



PRESIDENT'S MALARIA INITIATIVE



## INDOOR RESIDUAL SPRAYING FOR MALARIA CONTROL

# Quarterly Report

Indoor Residual Spraying (IRS) for Malaria Control  
Indefinite Quantity Contract (IQC) Task Order 1

October 1, 2008–December 31, 2008

Contract GHN-I-01-06-00002-00

Prepared for:  
United States Agency for International Development

Prepared by:  
RTI International  
3040 Cornwallis Road  
Post Office Box 12194  
Research Triangle Park, NC 27709-2194

RTI International is one of the world's leading research institutes, dedicated to improving the human condition by turning knowledge into practice. Our staff of more than 2,800 provides research and technical expertise to governments and businesses in more than 40 countries in the areas of health and pharmaceuticals, education and training, surveys and statistics, advanced technology, international development, economic and social policy, energy and the environment, and laboratory and chemistry services. For more information, visit [www.rti.org](http://www.rti.org).

RTI International is a trade name of Research Triangle Institute.

### February 2009

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

# Table of Contents

	Page
Acronyms.....	iii
Introduction.....	1
Core Activities .....	2
Angola.....	4
Benin.....	7
Ethiopia.....	11
Ghana.....	17
Liberia.....	20
Madagascar.....	23
Malawi.....	27
Mali.....	31
Mozambique.....	34
Rwanda.....	39
Senegal.....	44
Uganda.....	47
Zambia.....	50

## Acronyms

---

ABE	Agence Béninoise pour L'Environnement/Benin Environmental Agency
ASACO	L'Association de Santé Communautaire/Community Health Association (Mali)
CA-USA	Crown Agents USA, Inc.
CCF	Christian Children's Fund
CDC	U.S. Centers for Disease Control and Prevention
CMCP	Constructions Mécanosoudées Caoutchouc et Plastiques/Caustic Soda, Rubber, and Plastic Plant
COP	Chief of Party
CREC	Centre de Recherche Entomologique de Cotonou/Entomological Research Center of Cotonou (Benin)
CS	Capsule Suspension
CSCOM	Centre de Santé Communautaire/Community Health Center (Mali)
CSREF	Centre de Santé de Référence/Referral Health Center (Mali)
DDT	dichloro-diphenyl-trichloroethane
DEEC	Direction de l'Environnement et des Etablissements Classés (Environment and Classified Factories Directorate)
DHMT	District Health Management Team
DPS	Departamento Provincial de Saúde/Provincial Department of Health (Mozambique)
DRACPN	Direction Régionale de l'Assainissement et du Contrôle de Pollution et des Nuisances/Regional Directorate of Sanitation, Pollution, and Nuisance Control
ECZ	Environmental Council of Zambia
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FMOH	Federal Ministry of Health (Ethiopia)
FY	Fiscal Year
GHS	Ghana Health Service
HCC	Health Communication Center
HOTM	Home Office Technical Manager
ICON	Lambda Cyhalothrin
IEC	Information, Education, and Communication
INS	Instituto Nacional de Saúde/National Institute of Health (Mozambique)
IQC	Indefinite Quantity Contract
IRS	Indoor Residual Spraying
IRS TO1	IRS Task Order No. 1
IVM	Integrated Vector Management
LATH	Liverpool Associates for Tropical Health
LIBR	Liberia Institute for Biomedical Research
M&E	Monitoring and Evaluation
MEO	USAID Mission Environmental Officer
MEWS	Malaria Early Warning System
MOE	Ministry of Environment
MOH	Ministry of Health

MOHFP	Ministry of Health, Family Planning and Social Protection (Madagascar)
MOU	Memorandum Of Understanding
MRL	Minimal Residual Level
MRTC	Malaria Research Training Center
NGO	Nongovernmental Organization
NMCC	National Malaria Control Centre (Zambia)
NMCP	National Malaria Control Program
ORHB	Oromia Regional Health Bureau (Ethiopia)
PASP	Programme Africain Relatif aux Stocks de Pesticides/African Program on Pesticide Stocks
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
PMI	U.S. President's Malaria Initiative
PNILP	Programme National Intégré de Lutte contre le Paludisme/National Integrated Malaria Control Program (Rwanda)
PNLP	Programme National de Lutte contre le Paludisme/National Malaria Control Program (Benin, Senegal)
PPE	Personal Protective Equipment
PSI	Population Services International
RTI	RTI International
SEA	Supplemental Environmental Assessment
SLAP	Service de Lutte Anti-Parasitaire/Pesticide Control Service (Senegal)
SLP	Service de Lutte contre le Paludisme/National Malaria Control Program (Madagascar)
TO	Task Order
TOT	Training Of Trainers
UCAD	l'Université Cheikh Anta Diop
UGP	L'Unité de Gestion du Programme/Program Management Unit (Madagascar)
USAID	U.S. Agency for International Development
WHO	World Health Organization
WP	Wettable Powder

# Introduction

---

RTI International (RTI) was awarded the Indoor Residual Spraying (IRS) Indefinite Quantity Contract (IQC) on September 29, 2006, under Contract No. GHN-I-01-06-00002-00, Task Order No. 1. Working in partnership with RTI are its two main subcontractors, Crown Agents USA, Inc. (CA-USA) for logistics and procurement services, and Liverpool Associates for Tropical Health (LATH) for entomological activities. Funded by the U.S. President's Malaria Initiative (PMI), the purpose of the IRS project is to support PMI countries in planning and implementing IRS programs with the overall goal of reducing the burden of malaria in Africa. The specific objectives are to procure insecticides and equipment necessary for the IRS programs; provide operational management support for the programs; ensure compliance with environmental regulations in accordance with 22 CFR 216; provide short- and long-term technical assistance for IRS activities; and provide training and capacity building for safe and effective spraying in accordance with WHO guidelines.

Implementation of IRS activities under this project has expanded rapidly as PMI has expanded the number of countries included in the initiative. This project has built upon the IRS work conducted under the Integrated Vector Management (IVM-1) project, which launched spray operations in Angola, Uganda and Tanzania in FY06 in the first year of the initiative. Under IRS task order 1, four more countries were added in FY07, with operations launched in Senegal, Rwanda, Malawi, and Mozambique followed in FY08 with the addition of the Benin, Zambia, Ethiopia, Madagascar, Ghana, Mali, and Kenya IRS programs under this contract.

This report presents the project's progress during the period of October 1 to December 31, 2008. The report is divided into core activities outlining project management and technical support and specific country sections. It summarizes the project's current activities and achievements, outstanding issues, and upcoming activities.

## **Core Activities**

---

### **Project Management & Leadership**

Ms. Barbara Kennedy continued to provide overall project leadership as Acting Project Director while recruitment for a permanent Project Director continued. Several strong candidates were interviewed for the Project Director position. In support of the Acting Project Director, Ms. Lourdes Loch-Martinez assumed the role of Deputy Director for Management and Operations. Based in the Washington DC office, she provides leadership and management for the operational functions of the project. Dr. John Chimumbwa continued to provide technical direction and leadership as Deputy Program Director based in Nairobi.

RTI further streamlined and operationalized its IRS regional office in Nairobi, Kenya which houses the Deputy Program Director and the environmental, entomological, finance, human resources, and logistics project teams. At the field offices in most countries, the permanent field staff is comprised of a Chief of Party (COP), Finance Manager, Logistics Officer, a Technical Officer (in monitoring and evaluation, environmental compliance, or information, education, and communication (IEC), and an Office Manager. District staff in logistics, finance, and IEC, as well as temporary seasonal workers, is brought on during spray operations. Additionally, logistics, procurement and payroll services were carried out by Crown Agents USA, and technical support for country-specific activities by the Liverpool Associates in Tropical Health.

### **Current Activities & Accomplishments**

#### ***Technical Assistance***

The environmental compliance team provided technical assistance to IRS project countries by undertaking pre-, mid- and post-spray environmental compliance inspections to ascertain the level to which mitigation measures were compliant with the requirements spelled out in country SEAs and in 22 CFR 216. Effort was made to improve the conditions of warehouses and storage facilities and to ensure that soak pits and bath shelters are in place before any spray activities began. These country visits provided an opportunity to reinforce training on worker health and safety and to ensure that IRS best practices for environmental protection are observed.

#### ***Partnership and Collaboration***

The project team met with International Resources Group (IRG) and began discussions and plans to develop an effective partnership on the newly awarded environmental monitoring and capacity building contract with the objective of consolidating evidenced-based best practices for environmental monitoring for IRS.

### **Outstanding Activities**

#### ***IRS Training Manual***

Efforts to control malaria on the African continent have been hampered by a critical lack of skilled human resources, particularly in the area of vector control at the operational level. As a result, many IRS programs throughout Africa have been implemented without sophisticated

and well-trained staff, diminishing the potential effectiveness of IRS. Capacity building in general malariology, vector control program management, and especially practical field entomology, a prerequisite for effective IRS implementation, is insufficient. To address this gap, the IRS project has developed a training manual to strengthen the knowledge and skills of health workers and community volunteers who are involved in delivering IRS to the community. The training manual has six components: General Introduction, Basic Principles, Safety of IRS, Practical Sessions, Quality Control, and IRS Application Techniques. The training manual is scheduled for completion in the next quarter and a training of trainers schedule will be developed.

#### ***Standard Operating Procedures (SOPs)***

The IRS project continued its efforts to collect best practices in environmental compliance, entomology, training, procurement, finance, administration, and logistics from across project countries and institutionalize them through the development of project SOPs. During this quarter, the team revised the SOPs based on input from COPs and other field staff and changes in RTI's internal policies. The completed SOPs will be approved by senior project management and rolled out for training in all IRS field offices in the next quarter.

#### **Upcoming Activities**

##### ***Entomological Workshop***

The IRS project will undertake planning for the March 2009 entomological workshop which will focus on insecticide selection, resistance management, entomological surveillance, and enhancing related laboratory capacity. The workshop will bring together entomological experts to discuss methodologies and strategies for entomological surveillance; to share and review data on insecticide resistance status in PMI countries and devise a strategy for updating or adding to this information; and to discuss strategies for mitigating insecticide resistance in light of information on current resistance status.

##### ***Capacity Building***

The project will increase emphasis on activities aimed at capacity building among government counterparts and key IRS program country level stakeholders for effective IRS planning, implementation, and evaluation.

# Angola

---

## **Background**

During this quarter, IRS conducted round four of spray operations in Angola, which started on October 6, 2008 in Huila and were completed on December 16, 2008 in Huambo. The project also conducted the IEC campaign in support of the spray round, as well as training sessions for local health staff on the malaria early warning system (MEWS). During this quarter, the field office received technical support and assistance directly from the Nairobi Regional Office which is nearly fully staffed and operational. Key areas of technical support to Angola include technical leadership and oversight, financial and administrative management, logistics management, and environmental inspection and assistance.

## **Current Activities and Accomplishments**

### ***Procurement and Logistics***

#### ***Spray Pumps and Parts***

During this quarter, the spray pumps, repair kits, and spare parts destined for spray operations in Huila and Huambo districts were inadvertently shipped to Madagascar. However, the country management team put in place operational and logistical mechanisms that enabled the successful implementation of the operations, such as adjusting the deployment of IRS personnel and urgently repairing pumps. The equipment was received in time for the team to continue spraying as normal.

### ***IEC Development and Implementation***

Utilizing materials developed in the previous quarter, the IEC agents carried out an extensive IEC campaign from September 29 through December 19, 2008. During the campaign, around 135,000 heads of households were reached through interpersonal communications and received IRS messages. In the first phase of the campaign, IEC agents contacted heads of household or any adult person at home one week before the campaign and left publications with the beneficiary households. About 76,000 pamphlets and 2,000 booklets were distributed throughout the campaign. In some areas, beneficiary committees were established to assist in awareness-raising activities among residents. One day before spraying, the agents revisited the households. On the spraying day, operators provided additional IEC prior to commencing spraying. The campaign was supported by local radio interviews and programs delivered by the COP, district operations managers, and the provincial supervisor for the malaria program.

### ***Training of IEC Mobilizers***

In order to improve geographical coverage by increasing the number of structures sprayed per spray operator per day, 30 new IEC agents were trained in Huila and Huambo during the first week of November. This increased community mobilization increased household compliance with spray operators' instructions and improved overall coverage.

