fully and partly sprayed	62,360	69,609	93,190	116,890	84,662	68,736	103,301	75,752	34,511	149,404	858,415
7	Households not sprayed	12,262	4,375	3,886	3,874	9,604	2,866	6,813	5,162	4,712	17,764	71,318
8	% of households partly or fully sprayed	83.6%	94.1%	96.0%	96.8%	89.8%	96.0%	93.8%	93.6%	88.0%	89.4%	92.3%
9	% of households not sprayed at all	16.4%	5.9%	4.0%	3.2%	10.2%	4.0%	6.2%	6.4%	12.0%	10.6%	7.7%
10	Targeted population	199,967	243,817	279,889	362,312	243,427	188,332	279,750	142,614	121,913	494,734	2,556,755
11	Total population Found	234,575	226,228	284,369	387,557	259,023	192,137	298,605	254,584	118,456	507,726	2,763,260
12	Female population protected	100,260	108,975	140,062	191,115	120,496	94,314	145,323	122,688	54,374	234,541	1,312,148
13	Male population protected	98,631	105,291	133,770	186,122	114,074	90,662	136,627	118,719	51,276	224,688	1,259,860
14	Total population protected	198,891	214,266	273,832	377,237	234,570	184,976	281,939	241,390	105,650	459,211	2,572,996
15	Total population not protected	35,684	11,962	10,537	10,320	24,453	7,161	16,666	13,194	12,806	48,515	191,298
16	% of population protected	84.8%	94.7%	96.3%	97.3%	90.6%	96.3%	94.4%	94.8%	89.2%	90.4%	93.1%
17	% of population not protected	15.2%	5.3%	3.7%	2.7%	9.4%	3.7%	5.6%	5.2%	10.8%	9.6%	7.1%
18	No. of children under five protected	40,598	45,647	60,558	84,609	47,404	36,266	55,991	57,480	23,290	95,241	547,084
19	No. of pregnant women protected	4,113	4,747	8,399	12,928	4,674	4,099	6,781	8,264	3,347	16,764	74,116

SNo	INDICATOR	DISTRICTS										TOTAL
		Kitgum	Lamwo	Pader	Agago	Apac	Kole	Oyam	Amuru	Nwoya	Gulu	
20	No. of mosquito nets found	37,427	35,410	57,709	83,656	78,576	42,928	69,127	22,693	12,990	104,752	545,268
21	No. of children under 5 sleeping under a net	25,287	26,963	38,361	57,951	32,534	21,794	33,975	21,252	8,606	50,184	316,907
22	No. of insecticide sachets used	24,436	24,792	32,824	40,666	35,297	26,715	39,933	26,898	12,936	59,518	324,015
23	Average number of households sprayed per sachet	2.6	2.8	2.8	2.9	2.4	2.6	2.6	2.8	2.7	2.5	2.6
24	Number of spray operators	260	269	347	408	334	257	377	274	133	607	3,266
25	Average number of households sprayed per spray operator per day	9.6	11.8	11.7	13.0	10.6	12.2	11.9	11.5	11.8	10.7	11.4
26	Average number of spray days	25	22	23	22	24	22	23	24	22	23	23

Table 8: Summary of IRS round two output indicators for the 10 districts in year one, April-May, 2013

SNo	INDICATOR	DISTRICTS										TOTAL
		Kitgum	Lamwo	Pader	Agago	Apac	Kole	Oyam	Amuru	Nwoya	Gulu	
1	No of districts sprayed	1	1	1	1	1	1	1	1	1	1	10
2	Targeted households	68,597	85,458	95,986	120,365	71,697	70,798	106,400	76,891	35,891	153,886	885,969
3	Total households found	66,787	75,430	95,787	121,260	80,381	70,629	107,047	82,068	36,628	166,707	902,724
4	Households fully sprayed	63,636	73,386	94,304	115,595	74,943	62,920	100,575	80,688	35,389	161,966	863,402
5	Households partly sprayed	200	17	46	59	2,292	1,997	2,334	8	74	514	7,541
6	Total households fully and partly sprayed	63,836	73,403	94,350	115,654	77,235	64,917	102,909	80,696	35,463	162,480	870,943
7	Households not sprayed	2951	2,027	1,437	5,606	3,146	5,712	4,138	1,372	1,165	4,227	31,781
8	% of households partly or fully sprayed	95.6%	97.3%	98.5%	95.4%	96.1%	91.9%	96.1%	98.3%	96.8%	97.5%	96.5%
9	% of households not sprayed at all	4.4%	2.7%	1.5%	4.6%	3.9%	8.1%	3.9%	1.7%	3.2%	2.5%	3.5%
10	Targeted population	234,575	226,228	284,369	387,557	259,023	192,137	298,616	254,584	118,456	507,744	2,763,289
11	Total population found	209,384	233,988	280,024	389,768	215,268	180,258	287,250	257,299	111,081	503,591	2,667,911
12	Female population protected	102,966	115,435	139,842	188,107	105,918	85,493	141,193	129,262	55,190	248,865	1,312,271
13	Male population protected	97,890	112,538	136,203	185,041	100,983	80,754	135,811	124,768	52,415	243,165	1,269,568
14	Total population protected	200,856	227,973	276,045	373,148	206,901	166,247	277,004	254,030	107,605	492,030	2,581,839
15	Total population not protected	8,528	6,015	3,979	16,620	8,367	14,011	10,246	3,269	3,476	11,561	86,072
16	% of population protected	95.9%	97.4%	98.6%	95.7%	96.1%	92.2%	96.4%	98.7%	96.9%	97.7%	96.8%
17	% of population not protected	4.1%	2.6%	1.4%	4.3%	3.9%	7.8%	3.6%	1.3%	3.1%	2.3%	3.2%

SNo	INDICATOR	DISTRICTS										TOTAL
		Kitgum	Lamwo	Pader	Agago	Apac	Kole	Oyam	Amuru	Nwoya	Gulu	
18	No. of children under five protected	39,187	46,514	58,333	82,165	39,299	31,608	53,680	59,371	25,465	102,642	538,264
19	No. of pregnant women protected	4,317	56,331	9,808	13,422	4,844	3,343	6,867	8,904	3,685	20,697	81,218
20	No. of mosquito nets found	31,249	31,524	49,804	70,926	53,678	27,342	53,204	18,960	10,652	93,664	441,003
21	No. of children under 5 sleeping under a net	21,106	23,737	32,909	51,686	22,346	21,794	25,402	18,359	7,311	47,388	272,038
22	No. of insecticide sachets used	23891	25,975	32,918	40922	31,193	24686	40,175	28,467	13,072	60,753	322052
23	Average number of households sprayed per sachet	2.7	2.8	2.9	2.8	2.5	2.6	2.6	2.8	2.7	2.7	2.7
24	Number of spray operators	255	269	347	408	334	257	377	274	136	607	3,264
25	Average number of households sprayed per spray operator per day	11.4	11.9	12.9	12.9	10.5	11.5	11.9	13.4	11.3	12.2	12.1
26	Average number of spray days	22	23	21	22	22	22	23	22	23	22	22

Strategy: Sufficient program infrastructure, skills and information developed to manage IRS**2.2.2.9 Targeted IEC/BCC messages and interventions**

In year one, IEC/BCC focused on five key messages: insecticide pilferage, house ghosting, code of conduct for SOs, code of conduct for supervisors and frequently asked questions (FAQs). These messages targeted community members, spray teams in all the project districts, with the aim of minimizing cases of insecticide pilferage, indiscipline and incorrect reporting by SOs, raising awareness about responsibilities of SOs and supervisors in IRS, and answering IRS related common questions. Channels of dissemination included radio talk shows, spot announcements, community mobilization through IRS committees, participation in high profile events like World Malaria Day, and diagnostic, analytical interventions such as the barrier analysis study.

Details are provided in the sections below.

2.2.2.10 IEC/BCC materials printed, reviewed and disseminated

In year one, the project printed and disseminated a total of 20,000 copies of IEC/SBCC materials in local languages and English. These IEC/SBCC materials helped educate community members and spray teams on key messages regarding code of conduct for SOs and supervisors, the dangers of data falsification and of insecticides pilferage and abuse. To ensure that IEC/SBCC materials reached the intended audience, the project used different dissemination channels such as sub-county IRS committees and VHTs as well as spray teams. The project staff disseminated some of these materials during their field routine supervision activities. For quick dissemination and cost reduction, the materials were delivered to parish and district stores through the routine project activities. These posters were placed in strategic locations including health facilities, sub-county headquarters, and other public places for easy access. It can be assumed that these messages increased the knowledge of communities on IRS and promoted positive behavioral change. This is evident from enhanced reporting of insecticide pilferage cases by the community, positive appreciation for IRS from radio talk show callers, and committed involvement by local leaders in advocating for IRS. Figure 6 shows samples of some of the materials developed and distributed.

The project also paid attention to reviewing fact sheets and posters, addressed language and spellings, and harmonized interpretation differences with particular attention to the appearance of the pictures. The revised materials were subsequently pre-tested, printed and distributed. Overall all posters pre-tested were acceptable and found to be conveying relevant messages on IRS as intended for the audience. Some minimal changes were made to make them more user-friendly for communities with low literacy.

Figure 6: Samples of the posters in local language and English



2.2.2.11 Radio talk shows and radio spot messages

During the period October – December 2012, CDFU selected and contracted seven radio stations for a one year period. The choice of these stations was based on their geographical coverage. DHEs prepared the talk show schedules and scripts for their districts in consultation with CDFU and radio station management. The DHEs in consultation with other DHT members, and IRS field teams led the identification, invitation and briefing of the guest speakers. These guest speakers included prominent public figures like the Apac RDC, Mr. Daudi Kasibunte who encouraged community members to embrace IRS, and emphasized no-tolerance for insecticide pilferage. Community members such as Mr. Tom Ogi from Pader were also part of these talk shows, and shared their individual experience with IRS, including significant reduction in health related costs and visits to health centers for treating malaria.

