



PRESIDENT'S MALARIA INITIATIVE



PMI | Africa IRS (AIRS) Project
Indoor Residual Spraying (IRS 2) Task Order Six

2015 MALI
END OF SPRAY REPORT

SPRAY CAMPAIGN:
JULY 1 – AUGUST 9, 2015

Recommended Citation: PMI | Africa IRS (AIRS) Project Indoor Residual Spraying (IRS 2) Task Order Six. 2015
Mali End of Spray Report. Bethesda, MD: Abt Associates.

Contract: AID-GHN-I-00-09-00013

Task Order: AID-OAA-TO-14-00035

Submitted to: The United States Agency for International Development/President's Malaria Initiative

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Submitted: September 16, 2015

Approved: October 23, 2015

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



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**2015 MALI
END OF SPRAY REPORT**

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ACRONYMS

AIRS	Africa Indoor Residual Spraying Project
ASACO	Community Health Association (<i>Association de Santé Communautaire</i>)
CFV	Control Flow Valve
COP	Chief of Party
DNACPN	National Directorate for Sanitation and Pollution Control (<i>Direction Nationale de l'Assainissement, Contrôle de Pollution et de Nuisances</i>)
DTC	Health Center Technical Director (<i>Directeur Technique de Centre de la Santé</i>)
ECO	Environmental Compliance Officer
HBR	Human Biting Rate
HLC	Human Landing Catches
ICC	Inventory Control Cards
IEC	Information, Education, and Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
MOE	Ministry of Environment
MOH	Ministry of Health
NMCP	National Malaria Control Program (<i>Programme National de Lutte contre le Paludisme</i>)
OP	Organophosphate
PID	Pulvérisation Intra Domiciliaire
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
PSC	Pyrethrum Spray Catches
PSECA	Pre-Season Environmental Compliance Assessment
SEA	Supplemental Environmental Assessment
TOT	Training of Trainers
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

The President’s Malaria Initiative (PMI) has been funding indoor residual spraying (IRS) in Mali since 2008 with the aim of reducing the malaria burden, especially among children under five years and pregnant women. In August 2011, Abt Associates was awarded a three-year Africa IRS (AIRS) project, funded by the United States Agency for International Development under PMI. In September 2014, Abt Associates was awarded another three-year project, called The PMI AIRS Project (or “the project”) to implement IRS in up to 20 African countries, including Mali. The objective of the PMI AIRS project is to limit exposure to malaria and reduce its incidence and prevalence.

The objective of AIRS Mali in 2015 was to reduce malaria-associated morbidity and mortality in Baroueli and Koulikoro districts by spraying 135,971 structures (72,504 in Baroueli and 63,467 in Koulikoro). AIRS Mali implemented all activities with the involvement of the Malian Government at different levels.

Key lessons learned from the 2015 IRS campaign include:

- Use of the mobile soak pit and a modified motorbike called a *taxini*, both of which were introduced in the 2014 IRS campaign, was successfully expanded in 2015. AIRS Mali plans to further expand use of these operational improvements in 2016.
- The sensitization strategy should be revised to ensure that mobilizers work with the village residents not only on the day of spraying but also before teams arrive because sensitization plays a crucial role in the success of an IRS campaign.
- The involvement of local administrative authorities is important to increasing the success of sensitization activities, in particular helping to manage and minimize refusal cases.
- E-management is a powerful tool for effective monitoring of insecticides and other equipment and it can help prevent stock-outs.

TABLE ES-1: AIRS MALI AT A GLANCE

Number of districts covered by PMI-supported IRS in 2015	2 districts: Baroueli and Koulikoro
Insecticide	Organophosphates (Actellic CS) in both districts
Number of structures found by spray operators	135,971
Number of structures sprayed by spray operators	133,527
2015 spray coverage	98.20%
Population protected by PMI-supported IRS in 2015	494,205 (13,219 pregnant women and 87,861 children under five)
Dates of PMI-supported IRS campaign	July 1–August 9, 2015
Length of campaign (operational days)	37 days
Number of people trained with U.S. Government funds to deliver IRS*	582

*Based on the PMI indicator definition. It includes only spray personnel such as spray operators, team leaders, supervisors, and clinicians. It excludes data clerks, Information, Education and Communication mobilizers, drivers, washers, porters, pump technicians, and security guards.

RESUME (EN FRANÇAIS)

L'Initiative du Président Américain contre le Paludisme (President Malaria Initiative: PMI) a commencé à financer la Pulvérisation Intra Domiciliaire depuis 2008 avec le but de réduire le fardeau du Paludisme spécialement au sein des Enfants de moins de 5 ans et des femmes enceintes. En Aout 2011, Abt Associates a obtenu un projet Africain de Pulvérisation Intra Domiciliaire pour 3 ans financé par l'Agence des Etats Unis pour le Développement International (USAID) sous PMI, pour mener à bien le travail. En Septembre 2014, Abt Associates a reçu trois ans complémentaire pour continuer le projet appelle PMI AIRS Project et assure la mise en œuvre de la Pulvérisation Intra Domiciliaire dans 20 pays d'Afrique incluant le Mali. L'objectif de PMI AIRS Project est de limiter l'exposition au Paludisme et en réduire l'incidence et la Prévalence.

En 2015, l'Objectif de PMI AIRS Mali était de réduire la morbidité et la mortalité associées au Paludisme dans les Districts de Koulikoro et Baroueli en pulvérisant 135 971 structures (72 504 à Baroueli et 63 467 à Koulikoro). PMI AIRS Mali a mis en œuvre toutes ces activités avec la pleine implication du Gouvernement Malien à tous les niveaux.