## ***Spraying Operations***

### ***Recruitment and Training for Spray Teams***

Due to the high dropout rate of spray operators during the IRS campaign, the project recruited and trained additional spray operators. Announcements for spray operator applicants were made through local radio stations in October, and about 300 people submitted applications. A total of 115 people were successfully trained and deployed in the spray teams. During a training session that took place in Huambo from October 13 to 17, the project successfully trained 120 people as IRS operators and from October 20 to 24, 15 people as brigade supervisors, 40 people as team leaders, and 15 people as field monitors.

### ***IRS Operations***

The IRS operations in Huila started on October 6 and ended on November 27. An average of 252 IRS operators was deployed during the 37 working days, and around 258,000 structures were sprayed in Huila. In Huambo, IRS started on October 27 and finished on December 16. Around 148,500 structures were sprayed in 29 working days by a daily average of 137 spray operators.

## ***Other Activities***

### ***Entomological Monitoring***

The entomological baseline survey team was not deployed to the field as expected this quarter. There were delays in gathering specialized material, conditions were not ideal to grow larvae and breed adult mosquitoes, and the holiday season impeded the deployment of the team. This activity is expected to take place in January or February 2009.

### ***Capacity Building of MOH: Establishment of a Malaria Early Warning System (MEWS)***

In collaboration with local health authorities, the project trained six local health staff on the MEWS components and the respective system, including data collection tools, data analysis, and reporting. The training took place in Huila Province from November 24 to 28, 2008. Each of the three provinces (Namibe, Cunene, and Huila) sent the provincial supervisor for the malaria program and one additional representative. Three project staff attended the training to verify the correct establishment and continuity of the MEWS.

## ***Monitoring and Evaluation***

### ***Information Collection Mechanisms***

Throughout spray operations, the project used revised data, collection tools and an improved database to document IRS results. On a daily basis, data quality assessment assistants verified the completeness and accuracy of the data provided by IRS personnel entered into the database by the clerk. The consolidated data helped the COP and the district operations manager to monitor the progress and quality of operations and quickly adopt corrective measures where necessary.

### ***Project Management and Administration***

Mr. Sam Mesfin, Regional Controller, traveled to Angola from November 3 to 14 to provide technical assistance on financial matters in preparation for the fourth round of spraying. He travelled to the field and provided direct assistance to district operations managers, finance assistants, and logistics assistants on the current accounting system, tools, and financial guidelines and policy.

Ms. Catherine Ngugi, Operations Manager, traveled to Angola from November 17 to December 6, 2008, to provide operational assistance to field staff engaged in the fourth round. She travelled to Huambo and Huila to observe operations and provide timely

guidance, particularly in matters related to personal protective equipment (PPE), water supply, storage of empty insecticide sachets, and safe transportation of personnel.

Mr. Autman Tembo, Senior Environmental Inspector traveled to Angola from December 8 to 19, 2008, and carried out an environmental assessment in Huambo and an inspection in Huila. He met the PMI environmental officer and the NMCP team on environmental issues, particularly a location for an incinerator for the disposal of empty insecticide sachets. He also met the director of the Environmental Ministry to assess existing policy and regulation on the use of insecticide.

### ***Partnership and Collaboration***

The COP met with the head of WHO's Malaria Department to discuss ways to collaborate in the monitoring of IRS in Huambo and Huila. As a result of this meeting, WHO released their database manager to assist in the MEWS training in Huila and offered the WHO malaria provincial advisor to lead the beneficiary satisfaction survey in Huila.

### **Outstanding Issues**

- Review and editing of the English version of the National Strategy to Control Malaria.
- Timely release of the spraying pumps and repair kits from customs.

### **Upcoming Activities**

- Commence the baseline entomology survey.
- Carry out the IRS data quality assessment and certification for the release of the final data.
- Conduct the beneficiary satisfaction survey in Huila and Huambo.
- Conduct wall bioassays in Huila and Huambo.
- Conduct provincial IRS evaluation meetings.

# Benin

---

## Background

Benin is one of the second wave of countries to receive funding under PMI. USAID and the Benin Programme National de Lutte contre le Paludisme (National Malaria Control Program; PNLP) identified four epidemic-prone districts (Akpro-Misserete, Dangbo, Adjohoun, and Seme Kpodji) in the Ouémé Department for IRS activities. RTI is tasked with providing strategic, technical, management, and operations support for IRS activities in these districts. During the 2008 spray round, RTI and the PNLP treated 141,154 households and protected 521,738 people from malaria. In addition, the project in collaboration with PNLP and local partners distributed long-lasting insecticide-treated nets (LLINs) to houses in the targeted zone which were not sprayed due to environmental concerns.

During this period, the project's activities focused on the post-spray environmental inspection in preparation for the next round, identification of proper waste disposal facilities, the end-of-spray workshop, and preparations for the next IRS spray round.

## Current Activities and Accomplishments

### *Planning and Assessment*

To prepare and plan for the second spray round in Benin in March 2009, the project met with the medical chiefs of each of the four target districts. The early discussions aimed to allow the district health teams to integrate IRS activities into their work plans for the year.

### *Procurement and Logistics*

During this quarter, the project logistician initiated field visits to the four districts to update logistics information for the next spray round. He developed specifications and quantifications for insecticide, gloves, pregnancy test kits, and first aid kits; determined the number of buses needed for spray operator transportation; and updated the geographical mapping of villages for the next round.

### *Environmental Compliance*

#### *Post-Spray Environmental Compliance Inspection*

Mr. Gaspard Bikwemu, Environmental Compliance Inspector, traveled to Benin from October 11 to 18, 2008 to conduct the post-spray inspection. He held several meetings with national partners including the Ministry of Environment (MOE), the Beninese Environmental Agency (ABE), and USAID/Benin to inform them about the measures taken during IRS operations to meet environmental compliance rules and regulations. Mr. Bikwemu also conducted a field visit to Adjohoun District with the COP, the environmental consultant, the operations coordinator, and the district logistician of Adjohoun to identify a secondary warehouse facility out of which to base the next round of operations in Adjohoun. Because this district is more than one hour's drive away from Porto Novo, a separate secondary storage facility is necessary to limit the amount of time and distance spray operators must travel to reach spray sites. A facility was identified and a lease signed. The project operations

coordinator and logistician met with the landlord to initiate discussions when renovations can begin.

### *Solid Waste Disposal*

During Mr. Bikwemu's visit, the project team visited Société de Cimenterie du Benin Lafarge in Onigbolo, a cement factory in the district of Sèmè Kpodji, as a possible waste disposal site. The cement factory director indicated that it is not possible to incinerate insecticide sachets at their facility because some IRS solid waste contains a chloride, which is not compatible with cement production. The team also visited another manufacturer, the Constructions Mécanosoudées Caoutchouc et Plastiques (Caustic Soda, Rubber, and Plastic Plant; CMCP), a company specializing in the manufacture of rubber and plastic in Benin. The general director of CMCP provided the specifications for the incinerator that they plan to install. Mr. Damien Kodjo, Environmental Consultant, confirmed that the incinerator would satisfy the requirements for IRS waste disposal. CMCP will contact RTI once the incinerator has been installed to discuss collaboration for waste disposal. Currently, all IRS waste is properly packed and stored at the Porto Novo warehouse.

Bayer's regional director visited the Porto Novo warehouse on November 20, 2008, to examine sachet storage and initiate the collection process as required in the insecticide purchase agreement. He indicated that the collection and shipment of the empty sachets of Bendiocarb® from the warehouse to Abidjan, Côte d'Ivoire would take place in December. Unfortunately, the collection has yet to occur due to an internal problem with the supplier.

### *Spray Operations*

#### *End-of-Spray Workshop*

The end-of-spray workshop was held on November 13, 2008, and attended by approximately 40 participants, including senior MOH officials from the national and regional levels, medical chiefs from all four districts, representatives from the MOE, a representative from the Ministry of Foreign Affairs, members of the IRS task force committee, a representative from the Department of Toxicology of the University of Benin in Cotonou, USAID/Benin, WHO, the director of the Centre de Recherche Entomologique de Cotonou (Entomology Research Center of Cotonou; CREC), and others stakeholders involved in malaria control in Benin.

In addition to presenting IRS results, the CREC director shared the preliminary results of the first three months of entomological monitoring in the four sprayed districts. He indicated that Bendiocarb® was still effective at the time of monitoring.

During the workshop, the following recommendations were made to improve the next spray round in Benin:

- As per Government of Benin requirements, perform physical and biochemical tests before and after spraying for all personnel involved in IRS operations, including storekeepers and warehouse personnel.
- Develop a system to more easily identify each spray operator's PPE.
- Build more shower areas for male spray operators.

- Have the IRS project monitoring and evaluation (M&E) and environmental consultants, as well as other technical staff, on board prior to the start of IRS operations so that they are part of the preparatory phase of the spray operations.
- Encourage the involvement of local political authorities and religious leaders at all phases of IRS operations (before, during, and after) to increase community acceptance.
- Increase the number of IEC mobilizers and include village chiefs and religious leaders (or their representatives) in IEC activities so that they can participate fully and take ownership of the intervention.
- Have a separate storage facility in Adjohoun to reduce transportation time.
- Collect chronological data on malaria morbidity and mortality in the IRS districts before and after spray operations (to be conducted by the MOH).
- Elaborate a long-term IRS strategy defining the roles and responsibilities of the Government of Benin.

### ***Other Activities***

#### ***Entomological Monitoring***

The COP had a working session with the director of CREC regarding the entomological monitoring report on the first round of IRS in Benin. The first draft of the report was presented to the COP, who provided comments and suggestions to CREC. The final entomological assessment report will be submitted to USAID in January.

#### ***Project Management and Administration***

During this quarter, RTI initiated recruitment for an IEC consultant. The job advertisement was posted in local newspapers, and resumes of qualified candidates were collected. Interviews will be conducted and a finalist selected in January 2009.

#### ***Partnership and Collaboration***

During this quarter, a memorandum of understanding (MOU) between RTI and the MOH was drafted. The draft will be sent to USAID for comments in January 2009.

At USAID/Benin's request, the operations coordinator, financial officer, and logistician participated in USAID ethics training. The purpose of the training was to ensure the integrity of the U.S. government's foreign assistance programs in Benin.

On October 10, 2008, the MOH celebrated George W. Bush Malaria Day in Porto Novo. The theme of the celebration was the use of IRS as a method for malaria control. Spray operators wore PPE during the celebration to demonstrate the necessary precautions to take during spray operations.

On November 3, 2008, IRS staff met with the new PNLP coordinator, Dr. Imorou. The COP briefed him about the IRS project in Benin and plans for the upcoming spray operations. During the meeting, Dr. Imorou agreed to visit the Porto Novo warehouse.

The project team participated in the monthly malaria partners' meeting held at the WHO office and gave an update of IRS operations in Benin.

The project team participated in a workshop organized by PNLP on December 18, 2008, to draft a joint communication plan for malaria programs. During the workshop, the IRS IEC strategy was shared with the National Malaria IEC Committee. It was decided at this meeting that the IRS IEC plan will be included in the final version of the malaria national communication plan.

### **Upcoming Activities**

- Hold an IRS task force committee meeting.
- Continue preparations for the next IRS spray operations.
- The next spray round will begin in March 2009 prior to the start of the rainy season.

# Ethiopia

---

## Background

Ethiopia is one of the third group of countries to receive funding under PMI. USAID, the Ethiopia NMCP, and the Oromia Regional Health Bureau (ORHB) agreed that IRS activities should begin in FY08 in 20 selected districts in three zones (11 districts in East Shoa, 5 districts in Arsi, and 4 districts in West Arsi). RTI was tasked with providing strategic, technical, environmental compliance, management, and operations support for IRS activities in the districts. IRS operations took place during the previous quarter from July 22, 2008 to September 2, 2008.

During this period, the IRS data collected during the spray operation was validated, analyzed, and reported to USAID. Post-IRS evaluation and second round IRS micro-planning meetings were conducted and involved all IRS target district and other major partners.

## Current Activities and Accomplishments

### *Planning and Assessment*

A three-day meeting was held from October 27 to October 29 in Adama to evaluate round one IRS operations and undertake micro-planning for round two (FY09) operations. The meeting was attended by 20 district administrators or deputies and 60 district health heads or deputies, malaria focal persons, and environmental health focal persons representing all beneficiary districts. The three zonal health departments and administrations also attended, along with ORHB Malaria Control Department, Federal Ministry of Health/Malaria Control Unit, Crown Agents Ethiopia, and PMI/Ethiopia. Outcomes of the post-IRS evaluation meeting are discussed below, under Spray Operations.