2.2.2.12 Social mobilization for IRS

Social mobilization is an important strategy for continued acceptance of the project and thus through its partner (CDFU), the project continues to invest in it. During this period, CDFU through the sub-county IRS committee structure reached over 25,000 people at the interpersonal level with messages about IRS in the 10 districts (Table 9). This method of communication which includes reaching out to churches, schools, community gatherings, and door-to door campaigns, provides an opportunity for individuals to interact directly with IRS mobilisers about IRS issues, and further allows for community feedback. The IRS sub county committees are vital to IRS implementation because they serve as a link with the households to promote acceptance. This approach facilitates and encourages appropriate actions at household level by encouraging individuals and groups to discuss their beliefs and fears thereby facilitating them to make informed decisions towards IRS.

To ensure effectiveness, the project ensures that from the start of the spray round, each sub-county IRS committee member prepares an activity plan and records places and number of people reached during the mobilization visits. The project has also trained local community based organizations (CBOs) and non-governmental organizations (NGOs) that have been engaged in social mobilization. They have become a vital link to the sub-county IRS committees and DHEs to enhance mobilization in order to reach a wider audience. The project promotes integration of IRS issues in the routine activities of these local CBOs/NGOs to ensure sustainability of IRS in these districts.

Table 9: Number of people reached per IRS project district through social mobilization, April – June, 2013

Districts	Number of Sub-Counties	Planned Quarterly Target	Average No. of People Reached
Agago	17	3,400	3,520
Amuru	5	1,000	1,511
Apac	10	2,000	2,012
Gulu	17	3,400	5,002
Kitgum	10	2,000	3,046
Kole	5	1,000	1,987
Lamwo	10	2,000	2,460
Nwoya	5	1,000	1,386
Oyam	8	1,600	1,807
Pader	12	2,400	2,900
TOTAL	99	19,800	25,631

2.2.2.13 Sub county IRS committee orientation

In year one, CDFU mobilized and oriented 1089 sub-county IRS committees (11 per sub-county, covering a total of 99 sub-counties) on social mobilization for IRS, across all the 10 districts. The SBCC training manual (developed in IRS Phase I) was used to guide the orientation of these IRS committees. The ideal sub-county IRS committee comprises 11 members, 4 from the sub-county headquarters (Gombolola Internal Security Officer (GISO), LC III chairman, secretary health, sub-county chief), while the remaining seven positions are filled by VHT members, ensuring representation of each parish in the sub-county.

2.2.2.14 National Malaria Day activities

On May 10, 2013, the project participated in the national World Malaria Day (WMD) celebration in Soroti district. Through its partner CDFU, the project also supported eight districts in organizing district level celebrations to commemorate WMD. The national event was an opportunity to enhance the project's visibility and share experiences and achievements with partners in the fight against malaria. The project's COP, DCOP, and one SO was present at the event, the, along with the Executive Director and the Communication Specialist from CDFU. Other dignitaries including the President, USAID/PMI officials also attended this high profile event.

A display of IRS materials at the World Malaria Day Celebrations, Soroti, May 10, 2013**2.2.2.15 Community diagnosis**

In the second quarter of year one, CDFU together with the DHEs conducted community diagnosis in selected communities where there was lower coverage especially in Apac, Gulu, Kitgum and Nwoya districts. The team used transect walk, key informant (KI) interviews to analyze the causes of low IRS acceptance and negative perceptions about IRS among the community. The team interacted with sub-county IRS committee members, supervisors, SOs and community members. A random check of houses was conducted to ascertain whether they had been actually sprayed. The key findings of this diagnosis (Table 10), included the following:

- Lack of commitment to IRS activities by some community leaders
- Opposition to the program by a religious sect (not clearly identified) was common in Apac sub-county
- LCIs had limited knowledge on social mobilization
- Conflicting programs such as cash-for-work on the road implemented by Northern Uganda, Development of enhanced local government Infrastructure and Livelihood program (NUDEIL), hindered spraying activities in the target districts.



Michael Odong from CDFU, DHE Apac district, spray operator and LCI councilor walk across Arugulong village in Ibuje sub-county in Apac district



Michael Odong from CDFU meeting with Apac Town Council to discuss reasons for poor IRS performance

2.2.2.16 Qualitative study (barrier analysis)

The project conducted a qualitative study to understand the motivations behind some household heads being hesitant to have their houses sprayed. The study was done in six districts of Gulu, Nwoya, Amuru, Kitgum, Apac, and Oyam. A total of 90 household heads were interviewed as priority groups using barrier analysis standard questionnaires, during a two week period, in July 2013. A total of eight behavioral deterrents were analyzed: perceived self-efficacy, perceived positive consequences, perceived negative consequences, perceived social norms, perceived access, cue to action, perceived divine will and perceived severity. IRS performance data was used to identify those districts, sub-counties and villages with sub-optimal IRS coverage during spray round two where questionnaires were administered. The target groups for the study were household heads, 45 of whom were from sprayed houses that accepted IRS, while the remaining 45 were from unsprayed houses in round two.

Key findings:

Perceived self efficacy: Removing household items from the houses and taking them back, was perceived to be a burden, and a key factor in IRS acceptance/denial.

Perceived social norms: Approval of neighbors for spraying their houses was an influencing factor.

Perceived negative consequences: Increase in numbers of mosquitoes after spraying of houses, was reported as a negative consequence for accepting IRS.

The findings from the study have guided formulation and design of a behavior change communication framework that will help focus the communication activities for IRS in the future. The frameworks is based on a two pronged strategy: intense messaging through radio spots, IEC/BCC material dissemination, interpersonal communication to encourage behavior change regarding nuisance mosquitoes; enhanced social mobilization by engaging community networks such as VHTs, schools, churches in sharing experiences and engaging in community dialogue on identified issues.

Table 10: Key findings of community diagnosis in four project districts, Apac, Gulu, Kitgum & Nwoya, February, 2013

No	Finding	Explanation
1	Lack of commitment from community leaders	A number of community leaders were reportedly not interested in IRS and they were not opening their houses to be sprayed, thereby setting a bad example to the rest of the communities. CDFU has planned to have continuous dialogue with them to increase their participation in IRS activities.
2	Opposition to program by a religious sect (not clearly identified) common in Apac sub-county	A religious group (not clearly identified), is prominent in the two parishes of Athena and Abedi in Apac sub-county. This sect requires their followers not to use any medication when sick, and is also opposed to IRS. This practice is common in Abuli, Iwal villages in Atana sub-county and Alogoro, Lango center, Beropoc and Otek villages in Abedi parish. Based on guidance from the project, the sub-county leadership has committed to discuss these issues with the concerned religious leaders to formulate solutions to this obstacle to IRS.
3	Conflicting programs	The cash-for-work on the road implemented by Northern Uganda Development of Enhanced local government Infrastructure and Livelihood program (NUDEIL) in Lagaya village in Lamola parish, Amida sub-county, in Kitgum district, accounted for below target performance in Amida sub-county, because community members preferred to go to work for cash, leaving their houses locked and inaccessible to the SOs. Kitgum district leadership has consulted with NUDEIL management to agree on better coordination of these activities for better performance in April-May 2013 spray round.
4	Local Council One (LCI) has very limited knowledge on social mobilization.	LCI councilors were not equipped with sufficient knowledge on IRS and therefore were not able to appropriately guide their communities on IRS. CDFU has been orienting selected NGOs on social mobilization. These NGOs will in turn orient the community leaders.

2.3 Result 2: Capacity building and innovative approaches in IRS implemented

2.3.1 Result 2 activities by intermediate results for Phase II, year one

Table II below shows target and actual results for selected indicators for monitoring Result-2 as indicated in the PMP.

Table II: Result 2 indicators for IRS phase two, year one

INDICATOR	June24-Sept 30, 2012		Quarter 1, Oct-Dec 2012		Quarter 2, Jan-Mar 2013		Quarter 3, Apr-Jun, 2013		Quarter 4, Jul-Sept, 2013		Annual	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Number of IRS training manuals reviewed and approved by NMCP/MOH	0	0	0	0	0	0	5	5	0	0	5	5
Number of NMCP/MOH staff, environment officers and vector control officers given in-service training on IRS program	0	0	25	26	0	0	50	137	0	0	75	163
Number of people trained in IRS from the private companies/ NGOs/ CBOs	0	0	0	0	25	29	0	0	0	0	25	29

2.3.2 Accomplishments for result 2, phase II, year one

Strategy: IRS conducted in compliance with all USG and Ugandan environmental regulations and guidance

2.3.2.1 Dashboard development and implementation

The second objective of the IRS project is to strengthen capacity of the partners through innovative approaches. Thus to assess the capacity transferred to the district personnel, counterparts in IRS implementation, a capacity building dashboard tool was created. This tool serves as a temperature gauge for ongoing capacity building transfer to relevant district staff in all the project districts. Six areas: M&E, environmental compliance, entomological competence, logistics, spray operations, IEC/BCC are measured through different indicators. The scores are then filtered through objective analysis of district involvement in each indicator, to produce a visual dashboard that gives a bird's eye view of current capacity building progress in each district.