*Participants listen at the post-IRS evaluation meeting.*



*A district representative presents his report.*

Each of the PMI-supported districts conducted micro-planning with guidance and technical support from the project, ORHB, and the zonal malaria focal person. The exercise included logistics assessments for the next season's activities, an inventory of resources already

available to the district, and identification of resource gaps. The meeting also identified anticipated problems or implementation constraints and offered solutions or mitigation options. Draft plans for the zones were presented and discussed at plenary. Consensus was reached on the number of unit structures to be sprayed and requirements in human resources, vehicles, dichloro-diphenyl-trichloroethane (DDT), and PPE for FY09 operations. The micro-planning exercise formed the basis for field planning and budgeting for FY09.



*Zone and district representatives participate in micro-planning.*

### ***Procurement and Logistics***

During this period, RTI/Ethiopia received most of the entomological equipment ordered in the first quarter of FY08. The heater for the insectary was received in October and five additional shipments of susceptibility and bioassay test kits, insecticide-impregnated papers (DDT 4%, Malathion 5%, and Deltamethrine 0.05%), paper cups, aspirators, dippers, mosquito cages, forceps, CDC light traps, thermometer, humidifier, distiller, petri dish, pyrethrum, and other materials were received in December.

A suitable storage space for keeping DDT waste, such as empty sachets, cartons, and damaged PPE, was identified in Adama. The project began negotiation on the terms and conditions of the rental.

### ***Environmental Compliance***

Maintenance work on three evaporation tanks was completed this quarter, and the DDT wastewater that was temporarily stored in plastic tankers was transferred to the evaporation tanks to allow evaporation. The project also conducted a storage facility assessment in each district and inspected the status of all the other evaporation tanks constructed during the FY08 season. In some districts, the wire mesh covering the evaporation tanks was rusting and the wooden frame over the tank was broken. These issues were discussed with the district health focal points, and corrective actions will be taken as part of upcoming district storage rehabilitation exercise budgeted under the FY09 work plan.

The IRS team held discussions with the U.S. Environmental Protection Agency (EPA) regarding the final DDT waste disposal mechanism. The Adami Tulu pesticide plant management was visited to review options for retrieving DDT wastes and performing final disposal. The parties reached agreement on measures to further improve the quality of DDT

packaging and tracking of DDT sachets, including the inclusion of unique district codes on sachet labels.

### ***Spray Operations***

The post-IRS operation evaluation meeting was conducted in conjunction with the second round IRS micro-planning meeting from October 27 to 29, 2008. During this meeting, the successes and challenges of the first round of PMI-supported IRS operations were evaluated and best practices were shared among districts. The most prominent were issues related to delay in the start date of IRS operations, the lack of proper storage facilities, the need for more intensive training for health extension workers engaged in IRS operation for the first time, and DDT waste containment and disposal. The participants agreed to start IRS operations in mid-May in line with the ORHB IRS operation schedule. This proposal is both technically and operationally sound as the DDT will be efficacious for six months from June to November (the main malaria transmission season in Ethiopia), and the early start date helps to avoid the heavy rainy season, thus improving access to the target communities. To improve storage conditions, it was agreed that the IRS team, ORHB, and the district health offices work together to identify what each party could do to help meet the standard. Storage places in 12 district health offices were assessed and understanding was reached on what the district health offices would do on their own and what the project will support. Each district agreed to conduct a detailed costing of the improvements.

### ***Other Activities***

#### ***Entomological Monitoring***

Monthly entomological monitoring continued during this quarter and a summary was report compiled. Vector density monitoring was done using larval collection, pyrethrum spray, and night human landing collection. A total of 59.8% of the larvae collected in October were *A. gambiae* complex, which decreased to less than 20% in November and December. *A. pharoensis* was dominant in November and December. From pyrethrum spray collection, most *A. gambiae* complex were found in houses that people shared with domestic animals. The assessment result showed that more than 90% of the collected vectors had consumed a blood meal. Results from night human landing collection showed that 65% to 80% of the biting vectors were *A. gambiae* complex, of which about 54% bite outdoors.

As a result of unanticipated delays in the procurement and shipping of WHO test kits and insecticide-impregnated papers, pesticide wall bioassays originally scheduled for earlier in the year did not begin until this quarter. Assays were conducted in Ziway and Eddo Kontola using *A. gambiae* complex to evaluate the residual efficacy of DDT. Although the results are still being analyzed, there is evidence for serious concern, as mortality rates observed were very low, indicating elevated tolerance and resistance to DDT.

### ***Monitoring and Evaluation***

Data from the spray campaign from July 22 to September 2, 2008, in 19 districts in three zones of Oromia region, were validated and reported on during this quarter. Highlights of the M&E are as follow:

- 316,829 structures representing 91.96% of the targeted structures were sprayed.
- The total number of residents in the sprayed structures was 1,000,526 (91.74% of people in the targeted structures), of which 161,144 (16.1%) were children under five

years of age; 488,957 (48.87%) were female; and 12,496 (1.25%) were pregnant women.

- A total of 1,154 daily laborers (1,046 spray operators and porters and 108 washers and guards) were engaged in the IRS operations.
- 306 FMOH staff participated as squad and team leaders, supervisors, and district and zone coordinators.
- 152 people, including district and zonal malaria focal persons and environmental health focal persons, were trained during the IRS training of trainers (TOT), and they in turn trained 839 spray operators and 207 reserve spray operators.
- 36 district health education focal persons received IRS information, education, and communication (IEC) TOT and in turn trained and oriented 835 community leaders and political figures to disseminate IRS IEC messages.

### Structures Sprayed and Population Coverage by District

	Structures	Structures Sprayed	% Coverage	Population Protected
Adama	26,409	22,192	84.0	47,180
Adea	12,866	12,535	97.4	31,368
Adamitulu	19,799	18,514	93.5	67,135
Akaki	6,341	6,087	96.0	17,416
Boset	24,841	23,569	94.9	57,932
Bora	11,147	10,052	90.2	30,711
Dugda	16,900	14,749	87.3	42,384
Fantale	14,407	9,848	68.4	32,332
Lume	16,063	14,959	93.1	28,718
L/Zikuala	22,410	20,715	92.4	65,321
Dodota	17,673	17,027	96.3	43,258
Merti	19,338	18,578	96.1	59,822
Jaju	8,047	7,872	97.8	19,553
Sire	8,779	8,460	96.4	23,079
Z/Dugda	13,987	12,955	92.6	43,142
Arsi Negele	38,661	36,252	93.8	118,207
Shashamene	24,795	22,798	91.9	102,245
Shala	21,803	21,602	99.1	93,443
Siraro	20,279	18,065	89.1	77,280
<b>Grand Total</b>	<b>344,545</b>	<b>316,829</b>	<b>92.0</b>	<b>1,000,526</b>

## People Trained to Deliver IRS during the Previous Quarter

District	IEC Trainers	IEC Mobilizers	Spray Trainers and Leaders	Spray Operators and Porters	District Admin. Teams	Washers and Guards
Adama	1	69	22	85	4	8
Adea	2	25	9	36	3	7
Adami-Tulu	1	44	16	65	2	6
Akaki	0	14	6	25	2	3
Boset	1	19	16	68	2	12
Bora	1	85	10	40	2	4
Dugda	1	16	13	50	2	4
Fentale	2	20	13	64	4	8
Lume	0	12	12	50	2	5
Liben Zikuala	2	35	16	61	2	8
Dodota	3	81	10	43	3	8
Merti	2	46	15	62	4	4
Jeju	2	23	5	22	2	4
Sire	3	59	6	23	2	4
Z/Dugda	3	43	8	35	2	6
Arsi-Negele	4	63	26	103	4	4
Shashemane	3	61	15	60	3	5
Shalla	2	65	16	74	2	4
Siraro	3	55	20	80	2	4
<b>TOTAL</b>	<b>36</b>	<b>835</b>	<b>254</b>	<b>1,046</b>	<b>49</b>	<b>108</b>

### ***Project Management and Administration***

During this quarter, the IRS project in Ethiopia received the following technical support:

- Jacob Williams, Integrated Vector Management (IVM) project director (RTI/Washington), assisted the country team in conducting the post-IRS operation evaluation and micro-planning meeting. He held meetings with FMOH, ORHB, EPA, and the Adami Tulu pesticide processing factory manager on DDT waste management, particularly with regard to final disposal. He also assisted in better analysis and interpretation of entomological monitoring data and provided input to requests made to the FMOH and ORHB regarding the registration of RTI in Ethiopia.
- Patricia Preware, Home Office Technical Manager, assisted the country team in carrying out the post-IRS operation evaluation and micro-planning meeting and attended meetings with FMOH, EPA, and the Adami Tulu pesticide processing factory manager. She also made input to the requests made to the FMOH and ORHB regarding the registration of RTI in Ethiopia.

### ***Partnership and Collaboration***

The IRS Ethiopia project became a member of the Coalition against Malaria in Ethiopia and participated in the half-day partners' meeting organized by the FMOH. The meeting participants discussed field assessment reports on the malaria situation in different parts of the country and future strategies for controlling the disease in those areas. Project staff also attended a two-day workshop on malaria IEC organized by the Academy for Educational Development/Netmark, at which the standardization of malaria IEC activities was discussed.

### **Outstanding Activities**

- Analysis and reporting on vector susceptibility and resistance evaluation.
- Shipment of soil samples to SGS laboratory for DDT residual analysis.

**Upcoming Activities**

- Rehabilitation of district storage facilities.
- Construction of 12 outstanding evaporation tanks and fencing.
- TOT for spray pump maintenance.
- TOT on geocoding and mapping.

# Ghana

---

## Background

Spray operations for the first round in Ghana took place from May 5 to July 31, 2008, in Savelugu-Nanton, Tolon-Kumbungu, West Mamprusi, Gushegu, and Karaga districts. During this quarter, all logistic and operational materials were retrieved from the operational sites in the IRS districts and stored at the Tamale office and warehouse. Household data from the spray round were collected and compiled at the district level and submitted to the IRS project M&E unit in Tamale for further analysis and dissemination to all relevant stakeholders. The post-spray evaluation meeting was held on October 7, 2008, to solicit input from stakeholders at the district and regional levels about round one spray operations and determine measures to improve subsequent spray rounds.

Initial planning—including logistical, financial, and operational assessments for the second round of spray operations—began during this quarter. Reconnaissance visits were made to potential districts to determine the feasibility of expanding spray operations and the project began consultative meetings with NMCP, PMI, the Ghana Health Service (GHS), the District Health Management Team (DHMT) and district assemblies for the planning of the second round of spray operations.

## Current Activities and Accomplishments

### *Planning and Assessment*

An initial visit was made to the East Mamprusi District to assess the logistical, financial, and operational needs for IRS. The project team, led by the COP, met with stakeholders (government departments, chiefs, and other major players) to discuss undertaking IRS activities in East Mamprusi and the roles and responsibilities expected of each of them. The purpose of the visit was to collect information on the human, operational, and logistics requirements to include the district in the upcoming spray round. IRS requested that the district authorities assist the team in locating appropriate storage facilities, office accommodations, and requisite human capacity.

### *Environmental Compliance*

During this quarter, the project worked with the Environmental Protection Agency (EPA) and steel companies to determine the most appropriate strategy for disposal of the empty insecticide sachets from the first round of spray operations.

### *Spraying Operations*

During the demobilization of district-level operations following the spray round, all contaminated solid waste (masks, gloves, and empty sachets) and operational materials were collected and returned to the main office and warehouse in Tamale for proper storage. This consolidation was conducted in collaboration with the EPA. All the pumps used during round one spray operations were serviced and sent to the Tamale office for storage purposes. Field offices at the district level are guarded with 24-hour security surveillance.

A post-spray evaluation meeting was held in Tamale on October 7, 2008, to collect feedback from stakeholders at the regional and district level on the first round of spray operations. Present during this meeting were representatives from NMCP, GHS, DHMT, EPA, district assemblies, Noguchi Memorial Institute of Medical Research, PMI, and partner NGOs, as well as IEC implementers, spray operators, chiefs and village elders, and the IRS project team (Ghana and Washington staff). At the meeting, the Northern zonal coordinator of the NMCP, the PMI advisor, a senior researcher at the Noguchi Memorial Institute of Medical Research, and the COP made presentations highlighting various components of the IRS operations.

A number of lessons learned and recommendations were generated from the post-spray evaluation meeting, including:

- To address community concerns that the spraying is not having an effect on the mosquito population, the purpose of IRS needs to be better conveyed through IEC. It needs to be explained that the purpose of IRS is not to control the mosquito population; rather, the purpose of spraying for malaria control is to decrease mosquito-human contact.
- Disposal and soak pits need to be clearly marked using illustrations and indigenous languages.
- Ensuring an ample number of soak pits, located at an accessible distance for spray crews, can help with improving the quality of the washing of equipment and safety.
- Improve collaboration with EPA in Ghana. EPA has requested that IRS spray operators get an identification card and register with the agency.

### ***Other Activities***

#### ***Entomological Monitoring***

The Noguchi team is working on the entomological evaluation of the IRS project in Ghana and is expected to continue with wall bioassays and transmission indices through February 2009. Preliminary reports on susceptibility evaluation and baseline transmission indices (densities and biting rates) have been submitted by Noguchi and are currently under review.

Discussions are under way with other national research institutions to determine whether they have the capacity and resources to undertake entomological evaluations related to IRS operations. Preliminary meetings were held with the Navrongo Health Research Centre, University of Development Studies, Kwame Nkrumah University of Science and Technology and the Kintampo Health Research Centre in this regard.

During this quarter, the project began to develop plans with NMCP and Noguchi for a technician training course in entomological monitoring. The training course will take place in early 2009 and involve about 24 participants, six from each spray district. The training curriculum will develop field competencies and will include mosquito collection, species (morphological) identification, vector density evaluation, wall (cone) bioassays (insecticide residual efficacy studies), and larval monitoring.

In addition, as a capacity-building exercise in the area of entomological monitoring, the project team is discussing plans with PMI and NMCP on rehabilitation of a structure on the grounds of the NMCP offices in Tamale to be used as an insectary. The insectary will be used for IRS entomological monitoring activities in the coming year and for future rounds led by NMCP.

### ***Project Management and Administration***

Ms. Lenna Neat, Home Office Technical Manager and Jacob Williams, IVM Project Director and IRS Senior Technical Advisor visited Ghana and participated in the post-spray evaluation meeting. They also met with representatives from the Noguchi Memorial Institute to discuss the entomological monitoring component of the IRS program in Ghana.

### **Outstanding Activities**

In the coming quarter, the IRS project will play a large role in facilitating the formation of a national IRS oversight committee. Much of the foundation for this committee was laid in the present quarter.

### **Upcoming Activities**

- Recruitment and deployment of district teams.
- District assemblies/DHMT to select potential spray operators.
- Training of trainers workshop and training of spray operators.
- Development and dissemination of IEC materials.
- Training of IEC implementers and launch of IEC activities.
- Set-up of district offices.
- Release of tender notice for procurement and logistics.
- Micro-planning at district and regional levels.
- Identification and selection of institution(s) for entomological evaluations.

# Liberia

---

## Background

During this quarter, the IRS project began planning and assessment in preparation for the first round of IRS in Liberia in 2009. Project staff visited Liberia and met with PMI, the NMCP, and other malaria control stakeholders to assess spray sites, evaluate possible classes of insecticides, and develop specifications and quantifications for future commodity procurements. They also investigated the possibility of a partnership with Liberia Institute for Biomedical Research (LIBR) and began recruitment for a program manager for Liberia.

## Current Activities and Accomplishments

### *Planning and Assessment*

Mr. Jake O'Sullivan, Home Office Technical Manager, along with PMI and NMCP staff, visited the Red Hill and Crab Hole communities to establish average structure size and common wall surface compositions as part of the logistics assessment. The team used the information gathered to estimate pesticide requirements for future IRS rounds and establish the number of structures sprayed per spray operator per day. The team also discovered that flooding is common in the area, which can complicate use of IRS for malaria prevention. Mr. O'Sullivan also visited Mambah-Kaba District, Margibi County, to establish structure size and composition there.

After visiting the areas and after consulting with Dr. Kassahun Belay (USAID) and Dr. Filiberto Hernandez (CDC), and NMCP staff, the team recommended to NMCP that the initial round of IRS be done in the rural setting of Mambah-Kaba using a pyrethroid pesticide. Concurrent to this initial round, planning for future rounds using DDT would begin. NMCP and MOH agreed to this plan.

### *Procurement and Logistics*

Initial quantification of pesticide, spray equipment, and PPE was completed during this reporting period. Tenders will be issued in the next quarter.

### *Environmental Compliance*

Planning for the upcoming Supplemental Environmental Assessments (SEAs) in Liberia took place during this quarter. There will be two concurrent SEAs: one for pyrethroid and carbamate class insecticides (as a pyrethroid will be used in the initial round in Liberia), and one for organochlorine (DDT) to prepare for future rounds of IRS, as the Government of Liberia has expressed interest in pursuing DDT use in Liberia.

Tito Kodiaga, Environmental Compliance Manager, conducted the first SEA field visit in late December 2008. The draft SEA for pyrethroid and carbamate class insecticides will be submitted for approval early in the next quarter.

### ***Spraying Operations***

During Mr. O’Sullivan’s visit to Liberia, a potential training venue in Mambah-Kaba District was identified, along with possible storage and staging areas.

### ***Other Activities***

#### ***Entomological Monitoring***

The team consisting of RTI and PMI representatives visited the LIBR outside Monrovia to evaluate its potential for a reference laboratory and as a possible site for an insectary. The facility has dedicated space for an insectary, but it has not been used in some years. This insectary has potential for future entomological monitoring for vector control, and the project will pursue a partnership with LIBR.



*The team examines mosquito larvae growing in standing water.*

Baseline species identification, vector densities, and susceptibility will be conducted during the next quarter.

### ***Project Management and Administration***

The recruitment process for a Chief of Party to manage the program begun. This position was advertised both in Liberia and internationally.

### ***Partnership and Collaboration***

During their visit to Liberia, the team met with the Liberia NMCP’s IRS task force to discuss IRS strategy and planning. This meeting led to NMCP agreeing to modify the IRS first round plan to use a pyrethroid or carbamate class pesticide while preparing for possible future use of DDT.

### **Upcoming Activities**

- Dr. Joseph Shilulu will visit Liberia to conduct vector susceptibility monitoring to ascertain the susceptibility of local vectors to the pesticides being considered for IRS. He will also conduct vector species identification and densities to establish a baseline and will participate in the capacity strengthening component for entomology throughout the coming year.
- Conduct and finalize a SEA for pyrethroid and carbamate classes of insecticides, and begin preliminary work on a DDT SEA.
- Hire a COP and recruit a Finance Specialist.

- Following the signing of the SEA, procure pesticide for the initial IRS round scheduled for March 2009.
- Recruit and train spray operators, team leaders, supervisors, and community mobilizers for the spray round operations.
- Conduct spray operations.

# Madagascar

---

## Background

Madagascar was identified by USAID as one of the second wave of countries to receive funding under the PMI. USAID and the Service de Lutte contre Paludisme (Madagascar National Malaria Control Program; SLP) identified six epidemic-prone districts of the Central Highlands (Anjozorobe, Ankazobe, Betafo, Ambositra, Ambatofinandrahana, Ambohimahaso) for IRS activities. IRS-TO1 is tasked with providing strategic, technical, management, and operations support for IRS activities in these districts, in addition to support for training and a workshop on vector control strategies, monitoring, and quality assurance activities.

During this reporting period, the IRS team in collaboration with SLP conducted geographic reconnaissance; distributed insecticides and PPE to communes; held a TOT for team leaders; trained spray operators; launched the spray campaign; conducted spray operations; collected and stored PPE, pumps, and solid waste; and compiled spray data. To support these activities, the SLP appointed one national coordinator, two regional coordinators, two IEC team leaders, four technical team leaders, 10 zone managers, and 34 sector managers. Also, the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) funded spray operations in the Alaotra Mangoro and Ihorombe regions, for which IRS-TO1 provided planning support.

## Current Activities and Accomplishments

### *Procurement and Logistics*

The IRS project arranged for the procurement of insecticide, spray cans, spare parts for compression sprayers, PPE, and motorcycles for spray operations and the delivery of these commodities to destination communes. The first partial insecticide shipment arrived on October 18, 2008, and additional deliveries were received with some delay on October 23, October 26, October 28, November 1, November 6, November 8, November 11, November 13, November 15, and November 26, 2008. The arrival of pumps and PPE were also delayed, resulting in some delays in spray operations.

The two central warehouses were rehabilitated to address the recommendations in USAID's environmental compliance report. These warehouses were used to store pumps, PPE, and contaminated solid wastes following the completion of spray operations.

Project staff identified 107 secondary storage facilities at the commune level and rehabilitated to bring them into compliance with FAO storage recommendations. At each storage facility, insecticide stocks were stored on pallets separately from other materials and equipment. The facilities were also stocked with buckets of sand and water to extinguish fires, guarded 24 hours per day, and equipped with lockable doors.

All warehouses were staffed with one storekeeper and two guards trained on safety measures and the management of side effects from accidental exposure to insecticide.

### *Environmental Compliance*

In all communes, the construction of soak pits was completed before the start of spray operations. Additional smaller soak pits were constructed for spray can rinsing in villages

situated far from the commune seat where the main soak pit is located. Progressive rinsing was adopted for the pump washing, and the rinse water was reused to mix insecticide for the next spraying day.

Gaspard Bikwemu, Environmental Compliance Inspector, traveled to Madagascar from October 24 to November 5 and conducted a pre-spray environmental compliance inspection to ensure that all mitigation measures were in place. The IRS program now has in place adequate primary and secondary warehousing capacity, appropriate soak pits and wash areas. Mr. Bikwemu also conducted a brief training for IRS personnel on environmental compliance best practices for IRS.

During spray operations, Mr. Bikwemu returned to Madagascar to conduct the mid-spray environmental compliance assessment from December 7 to 18. During his visit, he noted that the IRS campaign in Madagascar made significant improvement in environment compliance.

### ***Information, Education, and Communication***

The IRS project, in collaboration with SLP, updated IEC materials and had them approved by the Ministry of Health, Family Planning and Social Protection (MOHFP). The project supported the costs for printing the materials.

The zone and sector managers recruited and trained two IEC mobilizers for each village, for a total of 2,162 mobilizers.

### ***Spray Operations***

The project team and SLP conducted a geographic survey from October 6 to 25, 2008. The data from this survey is displayed in the following table.

### **Geographic Survey Results by District**

District	Com-munes	Villages	Hamlets	Pop.	Structures		Rooms	Area (in m <sup>2</sup> )
					With Floor	Without Floor		
Anjozorobe	18	176	1,104	187,356	15,961	17,940	108,348	4,333,920
Ankazobe	14	158	1,098	160,033	19,715	10,732	118,885	4,755,400
Betafo	26	226	1,354	385,896	42,903	22,363	247,634	9,905,360
Ambositra	21	281	1,270	230,342	28,647	9,383	185,032	7,401,280
Ambatorinandrahana	9	81	416	157,825	20,543	4,232	101,209	4,048,360
Ambohimahasoa	18	159	839	232,388	34,243	2,274	156,779	6,271,160
<b>TOTAL</b>	<b>106</b>	<b>1,081</b>	<b>6,081</b>	<b>1,353,840</b>	<b>162,012</b>	<b>66,924</b>	<b>917,887</b>	<b>36,715,480</b>

Before commencing spray operations, SLP worked with community authorities to identify and recruit operations monitors, spray operators, team leaders, and IEC mobilizers. The sector and zone managers oversaw the training of the monitors, mobilizers, spray operators, and team leaders. During the training, each spray operator was issued a full set of PPE. The project logistics assistant worked with the sector and zone managers to identify storekeepers and the security guards for the commune warehouses where insecticide, spray equipment, and PPE were stored during spray operations and to oversee their training. One female spray operator was trained for each zone, and most of the mobilizers were women. All spray operators and female team leaders had negative results on pregnancy tests administered before and during IRS activities. During spray operations, washers were recruited; trained by sector managers on safety measures and management of side effects of exposure to insecticide; and deployed at soak pits in each commune. Female candidates were screened for

pregnancy. The M&E section below includes a table outlining the human resources identified and trained.

Health center workers in communes where spray operations were conducted were trained on symptoms and treatment for accidental insecticide exposure, and checks were conducted to ensure that treatment medicines were in stock.

The official IRS launch occurred on November 10 in Betafo District. Those present at the launch event included authorities from the MOHFP, the USAID Mission Director, WHO representatives, and local authorities. The follow table details the schedule for these activities in each intervention district.