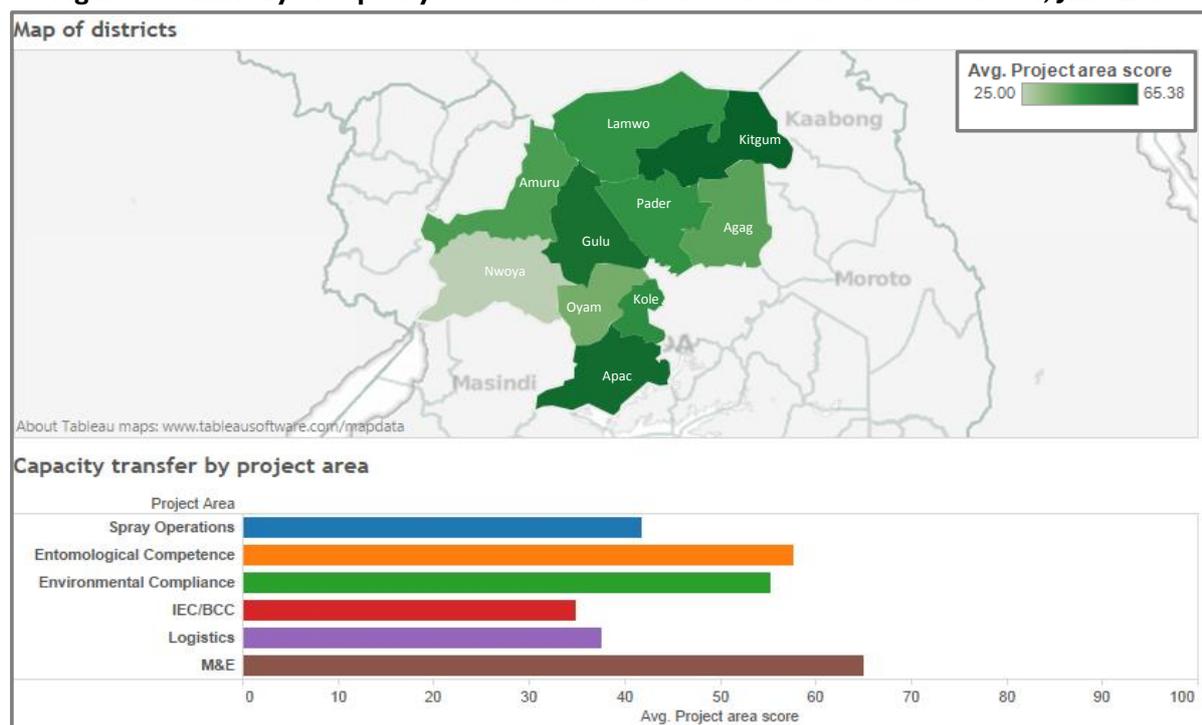
2.3.2.2 Dashboard baseline field data collection

In year one, after spray round two, the project piloted the capacity building dashboard. In order to populate the dashboard, data was collected from multiple sources. This includes project records, existing project data as well as field based data from each of the 10 districts. Field data collection was carried out after completion of spraying. SMT interviewed the district officials, while the FCs and SMs focused on the field activities and house-to-house efforts. To minimize bias, the project's district-based staff was assigned to collect data from different districts other than those where they are normally stationed. All staff was trained to ensure objective un-biased data collection, and the SMT provided support and supervised the SMs and FCs and addressed issues that came up during the data collection.

2.3.2.3 Dashboard data analysis and results presentation

After completion of baseline data collection, the project's CBM, the lead person in the dashboard activities, with the Peace Corps Volunteer cleaned and populated the excel-based dashboard database application for all the 10 districts. The baseline results showed that entomological monitoring competence, M&E, and environmental compliance were the areas that received the highest scores (Figure 7). At this preliminary level, this can be interpreted as areas where the districts have greater capacity than other areas. The SMT met with the relevant staff and discussed the preliminary results, and also discussed steps that districts need to take prior to the next round of data collection in November/December, 2013. As next steps, districts were encouraged to retain and fill available positions within their organizational structures.

Moving forward, the project staff is continuing to develop the dashboard to make it a more robust, easy to understand tool. The Tableau software license has been transferred to the project staff in Gulu, whereby they can make the necessary changes and update the file on a continuous basis.

Figure 7: Summary of capacity assessment results based on the dashboard tool, June 2013

2.3.2.4 Training of parish storekeepers on pilot SMS data transmission

In quarter one, the project piloted SMS based data transmission to improve acquisition and sharing of real time data for decision making and supervision. The pilot was conducted in Oyam and Kole districts. The SMS data transmission involved parish storekeepers sending data on selected spray indicators to a designated SMS gateway number to a central data base for instant analysis and sharing. During this process, Ms. Nancy Brown, the International IT Manager from Abt provided technical assistance, and demonstrated to the Gulu based project team, how SMS technology works for reporting. Ms. Brown along with the project's M&E/GIS Manager, conducted four training sessions for all the 41 parish SKs in the two pilot districts. The trained SKs were followed up through on the job supportive supervision and given guidance on how to correctly send SMS messages.

2.3.2.5 Pump maintenance training for Abt staff

Before his departure from the project in the first quarter (December 2012), the project's Senior Technical Advisor, Mr. Ranjith De Alwis conducted a refresher training for all six new project staff on spray pump maintenance in Kampala. The purpose of the training was to familiarize the new staff with the proper functioning of the spray pump, its calibration, servicing and maintenance as well as appropriate handling. During this training it was decided that all pumps must be regularly checked to identify the leakages and any other repairs required before distributing them to the parish stores. Subsequent to the training on pump calibration (according to WHO guidelines), all pumps were calibrated before releasing them for spraying.

2.3.2.6 Training of private pest control companies on IRS

In the second quarter of year one, from February 25-28, 2013 the project conducted training for private pest controllers on IRS implementation and management at Churchill Courts Hotel, Gulu. A total of 29 participants from 27 private companies attended the four day intensive training (Table

12). In addition to the project's technical staff, other resource persons were drawn from the MOH. At this training, the project's COR, Mr. Joel Kisubi, made an informative presentation on USAID policies and guidelines.

Table 12: Participants of the private pest controllers' workshop by gender, February, 2013

Category	Female	Male	Number of Participants
Project Districts	1	4	5
Neighboring Districts	1	8	9
Other (Kampala)	0	15	15
Total	2	27	29

2.3.2.7 In-service training for VCOs

In the third quarter, the project conducted an in-service training for 30 VCOs from 21 districts. The training covered malaria entomology and IRS. The primary purpose of the training was to improve knowledge and skills of the VCOs affiliated to the MOH/VCD, the NMCP and the School of Entomology and Parasitology. Among the participants were experienced VCOs as well as newly recruited VCOs from IRS and neighboring non-IRS districts. The training comprised of interactive lecture presentations with discussions and practical sessions. Through the different capacity building channels, during year one, the project has trained an additional 137 district and national staff.

As part of follow-up of trainings the project has utilized the VCOs in entomological monitoring activities such as bionomics studies, pre-and post-IRS PSCs and wall bio-assays. In every spray round, the project calls upon and assigns at least 10 VCOs to conduct these entomological studies in the project and non-project districts. The project also maintains close contact UPCA and continuously shares information with the member VCOs on other activities they have been involved in after the trainings.

2.3.2.8 Training of NGO/CBO on SBCC for IRS

In the second quarter (i.e. February 2013), CDFU selected and trained ten representatives from six Community Based Organizations (CBOs) operating within the project area that agreed to partner with the project to improve social mobilization (see Table 13). After the training these CBO/NGOs representatives were then linked to sub-county IRS committees to help boost community mobilization for IRS. It is expected that working with existing organizations in the communities will not only increase mobilization for IRS, but will also set the ground for sustainability of the project within the target districts.

Table 13: CBO/NGO partner organizations promoting IRS in the 10 project districts as of March 2013

No	CBO/NGO partner	District covered by CBO/NGO
1	Health Alert	Gulu, Amuru
2	Uganda Red Cross Society-Branches	Kitgum, Pader, Apac, Lamwo
3	Anaka Community Based Health care Giver (ACBHCG)	Nwoya
4	Widow and Orphans Support Organization (WOSO)	Agago
5	Dicwiyi pi two junior sec	Kole
6	Fight to Improve Community Health (FICH)	Oyam

2.3.2.9 National insecticide susceptibility study refresher training

The project conducted one-day training for VCOs selected from MOH/VCD and the districts to refresh their knowledge and skills in preparation for their participation in the national insecticide Susceptibility study. The staff from Gulu University, faculty of science, and a representative from MOH/VCD also attended the training. Mr. Ranjith de Alwis from Abt, provided technical support during training and thereafter in the field. The susceptibility study covered the six sentinel sites of Apac, Kitgum, Tororo, Wakiso, Hoima and Kanungu. The national insecticide susceptibility study takes place once every two years (Section 2.4.2.4).

2.4 Result 3: Comprehensive Monitoring and Evaluation of the IRS Program performed

2.4.1 Result 3 activities by intermediate results for year one, phase II

Table 14 shows target and actual results for selected indicators for Result-3 for monitoring as included in the PMP.

Table 14: Result 3 indicators for IRS phase two, year one, FY2012

INDICATOR	June24-Sept 30, 2012		Quarter 1, Oct-Dec 2012		Quarter 2, Jan-Mar 2013		Quarter 3, Apr-Jun, 2013		Quarter 4, Jul-Sept, 2013		Annual	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Number of Annual work plan developed and approved	1	1	0	0	0	0	0	0	0	0	1	1
Number of national/district-based IRS and entomological monitoring plans developed and implemented as scheduled	1	1	0	0	0	0	0	0	0	0	1	1
Number of Progress reports prepared and submitted. Progress reports include monthly, quarterly, annual and end of spray cycle reports	3	3	5	5	3	3	4	4	3	3	18	18
Number of district level IRS progress digital maps prepared	50	50	50	75	75	76	75	75	0	0	275	275
Number of spray teams inspected by supervisors per spray round, Supervisors are Project staff	0	0	500	346	500	0*	500	746	0	0	1000	1092
Number of IEEs and/or SEAs,	TBD	-	TBD	-	TBD	-	TBD	-	TBD	-	TBD	-
Percentage of washing bays and soak pits inspected	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of vector susceptibility tests conducted according to WHO standards	0	0	0	0	0	0	0	0	6	6	6	6
Number of wall bioassay tests conducted according to WHO standards	0	0	144	144	162	189	252	243	162	162	720	738
Number of Mosquito bionomics studies conducted	6	6	9	9	9	9	9	9	3	3	36	36
Number of PSCs carried out	192	188	192	188	192	204	192	204	192	192	960	976
Number of independent environmental compliance inspections conducted	0	0	0	0	0	0	0	1	0	0	1	1

2.4.2 Accomplishments of result 3 for year one, phase II

Strategy: Entomological monitoring implemented

2.4.2.1 Pyrethrum Spray Catches (PSCs)

The PSC is one of the methods the project employs to monitor the density of indoor resting vector mosquitoes. Since the beginning of phase II, the project has conducted PSCs in designated sentinel sites in all the 10 districts. PSCs are conducted before and after spraying respectively. The PSC results show that IRS with Bendiocarb significantly reduces the indoor resting vector mosquito populations for five to six months after spraying. This has been observed for both spray rounds conducted in year one in these districts. The main vector species caught in these PSCs are *An.gambie s.l* and *An. funestus*. In most of the districts other nuisance mosquitoes like *Culex* species and *Mansonia* species were quite many, which are a source of discomfort to many households. The charts (Figure 8-13) present results of pre and post IRS PSCs from the beginning of the project to date (2009 - 2013) for selected districts.

Figure 8: Pader district updated PSCs results from August 2009- July 2013

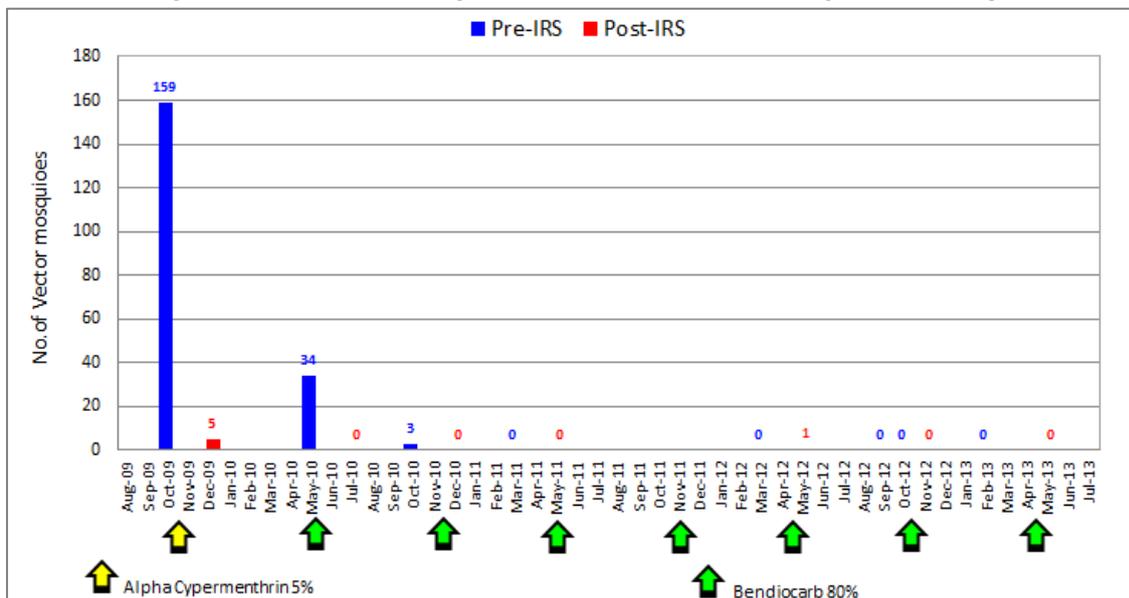


Figure 9: Apac district updated PSCs results from August 2009- July 2013

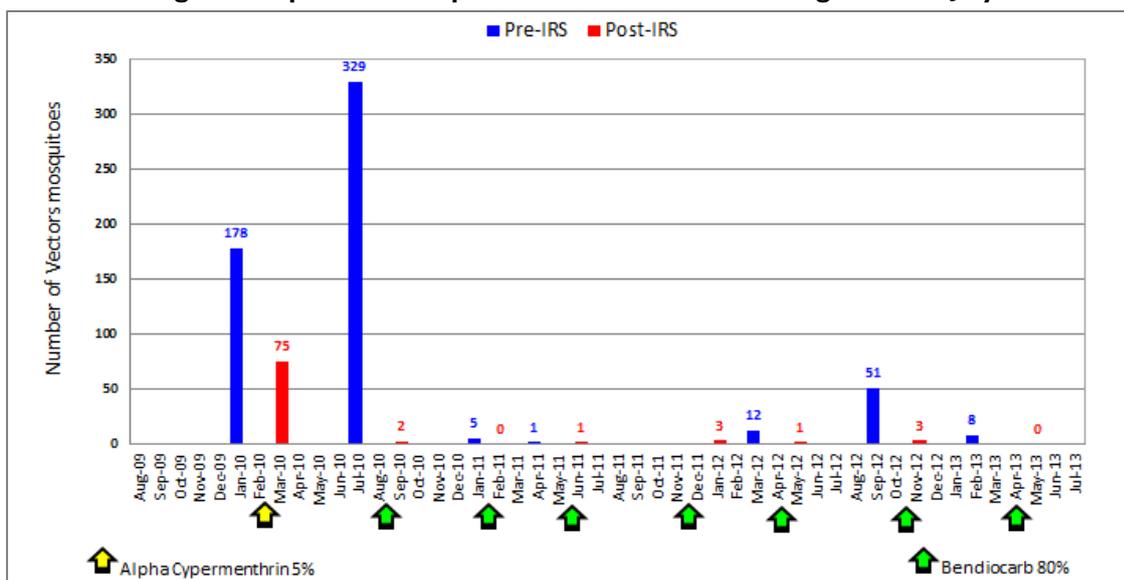


Figure 10: Kitgum district updated PSCs results from August 2009- July, 2013

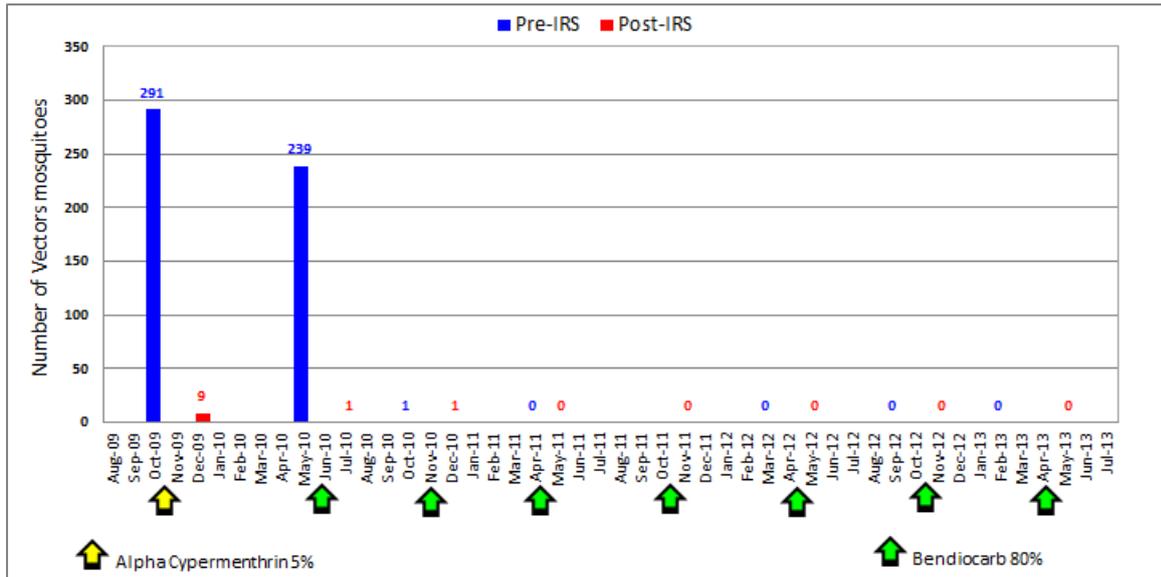


Figure 11: Oyam district updated PSCs results from August 2009- July, 2013

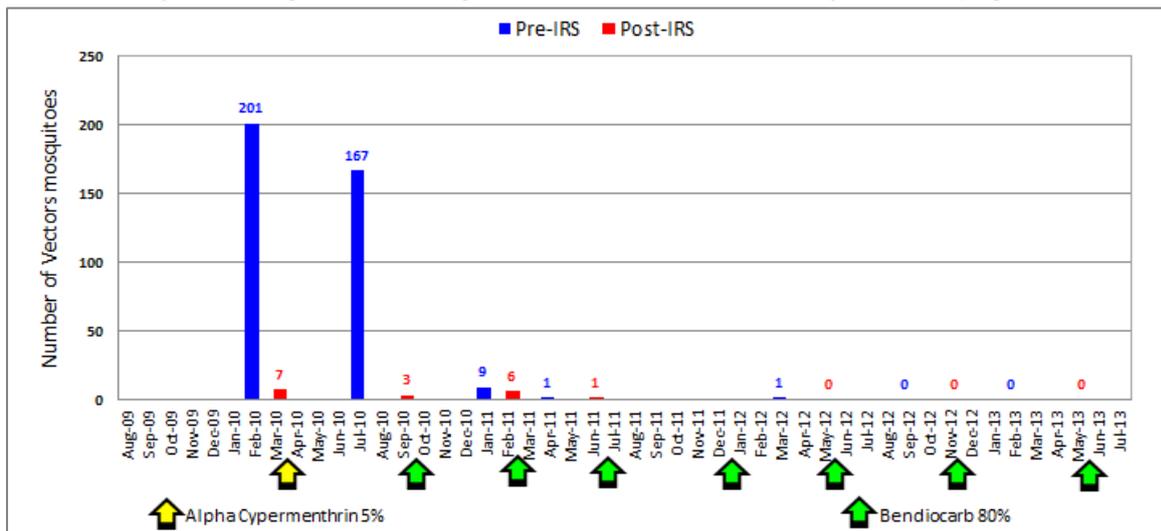


Figure 12: Amuru district update PSCs results from August 2009- July, 2013

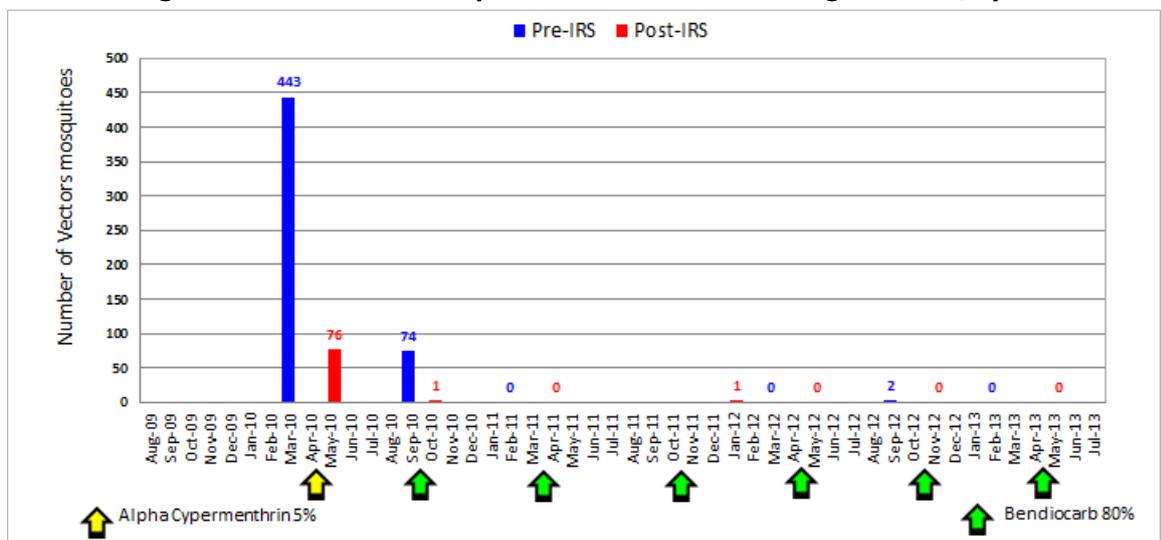
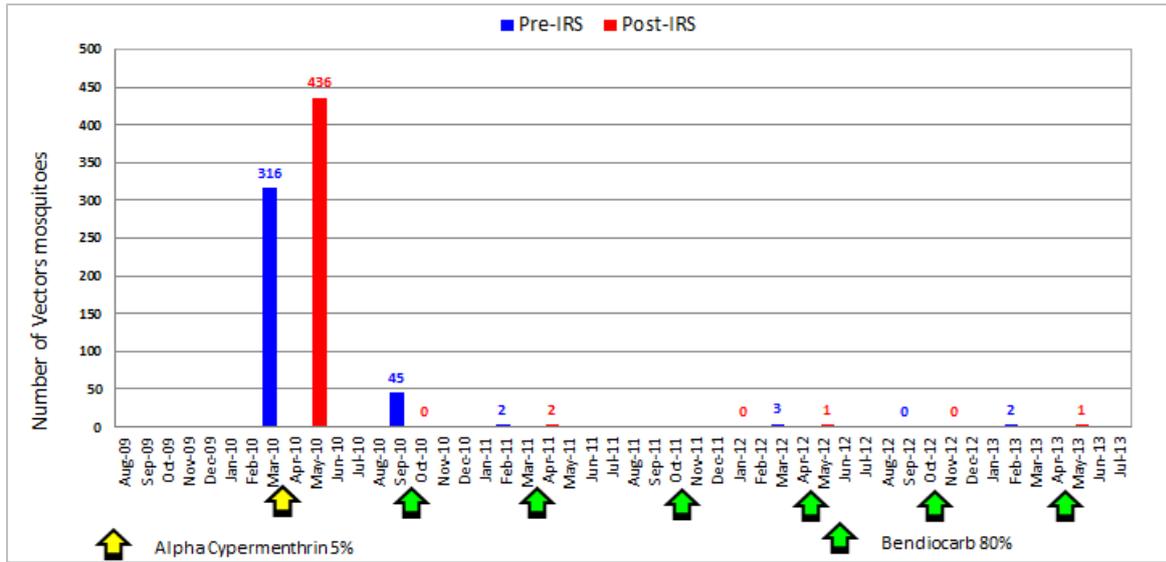


Figure 13: Gulu district updated PSCs Result from August 2009- July, 2013



2.4.2.2 Wall bioassays

During year one, the project regularly conducted routine wall bioassay tests to determine the quality of spraying as well as insecticide decay rate (or efficacy over time) of the insecticide on sprayed walls. During this period, the project carried out a total of 738 wall cone tests in sampled houses in all sentinel villages in the 10 project districts. The