### Start and End Dates of District Spray Operations

District	Spray Operations	
	Start Date	End Date
Anjozorobe	Nov. 19, 2008	Dec. 27, 2008
Ankazobe	Nov. 12, 2008	Dec. 16, 2008
Betafo	Nov. 21, 2008	Jan. 5, 2009
Ambositra	Nov. 20, 2008	Dec. 19, 2008
Ambatofinandrahana	Nov. 20, 2008	Dec. 19, 2008
Ambohimahasoa	Nov. 20, 2008	Dec. 19, 2008

Project district assistants worked with the zone and sector manager to oversee the IRS activities.

During this quarter, the project team worked with SLP counterparts to ensure that demobilization activities were initiated. The SLP team is responsible for collecting all PPE, pumps, and solid waste, and transporting it back to the central warehouses in Antananarivo and Ambohimahasoa for final cleansing and storage. The SLP national coordinator is also responsible for collecting all information required for the final activity report.

### ***Other Activities***

#### *Entomological Monitoring*

During Mike McDonald and Ray Beach's visit to Madagascar from November 30 to December 12, the project team attended meetings with PMI, SLP, and Gates Foundation representatives to plan and conduct a workshop on entomological monitoring.

### ***Monitoring and Evaluation***

Spray operators recorded data as they moved from structure to structure and transmitted it to team leaders, who in turn transmitted the data to sector managers. Zone managers verified the data before providing it to the coordinators. The following table summarizes IRS training; spray coverage will be reported in the next quarterly report.

### People Trained to Deliver IRS

District	Team Leaders	Spray Operators	Mobilizers
Anjozorobe	20	78	352
Ankazobe	15	68	316
Betafo	38	174	452
Ambositra	25	122	562
Ambatofinandrahana	15	78	162
Ambohimahasoa	24	121	318
<b>TOTAL</b>	<b>137</b>	<b>641</b>	<b>2,162</b>

***Project Management and Administration***

An environmental specialist was engaged for a six-month consultancy commencing on October 6. The Finance Manager started on December 15, 2008. The outgoing finance manager completed training and transfer of finance documents throughout the month of December.

The RTI registration certificate was approved by Madagascar's Foreign Ministry.

# Malawi

---

## Background

During this quarter, spray operations were held in Malawi from October 16 to November 29, 2008, in Nkhotakota. Throughout the campaign, IEC activities were conducted to raise community awareness and encourage participation. In compliance with USAID rules and regulations, environmental compliance inspections were conducted both prior to and during spray operations. Additionally, the project carried out disposal of contaminated solid waste generated during the first and second rounds of spraying, including torn gloves, face masks, and empty insecticide sachets. To ensure data quality following the completion of the spray round, the team, in collaboration with CDC, established a consolidated database to capture and store electronic information and conducted data quality assurance assessments to verify the consistency and validity of the collected data. Following the theft of insecticides reported during the previous quarter, a new warehouse was secured in Lilongwe to safely store all equipment and materials.

## Current Activities and Accomplishments

### *Procurement and Logistics*

A total of 12 vehicles were rented to facilitate the transportation of spray teams to and from spray sites and one four-wheel-drive vehicle and six motorbikes were rented to transport supervisors and team leaders. One vehicle was rented for the field office in Lilongwe.

In order to comply with the mitigation measures described in the PERSUAP, a new warehouse was secured in Lilongwe which required corrective renovations to meet the required standards for IRS storage facilities. Insecticide remaining from the second round of spraying and all IRS equipment including PPE were transported to and securely stored in the new warehouse.

### *Environmental Compliance*

Mr. Autman Tembo, Environmental Compliance Inspector, traveled to Malawi and conducted an environmental compliance inspection and an evaluation of mitigation measures prior to the commencement of the spray round. Following commencement of the campaign, the mid-spray environmental compliance inspection was conducted by Mr. Gaspard Bikwemu. These compliance inspections had the following objectives:

- Observe IRS activities in progress and determine and document whether the malaria program is in full compliance with USAID requirements as included in the approved SEA.
- Create baseline of current compliance activities for the purpose of evaluating improvement in future IRS activities.
- Determine current actions that can be taken immediately to comply with the country SEA.
- Determine, in consultation with IRS project and district officials, the training and other support required to improve and ensure future compliance with SEA requirements.

Further environmental compliance was ensured by supervision from project staff and the USAID Mission Environmental Officer (MEO) Madalitso Kaferawanthu. All recommendations were addressed by the IRS team to ensure environmental compliance.

### *Waste Disposal*

Following the end of the second round of spraying, in compliance with the mitigation measures described in the PERSUAP, the team disposed of IRS solid waste from the first and second rounds of IRS. In collaboration with the MOH and Department of Land and Environment, the project utilized the newly built Nkhotakota district hospital incinerator to dispose of all waste, including empty sachets, torn gloves, face masks, and packaging materials.



*Empty insecticide sachets are packed into the incinerator for disposal.*

### ***Information, Education, and Communication***

The project supported the IEC component through community meetings, the development and distribution of IEC materials, radio jingles, and house-to-house mobilization throughout the target district.

### ***Spray Operations***

#### *Training*

Before the beginning of spray operations, all personnel were trained on spray technique, store management, data collection, and compliance to safety measures as relative to their positions. The training sessions were conducted by trainers from collaborating partners, including Illovo Sugar Estate, Sygenta, farmers' organizations, Department of Environment, MOH, and IRS staff. All training was conducted in compliance with WHO standards.



*Spray operators receive instruction during a training session.*

Position	Number Trained
Spray operators	150
Spray team leaders	23
Spray supervisors	9
Mobilizers	125
Site managers	2
Data entry staff	2
Chiefs and village volunteers	703
Drivers	12
Warehouse staffs	5
Clinicians	24
Suit washers	6
Runners/supportive staffs	2
Site guards	4
Representative from other districts	10
<b>Total</b>	<b>1,077</b>

### *Spraying*

The second round of IRS in Malawi was carried out in the targeted spray area (North Nkhotakota); approximately 19,457 structures were sprayed, protecting a population of 96,776 from malaria. In total, spray coverage was 97.1 percent, and 14,200 sachets of ICON CS were used to complete the spray operations.

### ***Monitoring and Evaluation***

With support from CDC coordinator Carl Campbell, the project set up a data management unit with two data entry assistants at the spray site. The data entry staff, after an initial training period, entered into the database all IRS-related data using PMI indicators. To verify the data integrity and validity and conduct quality assurance, the project also worked in collaboration with USAID. The team worked from the data forms collected from the first round including mop-up operations and the data collected in the second round.

Recent data collected from Matiki Health Centre showed a dramatic decrease of anemia in children under five, and the parasite prevalence rate and entomological data from CDC show decreased mosquito population density within the sprayed area. A dramatic fall in malaria cases in the sprayed area might result in low compliance on preventive measures and negative

attitudes toward IRS and insecticide-treated net use. This phenomenon could be prevented by conducting IEC and raising community awareness on IRS and other preventive strategies, increasing demand for IRS and other malaria control interventions.

### ***Partnership and Collaboration***

A number of operational meetings were conducted with Illovo and the DHMT during the spray round to sort out critical issues. During the first spray round, the IRS project provided insecticide to the Illovo Sugar Estate, which used its own spray operators to conduct spray operations. For this round, spraying was executed by the PMI-supported IRS team in close collaboration with Illovo management.

### **Outstanding Activities**

- RTI actively continued its recruitment efforts for a COP to manage the program. Several candidates were interviewed and a final candidate identified. The hiring process is expected to be completed during the first quarter of 2009.

### **Upcoming Activities**

- Host post-IRS open community forums. A detailed report of the meetings will be compiled, and all concerns will be properly addressed during the meeting. The aim is to collect useful information for evaluation and future advocacy of the program.
- Following the community meetings, a feedback meeting will be conducted with partners and other stakeholders to share the information and conduct an evaluation to strengthen future rounds.
- Develop an IEC strategy.
- Hiring and orientation of COP and Finance Manager..

# Mali

---

## Background

During this quarter, the IRS project organized and conducted end-of-spray workshops in the Koulikoro and Bla districts and examined post-IRS pregnancy tests for all women who were involved in the 2008 spray campaign as operators or washers. The project also undertook assessment and planning in preparation for the second round of spray operations to take place in 2009.

## Current Activities and Accomplishments

### *Planning and Assessment*

The IRS project team held a two-day workshop during which IRS activities from the 2008 campaign were reviewed. The logistician's inventory presentation at the workshop indicated that in 2009 there will be no need to order insecticides, overalls, and boots. Also, the training of storekeepers will be performed earlier in the year. The project will increase the number of data clerks from two to four to improve the flow of data. Finally, the quality of secondary warehouses, wash facilities, and soak pits will be improved.

### *Procurement and Logistics*

The logistician evaluated RTI's experience in the 2008 IRS campaign and subsequently developed specifications and quantifications for the 2009 IRS campaign. Based on this evaluation, project staff determined that the quantities of insecticides, boots, and overalls left over from the previous campaign are sufficient to cover the 2009 spray needs and that no additional items in these categories will need to be procured.

### *Environmental Compliance*

The COP accompanied Dr. Cheick Hamala Sylla from the Programme Africain Relatif aux Stocks de Pesticides (African Program on Pesticide Stocks; PASP) to visit the project's two central storage facilities in Koulikoro and Bla. Dr. Cheick H. presented his recommendations for storing PPE and insecticides in the central warehouses and disposing of solid waste in containers:

- To store contaminated gloves, spray operators should remove the gloves and place the gloves in large plastic sachets, place the sachets in barrels, hermetically seal the barrels, and store them in the container.
- Open four air vents (two on each long side) in each container.
- Move the container in Koulikoro away from the main road to a protected place.
- Regularly recover and safely dispose of empty insecticide packing and solid waste in containers to be transferred to storage sites pending disposal by PASP-Mali.

### *Spraying Operations*

During this quarter, the project team performed the post-IRS pregnancy test for all the women who were involved in the spray campaign as operators or washers. The results showed two positives tests: one from Bla and the second from Koulikoro. The pregnancy from Koulikoro had happened after the spray campaign. For the pregnancy in Bla, The team is following the pregnancy with the medical chief of Bla District. This follow-up consists of medical examination, blood testing, and ultrasonography to ensure that the pregnancy evolves normally.

In collaboration with the PNLP, the project team prepared and organized end-of-spray workshops in Bla and Koulikoro in November 2008.

The 2008 IRS end-of-spray workshop in Bla was held on November 12, 2008. Nine representatives from the national level and five from the regional level were present. Additionally, mayors, sub-prefects, representatives from the Centre de Santé de Référence (Referral Health Center; CSREF), heads of medical posts, spray operators, washers, IEC mobilizers, representatives from L'Association de Santé Communautaire (Community Health Association; ASACO), and religious leaders attended from the district level. Dr. Halidou Sidibe of the PNLP presented the results of the 2008 IRS campaign, which was followed by a question and answer session.

The 2008 IRS end-of-spray workshop in Koulikoro was held on November 18, 2008, under the chairmanship of the deputy prefect of Koulikoro District. In attendance were representatives of PNLP; the Regional Directorate of Health, Social Development, and the Economy of Koulikoro; representatives of the Direction Régionale de l'Assainissement et du Contrôle de Pollution et des Nuisances (Regional Directorate of Sanitation, Pollution, and Nuisance Control; DRACPN) in Ségou; representatives of the local press of Koulikoro; the deputy prefect of Koulikoro District; mayors of Koulikoro; the chief medical officer of Koulikoro; the IRS focal point and representatives of CSREF; representatives of ASACO; heads of the medical posts of the CSCOM; and representatives of spray operators and IEC mobilizers involved in the IRS project in the health sectors of Koulikoro. The results of the 2008 spray round were presented to the participants. Following the presentation, participants' questions were addressed by the PNLP, the head of the CSREF, and project staff.

The most common recommendations and lessons learned for the 2009 IRS campaign were:

- Begin spray operations early to avoid spraying during the rainy season.
- Increase incentives to mobilizers and IRS operators and provide work certificates to the IRS operators.
- Involve authorities in the identification of sprayers because the authorities are best positioned to identify those with the educational qualifications.
- Involve the malaria focal point in the training of trainers.

### ***Other Activities***

#### ***Entomological Monitoring***

Entomological follow-up activities were conducted by the Malaria Research Training Center (MRTC) team and took place in November 2008. In both districts sampled, cone bioassays indicated that mortality rates were still quite high in four of the five districts sampled. The villages of Tia, Niala, Bagadadji, and Koula had mean knockdown rates of 87.3 percent, 96 percent, 86.9 percent, and 98.9 percent, respectively, indicating good residual activity of IRS pesticides on the walls at this time. The village of Karadie had a much lower mortality rate (51.7 percent), indicating less insecticidal activity on the walls.