field teams all used two-five day-old susceptible *Anopheles gambiae* s.s. (Kisumu strain) mosquitoes collected from VCD/MOH and Gulu University insectaries to conduct these tests. In summary, the wall bio-assay tests results indicate that Bendiocarb is still a very efficient insecticide for indoor residual spraying and its effectiveness lasts for at least four months. The immediate post IRS tests show that all the tested mosquitoes were knocked down within 20-30 minutes of exposure on plastered and painted walls respectively, while for other wall types (plain brick, mud and wattle), some mosquitoes were knocked down by 40 minutes of exposure. In all the districts where the tests were conducted, the 24-hour holding mortality rate for plaster painted walls was 100 percent.

Figure 14: Pader district monthly bio assay test results from July 2010 – September, 2013

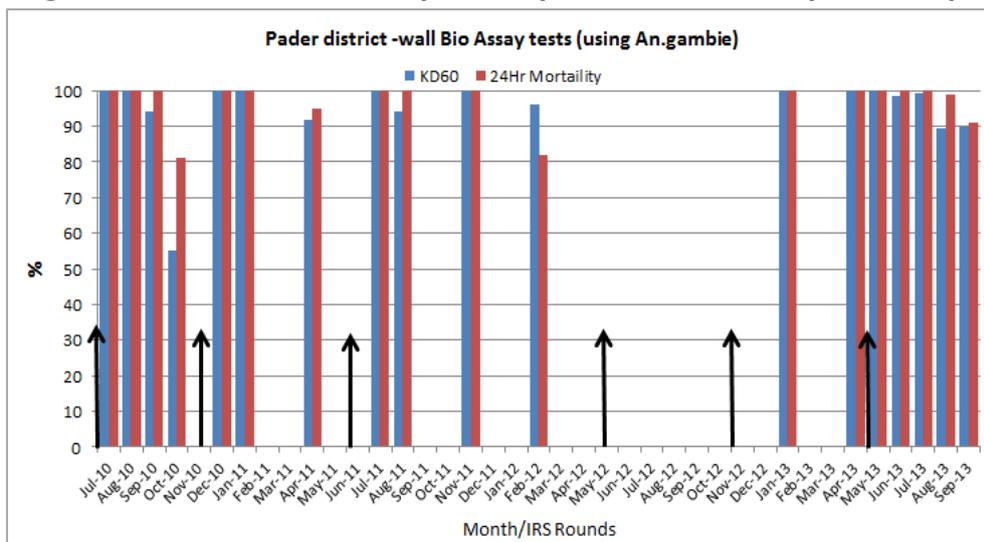


Figure 15: Apac district monthly bio assay test results from July 2010 – September, 2013

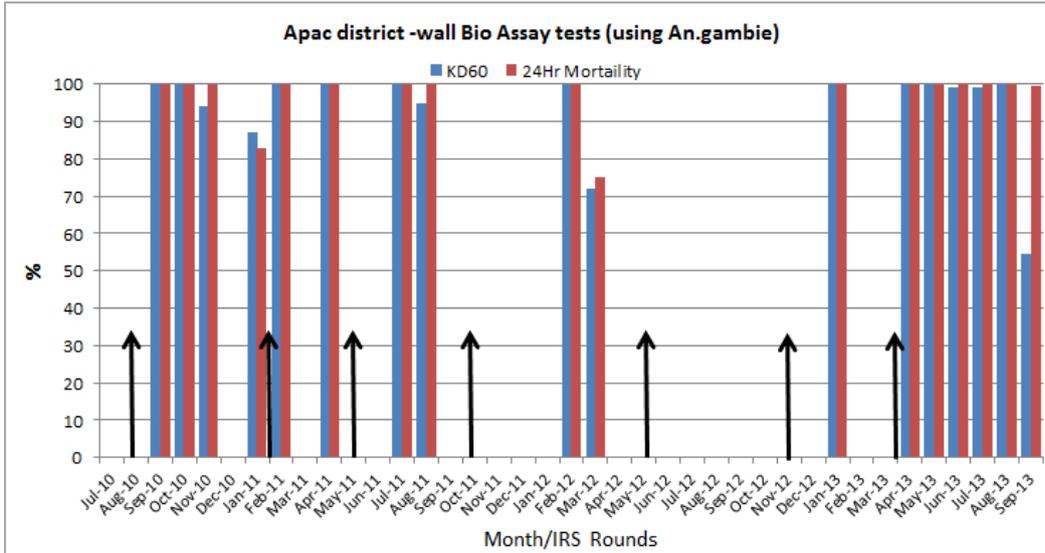
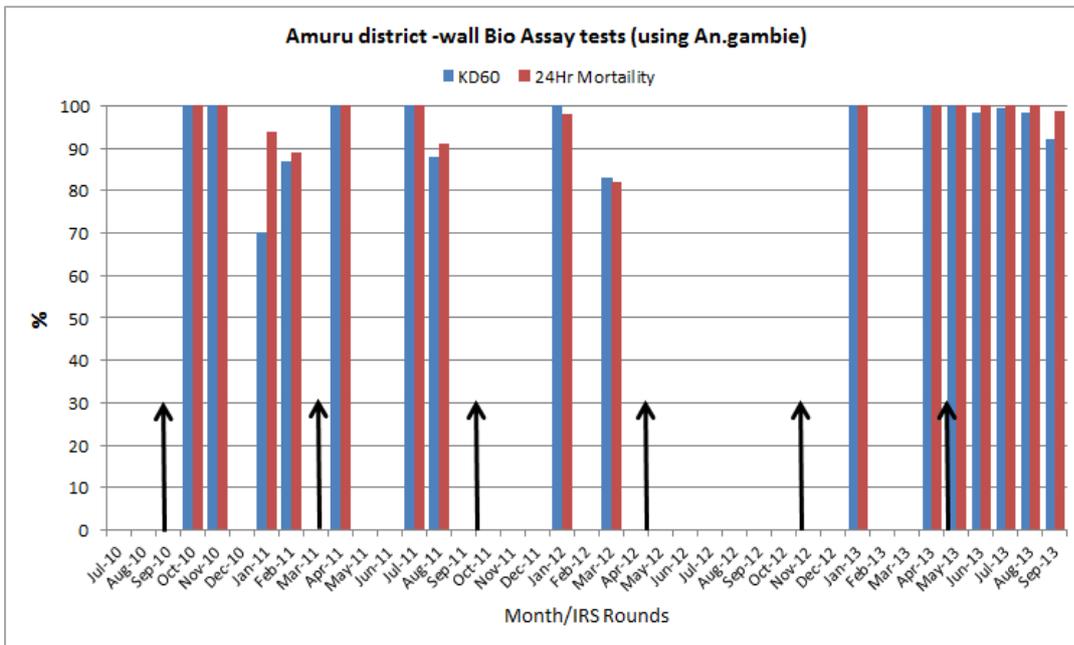


Figure 16: Amuru district monthly bio assays tests results from July 2010 – September, 2013



2.4.2.3 Routine vector bionomics

Bionomics is a comprehensive study of the vector behavior in relation to its environment. This year, the project conducted monthly bionomic studies to determine: indoor resting density (the number of mosquitoes resting indoor during the day), man-biting density, seasonal changes in indoor resting density, and species composition and abundance of the vectors, in the project and the control sentinel sites. They employed different techniques which included: human landing collections (both indoors and outdoors), PSCs, light trap catches and larval mosquito collections. A select team of entomologists and VCOs from the VCD/MoH and districts carry out these studies in the sentinel sites in Apac, Kitgum and Lira districts throughout the year. The results showed that the number of malaria vectors collected by the various techniques above was minimal in IRS districts of Apac and Kitgum. In comparison, in the control district of Lira, the team collected many malaria vectors, especially female *An. gambiae s.l* (over 80 percent) (Figures 17-20). However, other nuisance

mosquitoes like Culex and Mansonia species which cause discomfort to most households, are present in large numbers, in both the intervention districts (Apac, Kitgum) and control district (Lira). These studies show strong evidence that IRS has greatly contributed to reducing vector densities in the IRS project districts.

Figure 17: Summary of bionomic study using indoor HLC at sentinel sites, Apr-Sept, 2013

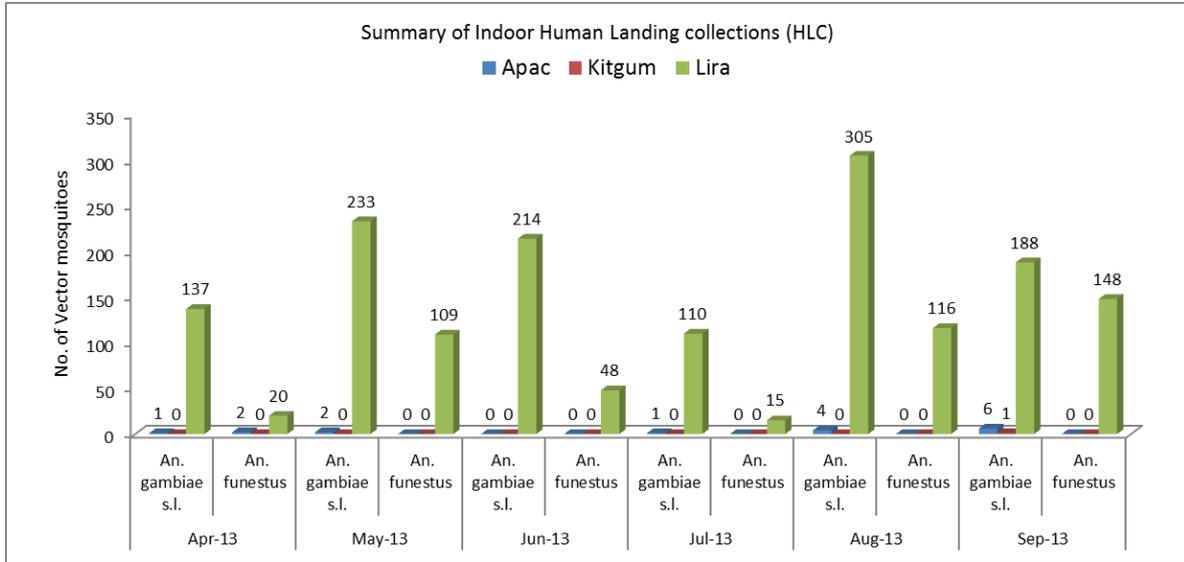


Figure 18: Summary of bionomic study using outdoor HLC at sentinel sites, Apr-Sept, 2013

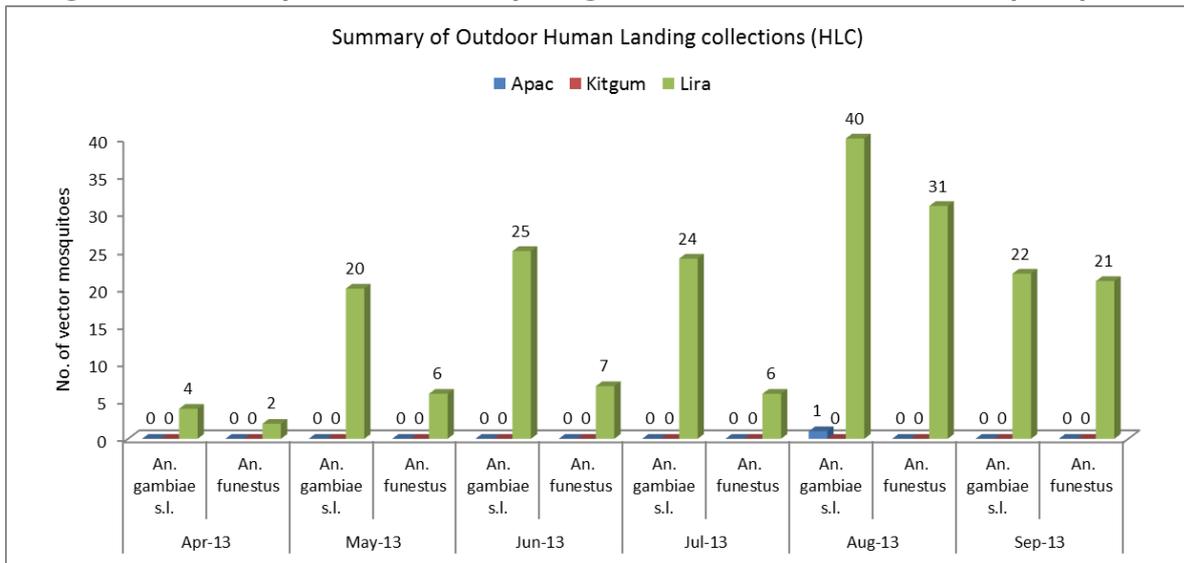


Figure 19: Summary of bionomic study using PSCs at sentinel sites, Apr-Sept, 2013

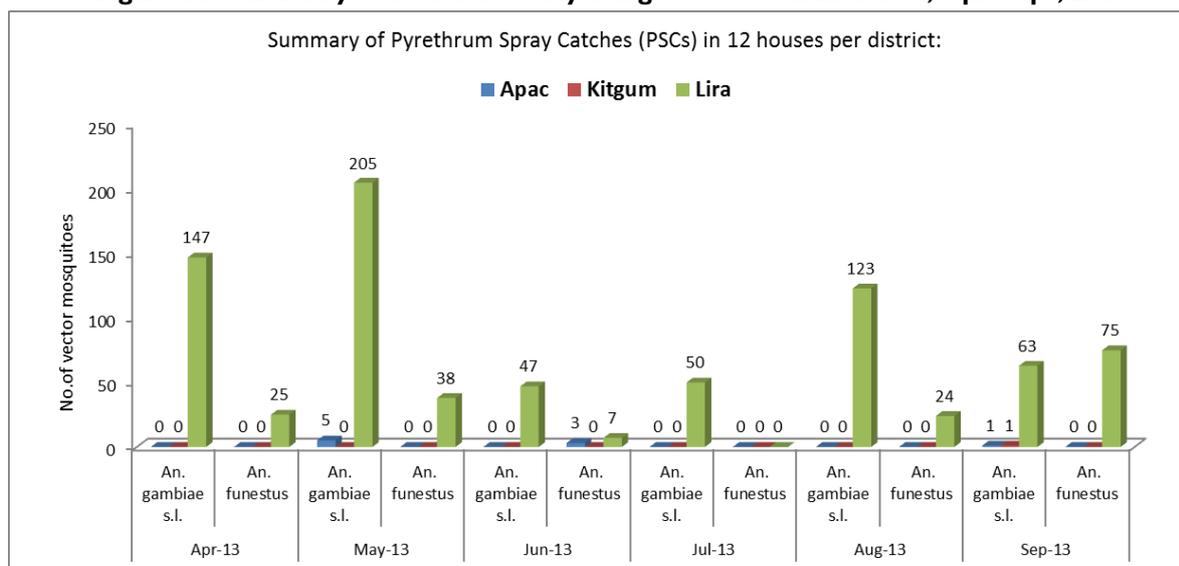
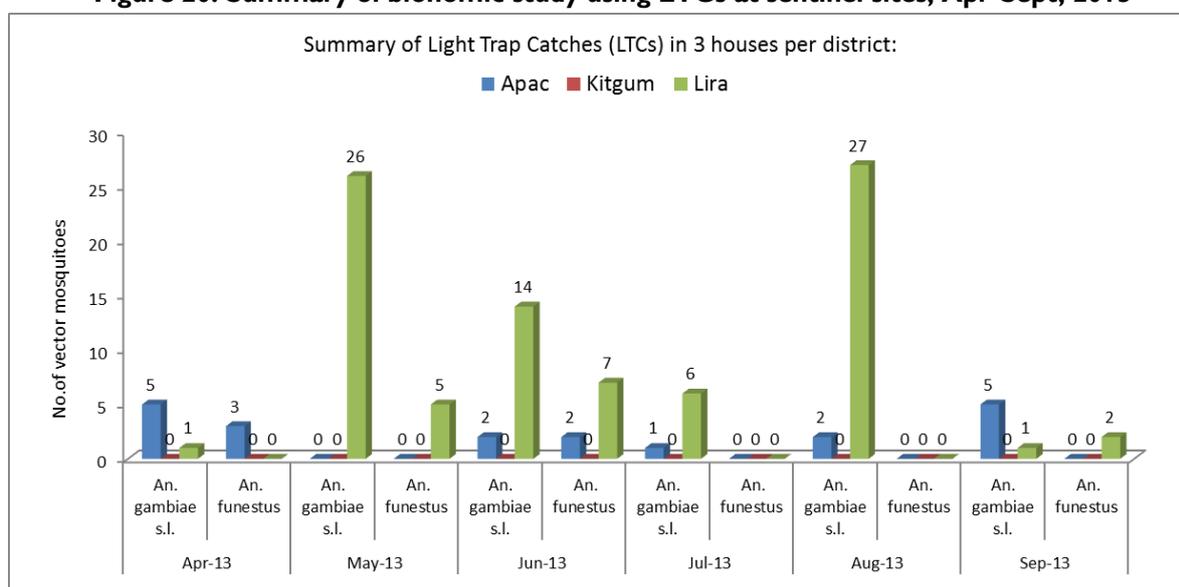


Figure 20: Summary of bionomic study using LTCs at sentinel sites, Apr-Sept, 2013



2.4.2.4 National insecticide susceptibility studies

The national insecticide susceptibility study team successfully completed the study in the six sentinel sites in the districts of Apac, Hoima, Kanungu, Kitgum, Tororo and Wakiso. The technical support team included Mr. Ranjith de Alwis project from Abt and Mr. Oguti David from MOH/VCD. The project Entomologist/Vector Control Specialist is analyzing the data, and the final detailed report will be submitted in quarter one of year two. Figure 21 shows the main findings from the study.