Due to the dry season, the quantity of mosquitoes collected in November 2008 was too low to make any determination regarding behavioral changes that might have occurred due to the effects of IRS pesticides. However, despite low mosquito numbers, 8 of 10 mosquitoes were collected indoors, indicating high endophilic behavior and good potential for IRS pesticides to affect mosquito populations in these areas. The man-biting rate was also low, but the

village of Tia had 5.45 bites/man/month, indicating a greater potential for malaria transmission in this area.

Insecticide susceptibility tests could not be conducted during this study due to the lack of adequate numbers of mosquitoes. Resistance testing is a vital component of post-IRS entomological monitoring and still needs to be conducted to determine if resistance is a factor affecting knockdown and mortality in Koula and other villages. The use of lambda-cyhalothrin for future IRS campaigns depends on results of such resistance assays using locally collected and reared mosquitoes.

### ***Monitoring and Evaluation***

During this quarter, the project developed an M&E plan for the 2009 spray campaign detailing data to be collected, spray cards, and data collection activities.

### ***Partnership and Collaboration***

The project team participated in the IRS technical committee meeting that took place on October 24, 2008, at the MOH to discuss the end-of-spray workshop for the 2008 IRS spray campaign. The IRS project's report was distributed to the participants, and suggestions and feedback to improve the report were collected. The team incorporated the suggestions and resubmitted the French version of the report to NMCP in December 2008.

### **Outstanding Activities**

- Present the results of 2008 IRS activities at the end of spray workshop in Bamako.
- Complete the registration of RTI in Mali.

### **Upcoming Activities**

- Organize the micro-planning workshop for the 2009 spray round.
- Hire IEC consultant, environmentalist, and IEC/IRS assistant.

# Mozambique

---

## Background

Mozambique was identified by USAID as one of the second wave of countries to receive funding under PMI. USAID and the Mozambique NMCP identified six epidemic-prone districts in the province of Zambezia (Quelimane, Nicosadala, Namacurra, Murrumbala, Milange, and Mocuba) for IRS activities. During the 2008 IRS season, the project is continuing support for the planning, implementation, monitoring, and supervision of PMI-supported IRS activities in Zambezia in collaboration with the provincial and district health offices, local NGOs, and NMCP.

Spraying in Mozambique began on August 11, 2008, and continued well into this quarter. As such, the project's activities during this quarter centered on the implementation of spray operations in six districts with a target of reaching 502,391 households in 62 working days or less. Before and during spraying, the project team implemented community mobilization activities in all six districts covering the spray target areas, and conducted monitoring and supervision of spraying activities in collaboration with staff from provincial and district ministry offices of health, agriculture, and environmental affairs. Project staff arranged the weekly collection and compilation of IRS coverage and mobilization information for program monitoring and management purposes. To facilitate IRS activities, the project maintained 23 operation bases to ensure the safe storage, handling, and use of insecticide (including DDT) and supervised transport and administrative assistance to the bases. Following spraying, a post-IRS operation review meeting was conducted in Milange. IRS program T-shirts were distributed to all spray operators and community mobilization agents at the meeting. The project team collected PPE, conducted an inventory assessment, and safely stored PPE for the next spray round and stored DDT wastewater in collection tanks. Sampling of soil, crop, and household food material for DDT levels was also conducted.

## Current Activities and Accomplishments

### *Procurement and Logistics*

During this quarter, the project procured water tanks (1,500 liter capacity), desktop computers to improve data management at district health offices, face masks for spray operators and storekeepers, and a water pump and 3,000 liter water transport tank to manage the DDT wastewater.

### *Environmental Compliance*

The following recommended mitigation measures to prevent DDT soil contamination were put in place for all 23 operational bases:

- 50-liter containers were set up for triple washing of pumps each day. DDT-contaminated rinse water was used for the first spray pump mixture the following day.
- Triple washing of overalls was adopted, and the resulting water with traces of DDT was collected in temporary holding tanks in all 23 operation bases until the construction of evaporation tanks is complete.

- Thick impermeable plastic sheeting was used to protect the ground against direct spillage.
- All DDT waste material, such as contaminated soil or clothes, was collected in special bins.
- Storage facilities for DDT waste were provided with protection and supervision by security guards and the oversight of district supervisors.

An environmental compliance inspection was performed in November, and the report was submitted to the PMI team by Mr. Autman Tembo. As per Mr. Tembo's recommendations, temporary measures were adopted to collect DDT wastewater from the washing of overalls until the appropriate structures are constructed. Building contracts were awarded in December to commence construction of permanent evaporation tank structures for the collection of DDT wastewater.

A comprehensive sampling of soil, crop, and food material from IRS operation areas was conducted, and a stock of about 450 samples was collected for analysis of residual DDT levels. Starting in December, tests are being carried out in Kenyan laboratories.

### ***Information, Education, and Communication***

During this reporting period, the project conducted community mobilization involving local religious leaders, administrative authorities, and other community leaders in all IRS target localities. The main IEC strategy was door-to-door mobilization of house owners one day in advance of the planned spray date. Negative outcomes during the mobilization efforts were reported in some cases and addressed with local authorities. The compiled data from the district mobilization teams are tabulated in the following table.

### **Household Mobilization by District**

<b>District</b>	<b>Households Visited</b>	<b>Households Mobilized</b>	<b>Coverage %</b>
Quelimane	4,0275	38,202	95
Nicodala	66,663	66,486	99
Namacurra	5,3610	48,307	90
Mocuba	94,971	93,569	98
Milange	105,623	104,223	99
Morrumbala	87,387	83,702	96
<b>Total</b>	<b>44,8529</b>	<b>43,4489</b>	<b>97</b>

Coordination between IEC and spray operations was done at the IRS operation base level. Each operational base had a daily spray plan that was also used as a guide for daily activities for the community mobilizing agents. The mobilizing agents were monitored and supervised daily by a team comprising IRS project staff, the Departamento Provincial de Saúde (Provincial Department of Health; DPS), and district health office personnel, using a routine schedule in each district.

### ***Spray Operations***

During spray operations, monitoring and supervision to maximize coverage levels and ensure quality of spraying were emphasized. The project modified the spray strategy as necessary according to coverage data. For example, in two highly dense operational base areas that

were showing lower than average coverage, three IRS teams of four spray operators each were combined as one unit to achieve targeted results.

The timely completion of spray operations was a result of improved operational management in the field and stricter monitoring and field supervision of daily activities between this round and previous rounds. Improving the efficiency of IRS operations in Mozambique has an added benefit of increasing cost effectiveness by shortening spray time and avoiding issues that arise in the community by spraying during the rainy season.

The project secured the operational, technical, logistic, and administrative support for the campaign, including transport for spray operators and mobilizing agents and supervisors, technical direction and supervision of spray teams, and payment of spray operators and mobilizing agents. In total, the IRS project facilitated the payment of 815 spray operators, 138 team leaders, 49 laundry personnel, 24 storekeepers, 6 pump repair technicians, 70 security guards, 140 community mobilizing agents, and 57 supervisory staff.

#### *Post-spraying Operations*

Following the completion of spraying, the project team collected PPE and other IRS equipment from the 23 bases and returned it to the central warehouse in Quelimane. An inventory was conducted, damages assessed, and the remaining usable materials and equipment were securely stored until next spray round.

A post-spray evaluation meeting analyzed the performance of the current IRS spray round. The following recommendations were discussed during the meeting:

- Form a roaming team consisting of two or three IRS teams to cover houses located far away from district centers.
- Conduct training sessions for base supervisors in base management and reporting.
- Include community leaders in district IEC mobilizing teams.
- More coordination among community authorities and leaders, mobilizing teams, and IRS teams.
- Stricter DDT stock management measures.
- Stricter environmental management measures in handling washing and waste material.
- Improve the management of payment for spray operators and transport at the district level.
- Use field motorcycles for base supervisors with more than one IRS team to monitor.
- Cooperate with district police forces to protect IRS operators from assault and the possible theft of DDT.

#### ***Other Activities***

##### *Entomological Monitoring*

The first round of mosquito collection was conducted in two Milange collection sites in December. Further collections are planned for January 2009.

### *Capacity Building of Ministry of Health*

As part of the provincial capacity building, the project initiated the refurbishment of a secured facility in Quelimane for an insectary. This insectary will house environmental acclimatization equipment, laboratory sinks, and work places; water and electricity supplies; and laboratory tools and benches.

### *Baseline Environmental Monitoring*

During this quarter, the baseline environmental monitoring in Mozambique was carried out, and about 240 soil samples (48 duplicates and 191 regular) were collected. These samples will be sent to outside laboratories for analysis in January.

### *Monitoring and Evaluation*

IRS field operation data was evaluated on Wednesday and Friday of each week. The data were collected daily at the base level and reported to the central DPS every three days by telephone. Weekly summary sheets were produced every Friday and sent to the central Quelimane city office by district staff. The IRS project data manager collected data from district offices, which was entered into a database which and shared with the provincial health office for reporting and analysis. During this quarter, IRS coverage data from the most recent spray round was compiled and reported.

The coverage rate for this round, based on the number of households reached by community mobilizing agents and visited by spray operators, was 95%. However, coverage based on the target number of households was only 82%, due to a lack of DDT in some districts (Mocuba, Milange, and Murrumbala). We faced DDT stock outs due to the failure of the central NMCP office to send promised stocks for the current year. However, by using pyrethroid stocks available from other districts, the project was able to mitigate some of the coverage loss. A total of 1,457,142 people were protected from malaria and the refusal rate was only 5.2%. The insecticide usage rate also improved from last season. During the current round, spray operators used on average one DDT sachet to cover around two medium-sized rural households (compared to only 1.4 households in last season).

### **Households Sprayed and Coverage**

<b>District</b>	<b>Households Visited</b>	<b>Households Sprayed</b>	<b>Refusals</b>	<b>Coverage %</b>	<b>DDT Sachets Used</b>	<b>Population Protected</b>
Nicodala	62,572	61,028	1,544	97.5	43,189	243,766
Namacurra	49,720	45,531	4,189	91.6	24,547	176,148
Mocuba	91,114	86,802	4,312	95.3	57,336	376,755
Milange	108,955	104,223	4,732	95.7	42,642	284,069
Murrumbala	82,564	78,148	4,416	94.7	35,311	238,728
Quelimane	40,625	37,191	3,434	91.5	18,399	137,676
<b>Total</b>	<b>435,550</b>	<b>412,923</b>	<b>22,627</b>	<b>94.8</b>	<b>221,424</b>	<b>1,457,142</b>

### *Project Management and Administration*

The IRS project in Mozambique was supported by several short-term technical assistance visits throughout the quarter. Ms. Judith Tukahirwa, environmental specialist, spent two weeks in Mozambique to conduct environmental baseline sampling for DDT. In addition, Mr. Autman Tembo, Environmental Compliance Inspector, conducted environmental safeguard monitoring for two weeks.

### ***Partnership and Collaboration***

During this quarter, the project and NMCP collaborated through data sharing and coordination of operations. The COP also assisted the NMCP director in planning and programming a national entomological survey to be carried out in January to May 2009. The project held meetings with PMI, NMCP, and Instituto Nacional de Saúde (National Institute of Health; INS) on capacity building for entomological research and survey activities. The meeting resulted in plans for the rehabilitation of central lab rooms in INS and allocation of a facility at the DPS office in Zambezia province for an insectary.

### **Outstanding Activities**

- Completion of evaporation tanks and establishment of district storage facilities.
- Procurement of vehicles.
- Renewing and re-signing of an MOU with DPS Quelimane for 2009–2010 period.
- Completion of the insectary and entomological monitoring activities in Zambezia province.
- Renewed request for rehabilitation of central entomology laboratory in Maputo from INS.

### **Upcoming Activities**

- Planning for next season IRS activities in June 2009.
- Contracts for building of district storage structures.
- Supervision and monitoring of the construction of evaporation tanks in 23 bases.

# Rwanda

---

## Background

Rwanda is one of the second wave of countries to receive funding under PMI. USAID and the Rwanda Ministry of Health (MOH) and its Programme National Intégré de Lutte contre le Paludisme (National Integrated Malaria Control Program; PNILP) identified three epidemic-prone districts of Nyarugenge, Gasabo, and Kicukiro in Kigali Province for IRS activities. In 2006, USAID and the PNILP agreed to focus spraying activities in these districts with the intention of expanding IRS coverage to Kirehe and Nyanza districts in 2008. The IRS project is tasked with providing strategic, technical, management, and operations support for IRS activities in these districts.