Figure 21: Preliminary results of the national insecticide susceptibility study, September, 2013

Insecticide tested	Apac		Hoima		Kanungu		Kitgum		Tororo		Wakiso	
	A	L	A	L	A	L	A	L	A	L	A	L
Organochlorine												
DDT 4%		95		34	59			81	41	37		10
Pyrethroid												
Cyfluthrin 0.15%												
Deltamethrin 0.05%		82		18	53		58		35	37	44	
Etofenprox 0.5%		84										
Lambdacyhalothrin 0.05%		56			27				40	26		21
Permethrin 0.75%		85			31				45			24
Alphacypermethrin 0.05%					61				42		60	
Organophosphate												
Malathion 5%									100		100	
Pirimiphos-methyl 1%		100		100	100	100	100	100	100	100		100
Carbamate												
Bendiocarb 0.1%		99.6		95	100		100		93.9	100		85
Propoxur 0.1%					100				95		92	

KEY

Confirmed resistance

Probable resistance

Susceptible

Strategy: Program activity management and performance monitoring plans developed and implemented**2.4.2.5 Environmental monitoring**

As a key component of environmental monitoring activities, the project routinely conducted store and soak-pit verification before every round of spraying. Led by the project's ECO, this activity is carried out in collaboration with the FCs and DEOs. This activity helps determine the status of the stores, soak pits and bath shelters. Subsequently the information collected is used to determine the budgets for repairs and rehabilitation of these facilities. After each spray round, the project also conducts in-depth post IRS inspections to ensure that stores are cleared and cleaned according to stipulated environmental standards and regulations.

2.4.2.6 IRS waste collection and management

In the two rounds of spraying conducted in first and third quarter in year one, the ECO in coordination with project SMs and with the support of the DSOs, ensured that all IRS wastes from the parish stores were collected, sorted, categorized and weighed. The waste was sorted into less contaminated and highly contaminated categories, as different disposal methods are utilized to deal with each type. A total of 9,871kgs and 10,004kgs of IRS waste were generated after round one and two respectively (Table 15). The main solid waste items collected were empty sachets (46.6 percent), black polythene (15.7 percent) and bicycle cushions made from local materials (14.6 percent). Under the supervision of ECO and the DEO of Gulu district, the Green Label company transported all the waste to the Nakasongola based Luwero Industries, where it was incinerated and certificates of destruction were issued.

Table 15: Comparison of IRS solid wastes collected after Phase II, round one and round two

No	Items	Waste collected [in Kgs]		Variations	Reason for variation in waste
		Jun. 2013	Dec. 2012		
1	Empty Sachets	4,598	4,288	-310	Formerly the empty sachets were packed & weighed in cardboard boxes which weighed about 2 kg but this round they were packed in sacks which weigh less than 0.5 kg
2	Nose and Mouth Masks	536	684	148	Nose & Mouth masks used in round two, are of better quality and slightly heavier
3	Insecticide Coverings	831	933	102	The amount of insecticide used increased in this round hence increase in waste
4	Haversacks	0	56	56	Backlog of the old "Khaki type" retained but useable haversacks has been discarded as waste
5	Gloves	702	516	-187	Better quality gloves were procured this round so fewer were damaged at end of spraying
6	Black polythene	1,550	1,807	257	A different gauge was procured. Most were worn out and could not be reused.
7	Bike cushion	1,446	1,704	258	Store managers have now stopped disposal by burning of cushions at district store sites.
8	First aid kits	15	7	-8	Less damage was observed in the first aid kits procured for Phase II round two
9	Towels and filter cloth	148	5	-143	The new towels procured were of better quality than the earlier lot
10	Apron	37	2	-35	New aprons were procured therefore less damage
11	Helmet adaptor	10	4	-6	New helmets were procured therefore less damage
	TOTAL	9,871	10,004	133	

Strategy: Program activity management and performance monitoring plans developed and implemented

2.4.2.7 IRS data management and data quality assurance (DQA)

The project has put in place processes and tools to ensure data quality (i.e. completeness, validity and integrity) collected during every round of spraying. This system of connected processes targets persons involved at different levels of IRS supervision structure. Table 16 describes the data quality assurance tools that the project is using for monitoring and supervision.

Table 16: Data management and supervision tools

Tool	User	When is it used?	How it's used
Field supervision checklist/ Data validation tool	<ul style="list-style-type: none"> ▪ Sub-county supervisors ▪ Field Coordinators ▪ Project support staff ▪ District IRS team members ▪ MOH supervisors ▪ Project's Store Manager 	During spraying	<ul style="list-style-type: none"> ▪ The supervisor randomly selects 3 households at least one from three different daily spray operator cards he/she encounters. ▪ He/she fills out data element recorded it appears on the card; ▪ He travels to the location of the household where sprayed was done and verifies the data as recorded by Spray operator (SO). ▪ If the errors committed on all the three randomly selected households are similar its address to the whole store spray team
Data Entry Verification Form	<ul style="list-style-type: none"> ▪ District Biostatisticians ▪ Data Analyst ▪ M&E Manager 	During spraying/Data Entry	<ul style="list-style-type: none"> ▪ The user of form randomly selects 20 daily spray operators that have been marked/ signed as entered into the database. Using the unique card serial number, he/she search the database for the records of this card; ▪ He/she then verifies if the recorded data matches the database record for all the variables indicated on the data verification form. ▪ The identified errors are noted and the data cleaned together with the data clerk. The card is then marked or signed by data verifier so that it's not sampled for next time.

Tool	User	When is it used?	How it's used
Post-IRS data quality audit <i>(Household questionnaire in dashboard data collection tool)</i>	<ul style="list-style-type: none"> ▪ Team collecting data for capacity building dashboard 	2 weeks after end of spray round	<ul style="list-style-type: none"> ▪ From a list of eligible parish stores, four(4) stores is randomly selected per district ▪ The data collection team will travel to these selected parish stores and randomly sample 30 households from villages served by the parish store; ▪ They will administered the household questionnaires combined with observational evidence for especially eligible houses and houses sprayed; ▪ These data collected will be analyzed and compared with coverage computed from the IRS database;

2.4.2.8 Data clerk recruitment and training

The project in collaboration with DHTs, recruited and conducted refresher training for 21 data clerks (of which 10 were females) to process data at the 10 district data centers for round one (Table 17). The same number of data clerks was used to enter and process data for round two. During round two, the project stopped using data collection agents, and the sub-county supervisors along with project staff were responsible for collecting and delivering data cards to the data centers. This helped strengthen supervision among the spray teams and reduce data collection costs. All data from 274 parish stores was successfully delivered at the data centers. Data analysis was completed for all the 10 project districts, and reports were disseminated to the relevant heads of department for planning and decision making.

Table 17: The number of data clerks used during IRS project phase II, round one and two

District	No. of Data clerks		
	Female	Male	Total
Gulu	1	2	3
Pader	1	1	2
Agago	0	2	2
Kitgum	1	1	2
Lamwo	2	0	2
Amuru	2	0	2
Apac	0	2	2
Kole*	0	1	1
Oyam*	2	1	3
Nwoya	2	0	2
TOTAL	11	10	21

2.4.2.9 Pilot SMS data transmission

In year one, the project piloted transmission of spray data from parish stores using SMS technology in Oyam and Kole districts in October 2012. Overall, this mobile technology based innovation was successful and achieved the objective of providing daily spray updates to the FCs. It involved training parish store keepers to submit simplified daily reports via SMS directly into a centralized Episurveyor SMS repository database. During the pilot, the project's M&E/GIS Manager, supervised the activities and analyzed data on a daily basis and provided daily reports to the project team. Following this successful pilot of SMS data transmission technology in Oyam and Kole districts in round one, the project scaled it up to all 10 project districts in spray round two.

The adoption of mobile phone technology helped: 1) reduce the need for motorcycle couriers; and 2) made selected real-time data available on the day of data collection, rather than two or three days later, which was the case when collected by motorcycles. This approach of rapid real-time sharing of IRS data among the project team, helped with making timely decisions and adopting remedial measures for any identified constraints and challenges. This innovation enabled the project to stop using motorcycle data collection agents initially used in the previous rounds, and saved about UGX 34 (thirty four) million in round two. During round two micro-planning, all district IRS teams and storekeepers were trained on how to use the SMS technology.

In spite of the benefits of this technological innovation, the project experienced certain challenges including improper texting and problems associated with the SMS provider which affected the data quality to some extent. The project's assessment of the SMS technology was that it was suitable for a smaller set up with fewer stores and for experienced mobile phone users. The project decided instead to pilot smart phone data transmission, the details of which are provided below.