The second round of IRS in Rwanda continued during the first two weeks of October 2008, concluding on October 17. The spray round covered five districts: Nyanza, Gasabo, Kicukiro, Nyarugenge, and Kirehe. The final results of the spray round show a 94 percent household coverage rate, exceeding the PMI goal of 85 percent. The total population protected was 885,957 people, of which 146,214 were children under five and 15,748 were pregnant women.

Activities during this quarter focused on finalizing the second round of IRS operations, conducting capacity-building activities, and planning for the third round of IRS, which will begin in January 2009. The project held district and national evaluation meetings, conducted an end-of-spray-round logistics and warehouse assessment, conducted an entomology field technician training course developed by the IRS project and PNILP, and prepared for the rehabilitation of an insectary, which will take place next quarter. Planning for the third round included identifying and training spray personnel, developing district operational plans, conducting procurement activities, preparing IEC, and coordinating the proper disposal of hazardous waste.

## Current Activities and Accomplishments

### *Planning and Assessment*

#### *Logistics Assessment*

On November 4, PNILP, the IRS project team (including district managers), and PMI developed an IRS operational plan for the third round of spraying and identified next steps including carrying out IRS district operational micro-planning, updating household data, procuring insecticide, equipment, and related materials, and preparing planning budgets per PNILP requirements. In addition, the project developed an internal operational plan with district managers. The district managers then worked with local leaders and developed detailed operation plans for their districts. The development of each plan included updating the list of training needs, identifying soak pits that are in need of repair or that need to be built, selecting training venues, and developing district budgets. Based on information collected from the districts during planning sessions, the target number of structures for the third round is 204,928.

Once planning was complete, sector managers and supervisors were oriented at the RTI office and dispatched to districts to help with the training of IEC implementers and spray operators.

### *Environmental Compliance*

The M&E manager conducted regular visits to operations sites in the five districts during the second round and assessed the condition of existing soak pits. Many had minor damage that needed to be repaired, and it was determined that eight new soak pits were necessary.

The project continues to work with PMI and PNILP to finalize a solution for the disposal of IRS hazardous wastes. In December, Mr. Tito Kodiaga, Environmental Compliance Manager, visited Rwanda to meet with the MOH's environmental health director, the TRAC Plus director, and representatives from USAID, the Global Fund for AIDS, Tuberculosis, and Malaria, and the Rwanda Environmental Management Authority to discuss the issues surrounding the purchase of an incinerator for disposing empty sachets and other contaminated materials. During these meetings, the participants discussed which partners would be involved, the availability of funds for incinerators, the types and costs of available incinerators, the disposal capacity, an environmental assessment, and general management of waste and costs.

### ***Procurement and Logistics***

#### *Pesticide Selection*

The project solicited class-level quotes for insecticide for the third round of spraying in January 2009. After competitive bids were received, the final award was made based on delivery time, price, fit to technical specifications, and overall best value.

#### *Spray Pumps and PPE*

During this period, the project team finalized quantities and specifications for IRS materials and arranged for the procurement of PPE, insecticide, and spray equipment. These shipments were delivered in January 2009. Additionally, there is enough PPE and insecticide left over from the second round of spraying to cover at least the first two weeks of the third round.

### ***Information, Education, and Communication***

Throughout the second spray round, project staff worked closely with USAID implementing partner Population Services International (PSI) to coordinate and conduct IEC activities. During the first week of October, the IRS project and PSI reinforced IEC messages in Gasabo and Nyanza to ensure that the communities followed guidelines during rainy days. As the IEC campaign period coincided with local election activity in Rwanda, project staff and PSI visited local leaders and reviewed community mobilization agendas to make sure mobilization activities were not delayed.

#### *Preparation for Third Round of IEC*

In early December, PNILP, Health Communication Center (HCC), PMI, PSI, a national radio representative and IRS project staff met to review the IEC strategic plan from previous rounds. Participants agreed that IEC coordinators from the IRS project, PSI, and HCC, as well as the radio representative, would meet to review IRS key messages and emphasize preventing the transmission of malaria rather than killing mosquitoes, as was perceived by many community members to be the purpose of IRS. For the upcoming third round in January, PSI provided a group of IEC implementers to the IRS team for training and remuneration. A one-day refresher training session was conducted for 212 new IEC mobilizers at the sector and cell levels. Village-level implementers were given two days of training.

The competitive solicitation process for new IEC brochures and stickers has been completed, and the materials have been delivered.

### ***Spraying Operations***

During the second spray round, a total of 103,353 sachets of ICON WP insecticide were used throughout the five districts. Upon completion of the round, an inventory assessment was conducted by the logistics assistants and the logistics manager to quantify remaining insecticide sachets, determine what equipment needed repairs or replacement, and ensure that equipment was properly washed and stored for the next round. Empty sachets were collected throughout the duration of the spray round and stored safely in the central warehouse while the disposal solution was worked out.

During the second spray round, regular staff meetings were held with district managers to go over the week's spraying activities, giving staff updates on the overall spray round, news from the RTI home or regional office, and PNILP announcements. These meetings also facilitated discussions among the larger spray management teams to find solutions to challenges and constraints related to spraying operations. Typical spray round challenges included transportation, meals for spray operators, equipment, insecticide, side effects, and community mobilization.

### ***Adverse Events***

During the second spray round, there were ten cases of adverse side effects identified in Kirehe. These incidents were the result of people entering their homes due to rain before the required two-hour waiting period. IEC efforts were increased in the area. It was also noted an early start for the spray round is critical to minimizing spraying during rain and thus avoiding adverse effects.

On October 12, 2008, a spray operator was killed as a result of a vehicle accident in Nyanza. The district manager informed the project office right away and a number of staff led by the COP went to Nyanza the next morning for the funeral ceremony. The IRS project collaborated with the authorities in the accident investigation. The final police report indicated that the death was caused by the negligence of the deceased. The project continues to assist the wife of the deceased in collecting necessary documents for the insurance claim and has taken measures to minimize such accidents from happening again, such as emphasizing vehicle safety during trainings of spray operators.

### ***End of Round Evaluation***

After the second spray round concluded on October 17, district evaluation meetings were carried out and a final end-of-spray-round evaluation meeting was held on November 20. The evaluation meeting was chaired by TRAC Plus and hosted by the IRS project and PNILP and was attended by key stakeholders such as PSI, district spray managers, IEC managers, and MOH representatives. The evaluation meeting generated a list of recommendations and observations to improve the next IRS spray round.

### ***Training for the Third Round***

The project team identified the need for one sector manager and one supervisor in each of the 36 sectors. To fill these positions, project staff trained 77 Kigali Health Institute graduates as sector managers and supervisors during a TOT, including five extra trainees in case of dropouts. The training was carried out by three trainers.

In preparation for the third spray round in January, the district manager and local leaders submitted the list of sprayers to PNILP for organizing pre-spray-round medical check-ups. In total, 1,484 spray operators were given medical check-ups, including liver testing and hemoglobin and pregnancy tests. Those who were found fit for the spray round will be trained during the upcoming spray operator training on January 5.

### ***Other Activities***

#### ***Entomology Training for Sentinel Site Technicians***

The IRS project, in partnership with PNILP, held a month-long entomology technician training course to increase capacity within the PNILP in entomological monitoring in malaria-prone districts. The course, based on a manual developed by IRS project consultant Dr. Josephat Shililu, was led by two trainers and took place in the Mashasa training center in Risizi District. The participants were 17 recent college graduates from malaria-prone districts. Training topics included identifying, collecting, sampling, dissecting, and preserving different species of mosquitoes. The training enhanced crucial skills needed by the field technicians to collect reliable entomological data for use in the impact assessment of the IRS malaria control program in Rwanda.



*Entomology training participants study mosquito species.*

#### ***Insectary Renovation***

The MOH requested the project's support in setting up an entomology laboratory based on WHO recommendations and best practices. This activity is in line with USAID's objective of building capacity in-country and laying the foundation for a sustainable IRS program in Rwanda. At TRAC Plus's request, the Kigali Health Institute provided space within its premises for a laboratory and insectary. A competitive solicitation for the rehabilitation work was issued and a vendor has been selected. The renovated laboratory and insectary is expected to be complete in early February 2009.

### ***Monitoring and Evaluation***

#### **Coverage of Second Round of IRS**

District	Structures Found	Structures Sprayed	%	Population			ICON Used
				Total	> 5 Years	Pregnant Women	
Gasabo	59,495	58,259	97%	275,619	42,612	4,880	33,999
Kicukiro	25,948	23,663	91%	122,099	15,929	1,738	14,981
Nyarugenge	20,555	19,548	95%	85,324	12,878	1,489	10,537
Nyanza	47,978	41,777	87%	192,417	34,333	3,910	20,062
Kirehe	47,574	46,509	97%	210,498	40,462	3,731	23,774
<b>Total</b>	<b>201,550</b>	<b>189,756</b>	<b>94%</b>	<b>885,957</b>	<b>146,214</b>	<b>15,748</b>	<b>103,353</b>

### People Trained to Deliver IRS

	IEC Trainers	IEC Mobilizers	Spray Trainers	Spray Operators	District Admin. Teams	Washers, Drivers, etc.
TOTAL	159	3,365	72	2,053	24	129

#### ***Project Management and Administration***

During the first week of October, the orientation of the newly appointed COP continued with leadership and support of Dr. John Chimumbwa, Deputy Program Director. The COP was introduced to the PNILP team and updated on IRS activities.

#### **Upcoming Activities**

- Training of IEC implementers at the village level in Kirehe and Nyanza.
- Training of spray operators in all five districts.
- Contract seasonal workers.
- Arrival of insecticide, PPE, and other supplies in the first two weeks in January 2009.
- Training and refresher training for medical team at the district level for side effect case management to be conducted by PNILP.
- Environmental assessment before IRS operation by PNILP.
- Renovation and building of soak pits.
- Initiation of spray campaign on January 19, 2009.

# Senegal

---

## Background

During this quarter, the IRS project's activities focused on planning for the spray round in Richard Toll in the first quarter of 2009. The project is working closely with its partners to ensure a successful spray round. Project staff also held a post-IRS evaluation meeting attended by all stakeholders to assess the success of the 2008 spray round.

## Current Activities and Accomplishments

### *Planning and Assessment*

On November 4, 2009, IRS program partners met to discuss the 2009 IRS campaign spray schedule. This meeting was attended by PMI, PNLP, L'Université Cheikh Anta Diop (UCAD/LEV). During the meeting, the partners decided to spray from February to March in Richard Toll district and from June to July in Velingara, Nioro and Richard Toll districts.

### *Procurement and Logistics*

The project team conducted procurement and logistics planning for all IRS rounds in 2009. Quantification has been completed for all materials necessary for the year, including insecticide, spray pumps, pump repair kits and spare parts, and PPE. Also during this quarter, the project initiated local procurement as part of the preparation for the next IRS round in Richard Toll.

### *Environmental Compliance*

The project met with the MOE's Direction de l'Environnement et des Etablissements Classés (Environment and Classified Factories Directorate; DEEC) on October 13, 2008, to discuss the management of the 2007 and 2008 IRS contaminated solid wastes. The parties agreed that incineration is the best disposal option. To that end, the project team explored partnership with institutions and businesses equipped with incineration facilities: the L'Hôpital Principal (Principal Hospital), Cimenteries du Sahel and SOCOCIM (cement factories of Senegal), FOMSEN (smelting plant), and SANOFI/ADVENTIS (a pharmaceutical firm). Staff found that the L'Hôpital Principal and FOMSEN were the only entities capable of and available for collaboration with the IRS project on waste disposal. The project's waste disposal expert, Mr. Tito Kodiaga, has planned a visit to Senegal in early February 2009 to follow up on this matter.

The IRS project has initiated the donation of the remaining stock of ICON 10 wettable powder (WP) used in the 2007 spray rounds to the Government of Senegal through USAID.

### *Spraying Operations*

Following the implementation of this IRS round, there was an end-of-spray meeting on October 10 to review all aspects of IRS in order to document lessons learned and make recommendations the improvement of subsequent rounds. Participants included representatives from the MOH (PNLP and Service de Lutte Anti-Parasitaire [Pesticide Control Service; SLAP]), WHO, Christian Children's Fund (CCF), PMI, the Hygiene Service, and UCAD. During the meeting, it was noted that there was significant emphasis on using government (district and central MOH) staff for various components of program implementation in this round. The Senegal IRS team worked daily in collaboration and

consultation with PNLP at the central and district levels and with the MOE throughout operations, particularly in supervision, which was conducted by the Hygiene Service and MOE. This approach was quite successful at building capacity and creating ownership of the IRS program at all levels.