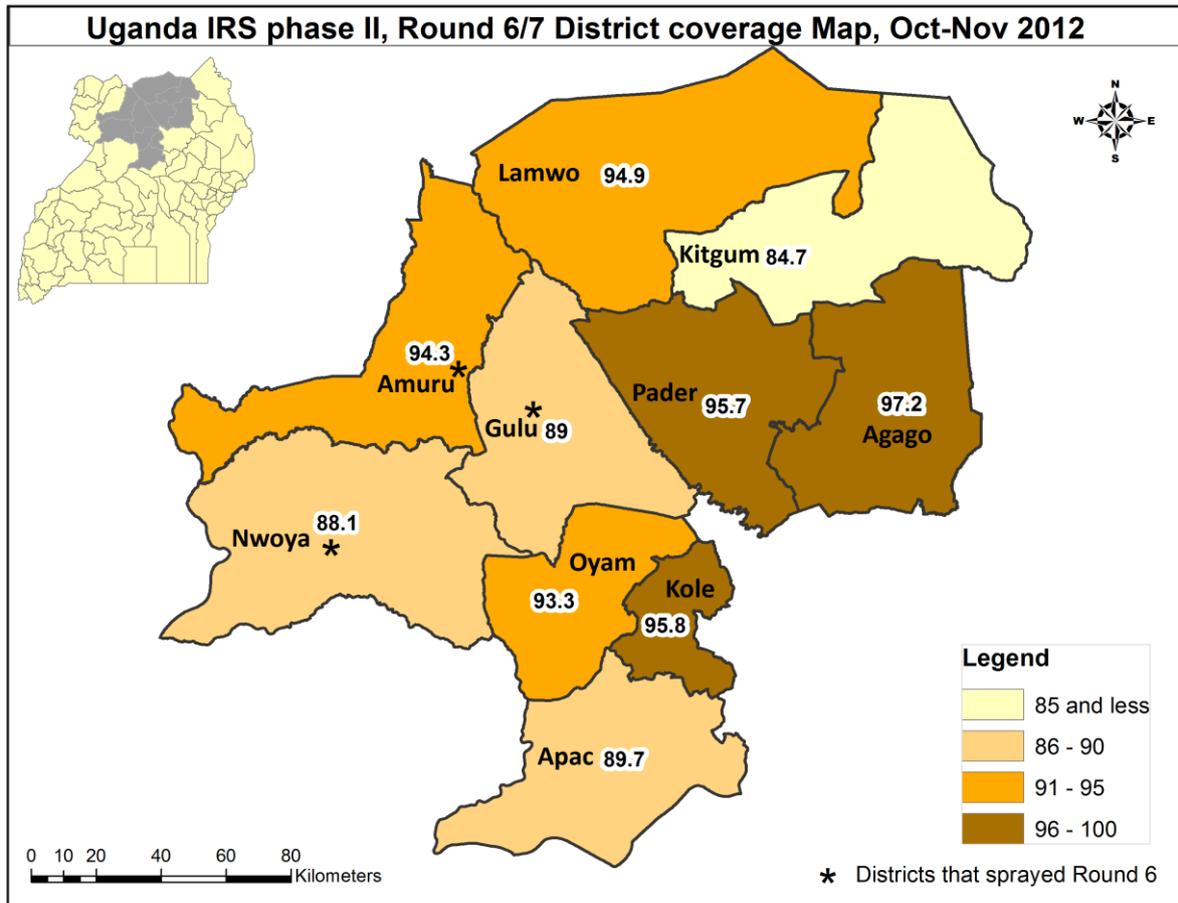
2.4.2.10 Pilot smart phone data collection

Given the challenges associated with SMS texting, and in order to increase further the efficiency of data transmission, the project piloted, the use of smart-phones for data collection in four districts; Kitgum, Gulu, Apac and Pader using (ODK) forms and cell-phone and wireless networks to transmit an expanded set of indicators and insecticide inventory data, which yielded positive results. Data submissions were on time, less network interruptions occurred, and storekeepers who used the phones, did not report any major problems. Furthermore, the data collection form was designed, tested and easily maintained by the project's M&E Specialist without constant outside vendor support, which was the case with the earlier SMS software. The smart phone is user friendly, since it enables the SK to simply complete the data in database forms without having to follow a standard SMS format which was challenging for many storekeepers. Additionally, smartphones enable the use of intuitive forms that emulate paper with a user friendly interface. In contrast, SMS texting of SK data required stringing together daily data with hash tags in a required format. In addition to learning this rather foreign code, the SMS gateway malfunctioned contributing to errors. The new platform of smart phones will bypass both problems and the project can focus on training and delivering data quality.

2.4.2.11 Geographic information systems (GIS) utilization

As in Phase I, the project continued to use GIS technology for planning, data analysis and presentation of data. During this period, the project achieved the target of producing 274 parish level planning maps in addition to IRS coverage maps (Figure 22). These maps have been important in re-organizing of parish stores, and to address "hard to reach" locations in some districts. The next phase involves including the household coordinates to get precise information regarding the distribution pattern of households in the target districts.

Figure 22: Uganda IRS phase II, round one district IRS coverage map, October – November, 2012



2.4.2.12 Project impact on malaria epidemiology

Throughout the first year, the project continued to collect, analyze and update malaria related from the district Health Management Information Systems (HMIS). Data was collected and analyzed from selected health facilities including St. Josephs and Kitgum General Hospital (Kitgum district), Anyeke HC IV (Oyam district), and Aduku HC IV (Apac district). The data analyzed from these facilities showed a declining trend of malaria cases, which is also a testimony to the effectiveness of IRS. (Figures: 23-26).

Figure 23: Slide positivity rates, St. Joseph’s Hospital-Kitgum, 2006 - 2013

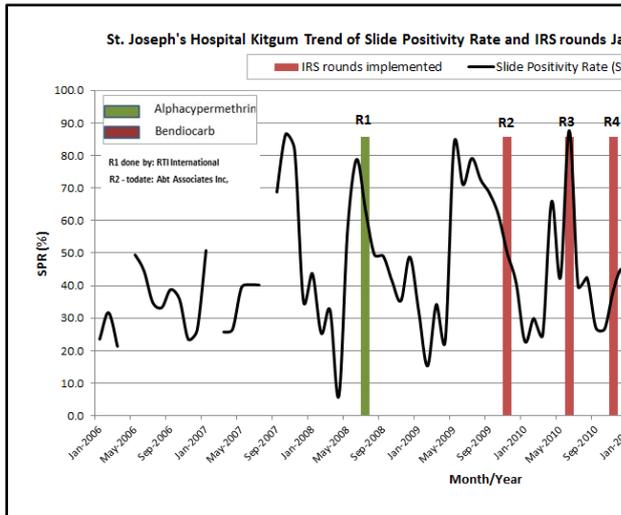


Figure 24: Slide positivity rates, Anyeke HC IV – Oyam district 2006- 2013

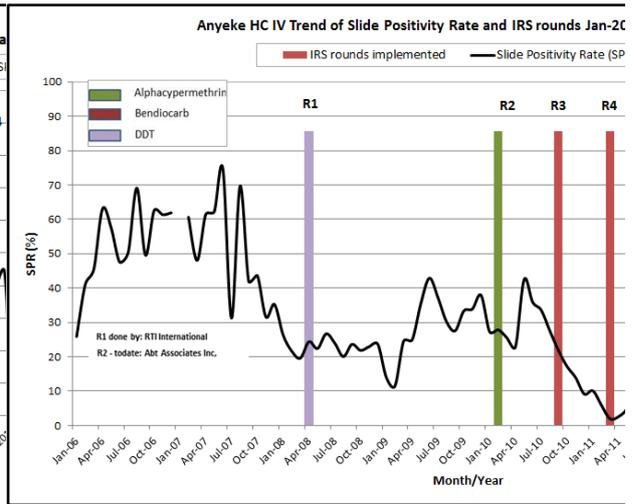


Figure 25: Slide positivity rates, Aduku HC IV –Apac district 2006- 2013

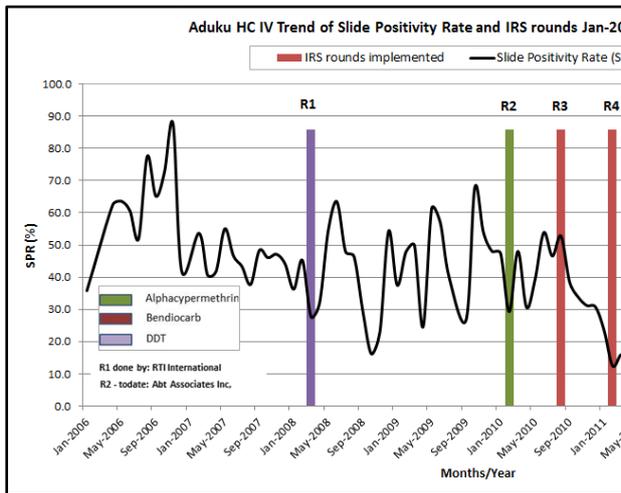
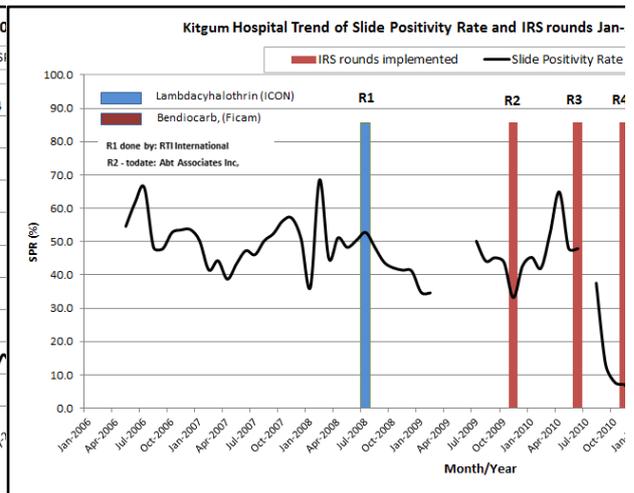


Figure 26: Slide positivity rates, Kitgum General Hospital 2006- 2013



Annex - Success Stories

Sent as separate files to USAID/PMI. Success stories include:

1. IRS: Saving lives, helping reduce Apac's socio-economic burden
2. Gulu University Insectary: On the way to becoming a regional center of excellence in Africa
3. Local Leader Champions Indoor Residual Spraying
4. Uganda IRS Project Fights Malaria, Empowers Women

The project will submit additional success stories in the upcoming months.