The following recommendations were offered to improve future spray rounds:

- Increase the number of hygiene agents trained for supervision at all levels.
- Provide replacement spray operators for possible needs during spraying activities.
- Implement IRS activities before the start of the rainy season.
- Compile the IRS data per village.
- Establish a supervision manual.

In addition, during the end-of-spray assessment meeting, it was highly recommended that IEC be strengthened at the community level in subsequent rounds. CCF is the implementing partner leading and managing the IEC campaign for IRS operations.

### ***Other Activities***

#### ***Entomological Monitoring***

Entomological monitoring on the efficacy of the 2008 IRS operations in the Niuro, Richard Toll, and Velingara health districts was conducted by the vector and parasite ecology laboratory of UCAD. The results were discussed during the end-of-spray assessment workshop, and the following conclusions were made by the entomological team:

- Notable efficacy of IRS in all types of housing, including straw huts.
- Low density of indoor-living *Anopheles* populations.
- Majority of rooms negative for female *A. gambiae* in all districts.
- Variation of efficacy between bare walls.
- Improved efficacy indicators for the second year of spraying.

#### ***Project Management and Administration***

Lenna Neat, Home Office Technical Manager, and Dr. Jean Desire Rakotoson, Vector Control Manager, traveled to Senegal to participate in the end-of-spray meeting and discuss issues related to the management of IRS solid waste.

#### ***Partnership and Collaboration***

During this quarter, two meetings were planned to review the training manual with IRS partners.

The first meeting on the IRS training manual took place on October 9, 2008. Representatives from PMI, PNLP, UCAD, the National Hygiene Service, SLAP, and the Plant Protection Directorate of the Ministry of Agriculture were in attendance. The participants agreed that the manual should be divided into chapters and be subject to joint review by all participants prior to its finalization.

One month later, review of the second draft of the IRS training manual took place from November 12–14, 2008. The training manual was divided into five modules and was reviewed by all participants over three days. At the end of the workshop, the final draft of the manual was shared with all participants for further review. The workshop was attended by IRS partners, including PNLP, UCAD, the Poison Control Center, the National Hygiene Service, SLAP, and all IRS project staff in Senegal. Dr. Perry of PMI joined the workshop on November 13.

**Outstanding Activities**

- Finalization of the training manual.
- Local procurement for the Richard Toll February 2009 spray round.

**Upcoming Activities**

- Fourth round IRS micro-planning meeting in Richard Toll.
- Fourth round IRS operations in Richard Toll in February and March 2009.

# Uganda

---

## Background

Funded by the PMI through USAID, the IRS project is providing strategic, technical, management, operations, and financial support to the Uganda NMCP to expand the use of IRS as an intervention for malaria prevention and control.

## Current Activities and Accomplishments

### *Planning and Assessment*

Project staff conducted IRS micro-planning activities with 43 IRS field supervisors and members of the district health team in preparation for spray activities. Issues covered included reassessing the household population in the respective sub-counties following resettlement of some residents; reviewing previous IRS round results; discussing project logistics for the upcoming spray program; repairing soak pits and operational centers according to guidelines; identifying and securing new stores; and reviewing guidelines for spray personnel recruitment. All IRS supervisors developed draft plans for operational activities in their respective districts.

### *Procurement and Logistics*

The project took stock of commodities and assets in all stores. Following this exercise, an updated inventory was generated and used to identify additional commodities needed for the upcoming spray rounds in January and February 2009. During this period, the project procured and delivered all the additional insecticide (4,500 liters of ICON CS), PPE, and other commodities needed to complete IRS round three activities in Kitgum and Pader.

### *Environmental Compliance*

Environmental compliance activities in this period focused primarily on post-spraying compliance and preparation for the third round of spraying. Post-spray activities included post-spray environmental compliance inspections and waste management. A total of 4,946 kg of IRS-related waste using ICON CS were disposed at the Kabale incinerator. Another 3,622 kg of IRS-related waste using DDT was captured and handed over to Avima, the supplier of the DDT chemical, for proper waste management. This exercise was completed in partnership with the National Environment Management Agency and the National Drug Authority.

### *Information, Education, and Communication*

The project produced IEC materials for use in the upcoming spray activities in Kitgum and Pader. These materials contain information on IRS compliance and guidelines for the preparation of houses to be sprayed.

### *Other Activities*

#### *Entomological Monitoring*

During the reporting period, RTI and LATH partnered with the Vector Control Division of the NMCP (NMCP/VCD) to conduct an entomological monitoring activity in three districts, Apac, Oyam, and Kitgum. This activity was finalized in December with two major findings:

- The local *Anopheles gambiae* population in all three Northern Districts where IRS was conducted in early 2008 showed high levels of resistance to DDT, and also to the pyrethroid, lambda cyhalothrin.

- All populations were susceptible to the carbamate, bendiocarb, and the organophosphate, fenitrothion.

A full entomology monitoring report was shared with USAID/PMI and NMCP partners in December, and discussions will be conducted with all stakeholders in January 2009 on the results presented in the report.

#### *Routine Environmental Monitoring for DDT*

During the reporting period, the project partnered with the NMCP to conduct a routine environmental monitoring for DDT in the districts of Apac and Oyam. Preliminary results were shared with USAID/PMI and NMCP in December and indicate that although DDT was generally not detected in soils and sediment, it was detected in crop samples from homes, markets, and trading centers across the districts. Concentrations ranged from 0.011 to 0.26 mg/kg (parts per million) in 55% of the samples, with about 40% of the samples having levels above the European minimal residual level (MRL) of 0.05 mg/kg for agricultural products. No evidence has been collected so far suggesting contamination from misapplication or spillage of DDT during IRS operations.

The evidence is consistent with the contamination of crops stored in homes sprayed with DDT. These levels probably do not pose an elevated risk to human health. The European MRLs are detection limit-based, and human exposure to DDT is probably much greater through inhalation of DDT vapors in the IRS-sprayed homes. The primary concern is negative publicity in Uganda and Europe that these levels could damage the organic produce industry in Uganda. Several of the detections occurred in homesteads identified as organic farms during the sampling effort.

Additional analysis is ongoing, including the analysis of quality assurance and quality control samples at two labs in Kampala, Uganda, and Mombasa, Kenya. The results appear consistent and within the range expected for crops stored in IRS-sprayed homes for varying periods of time before delivery to local markets. No quality concerns regarding IRS activities have been identified to date. The project expects to receive final results from the labs in early January and will share a final report in the next quarter.

#### *Capacity Building of Ministry of Health*

Sixty-seven district leaders and field supervisors (who are employees of the MOH) participated in orientations and IRS micro-planning efforts during the reporting period. These activities further enhanced their capacity to conduct IRS activities, and some of these individuals will act as trainers for spray personnel in the upcoming round.

#### ***Project Management and Administration***

- Judith Tukahirwa, Environmental Compliance Specialist, traveled to Mozambique to support DDT monitoring activities.
- Robert Ssengonzi, Home Office Technical Manager, traveled to Uganda to support IRS planning efforts and deployment of IRS logistics.
- John Morgan traveled to Uganda to participate in the entomological monitoring activities.

#### **Outstanding Activities**

- Completion of training for spray personnel who will undertake round three IRS activities.

- Completion of preparation of soak pits, securing of stores, and deployment of vehicles and outstanding IRS logistics.

### **Upcoming Activities**

- IRS round three will be conducted in the districts of Pader and Kitgum starting on January 5, 2009, and completion is scheduled for mid-February. Activities will include: environmental compliance (pre-spray, during spray, and post-spray inspections), IEC and community mobilization, spraying of houses, and the generation and dissemination of program coverage data.

# Zambia

---

## Background

Zambia's 2008 spray round began in September and ended in December of this quarter. The IRS project is tasked with providing support to the National Malaria Control Center (NMCC) of Zambia for procurement and environmental compliance in 15 districts. IRS project activities during this period focused on environmental compliance activities. The wash bays, evaporation tanks, and soak pits required for environmental compliance and safe disposal of liquid pesticide wastes were mostly completed during this quarter. The project also recruited and hired Mr. Adrian Kamuhuza, Program Manager. Mr. Kamuhuza will assume his duties in January 2009.

## Current Activities and Accomplishments

### *Environmental Compliance*

Work is nearly complete on the wash bays, evaporation tanks, and soak pits in 22 sites across the 15 districts implementing PMI-supported IRS. These facilities support the environmentally safe disposal of liquid pesticide wastes and the cleaning of spray equipment and personal protective equipment.

The project engaged a supervising engineer who inspected all work and collaborated closely with the contractors to assure the highest quality construction. His final report will be submitted in January 2009.



*Wash bay and evaporation tank under construction.*

Sites by PRONET (Z) Ltd.

- Kafue: Evaporation tank lid was not yet mounted. Contractor to install lid during first week of January 2009. Structural work was well executed.
- Mazabuka: Evaporation tank lid was not yet mounted, and poles for drying lines were not yet put up. To be finalized during the first week of January 2009. Structural work was excellent, and the site may be designated as model for Southern Province.
- Livingstone: Soak pit was not filled up with saw dust, charcoal, etc. Structural work was good.

- Kazungula: Soak pit not yet filled up with saw dust, charcoal etc. Structural work was good.

#### Sites by Kachame Roofing and Construction

- Lusaka 1: Site was fully completed. Structural work is good.
- Lusaka 2 (Matero): Three soak pits were well constructed. Third evaporation tank was just completed. Site was designated as model for Lusaka. This site was previously occupied by the Chinese company. Site is to be completed in first week of January 2009.
- Chongwe: Site was completed and good structural work was in place.  
Kabwe: Site completed, with excellent structural work—a model site for Central Province.
- Chingola: Site completed and structural work is excellent. May be designated as a model site for Copperbelt province.
- Solwezi: Evaporation tank lid was not yet mounted, and wire fencing was not completed. Contractor working to complete during first week January. Structural work was well executed.
- Chililabombwe: Evaporation tank and soak pit were poorly executed. Contractor to revisit and complete within first week of January 2009.



*Completed wash bay and soak pit with supports for drying lines.*

#### Sites by PROS Construction

- Ndola: Hinges and lid handles were not fixed to evaporation tank lids; contractor is rectifying. Structural work is good.
- Luanshya: Tank lids were not hinged and were without lid handles; contractor is rectifying. Structural work is satisfactory.
- Kalulushi: Lid hinges and handles were not fixed. Contractor is rectifying accordingly. Structural work is excellent.
- Kitwe: Two lids for tank were not installed. Hinges and handles not fixed. Contractor is rectifying accordingly. Structural work is good.
- Mufulira: Lid hinges and handles were not fixed. Structural work is very unsatisfactory. Contractor was directed to revisit.



*Wash bay and evaporation tank completed and fenced.*

### ***Spraying Operations***

IRS in Zambia is conducted by the government and the IRS project is not directly involved in spraying, as USAID supports spraying through a different contractual mechanism. The 2008 spray round ended in December.

### ***Project Management and Administration***

Mr. Adrian Kamuhuza was hired as Program Manager to oversee all program activities. Mr. Kamuhuza will manage the project in collaboration with USAID/PMI, NMCC, the Environmental Council of Zambia, and other partners. He will oversee and administer financial and administrative systems to ensure the smooth operation of project activities and prepare reports on project activities to relevant stakeholders. Mr. Kamuhuza will join the project in the first week of January 2009. Mr. Kamuhuza is an agricultural engineer by training and has wide experience in health and development in Zambia.

### ***Outstanding Activities***

DDT baseline determination, source monitoring, and incident monitoring did not proceed as planned in this quarter. The project team has prepared for this activity by purchasing sampling materials and assembling them for shipping, while pursuing an agreement with NMCC and Environmental Council of Zambia (ECZ) to conduct sampling and with the University of Zambia to do laboratory testing. With the recruitment of the new program manager, this activity is expected to move forward early in the next quarter.

### ***Upcoming Activities***

In the second quarter of FY09, the project team will work with University of Zambia staff, the NMCC, and ECZ to refine and adopt monitoring plans and protocols for monitoring DDT in the environment. Technical staff from the IRS project will evaluate University of Zambia lab to assess testing infrastructure, including personnel, facilities, support systems, and quality assurance processes and procedures. Based on this evaluation, the team will develop a Quality Assurance Project Plan for DDT monitoring. This monitoring will take place throughout the coming year.