Les principales leçons tirées de la campagne PID 2015 sont les suivantes:

- L'Utilisation du Puisard mobile avec une motocyclette modifiée appelée Taxini. Les deux ont été introduits pendant la campagne de 2014, et ont été étendu avec succès à plusieurs aires de sante en 2015.
- La stratégie de la sensibilisation devra être bien repensée afin d'assurer que les mobilisateurs travaillent avec la population pas seulement pendant la journée de pulvérisation mais également pendant les semaines précédentes car cette stratégie joue un rôle capital dans la réussite d'une campagne PID.
- L'implication des autorités administratives locales est importante car elle augmente le succès des activités de sensibilisation, et contribue à réduire les cas de refus.
- L'E-gestion est un outil puissant pour la surveillance efficace des insecticides et d'autres équipements et elle peut aider à prévenir les ruptures de stock.

TABLE ES-2: AIRS MALI EN BRIEF

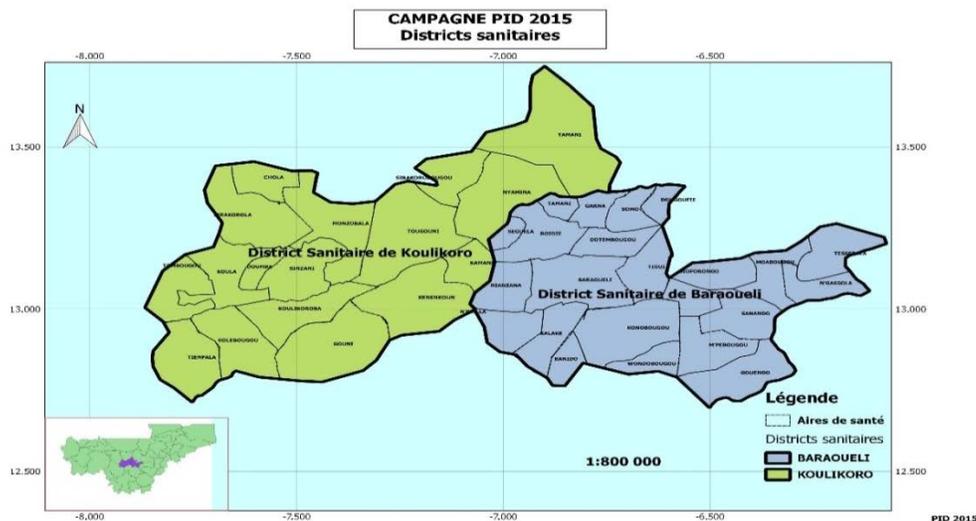
Nombre des districts couverts par PMI en 2015	2 districts: (Barouéli et Koulikoro)
Insecticide utilisé pour la PID	Organophosphores (Actellic CS) à Koulikoro et Baroueli
Nombre de structures trouvées par les Opérateurs.	135 971
Nombre de structures pulvérisées par les opérateurs en 2015	133 527
Taux de couverture de la PID 2015	98.20%
Population protégée par PMI en 2015	494 205 (13 219 femmes enceintes et 87 861 enfants de moins de 5 ans)
Dates de la campagne financée par PMI	1 ^{er} Juillet au 9 Aout 2015
Durée de la campagne (jours opérationnels)	37 days
Nombre de personnes formées avec les fonds du Gouvernement des Etats Unis d'Amerique pour faire la PID*	582

* En se basant sur la définition des indicateurs de PMI. Ce chiffre inclut seulement les acteurs comme les Opérateurs, les Chefs d'Equipe, les Superviseurs, et les Cliniciens. Il exclut les agents de saisie, les mobilisateurs, les Chauffeurs, les lingères, les maintenanciers, et les gardiens.

I. BACKGROUND

The President's Malaria Initiative (PMI) has supported indoor residual spraying (IRS) in Mali since 2008, initially through IRS programs in Bla and Koulikoro districts. In 2011, PMI added support for Baroueli district, thus making the IRS-supported area geographically continuous. In 2012 and 2013, PMI continued spraying in the three districts with a carbamate class insecticide (bendiocarb). In 2014, due to observed short residual life (two months) of this insecticide, PMI switched to a long-lasting organophosphate (OP) insecticide (pirimiphos methyl, Actellic CS) in Baroueli and Bla districts, and continued to use bendiocarb in Koulikoro. However, the results from the entomological monitoring after the campaign indicated that bendiocarb was short lived in the IRS districts, particularly Baroueli in 2013. Therefore, PMI and the National Malaria Control Program (NMCP) agreed to switch to an OP insecticide for all spray areas in 2015. However, due to the high cost of the new insecticide and NMCP's planned implementation of a universal net coverage campaign in Bla district, only Baroueli and Koulikoro were targeted for IRS in 2015 (Figure 1). IRS in Bla ended and the district was prioritized for the full package of malaria control interventions including LLIN distribution and Seasonal Malaria Chemoprevention. Bla, which is located in Segou region will benefit from a mass LLIN campaign in October 2015. A refresher training in case management will be undertaken in Bla and malaria surveillance will be strengthened to mitigate the possibility of a malaria rebound in the wake of IRS withdrawal. The campaign started on July 1 using Actellic CS, to ensure that the sprayed surfaces would retain their efficacy through the peak malaria transmission season in September and October. The July start of the 2015 IRS campaign coincided with the start of the rainy season however, which presented some challenges in transportation and spraying.

FIGURE 1: 2015 IRS CAMPAIGN DISTRICTS: BAROUELI AND KOULIKORO



I.1 2015 IRS CAMPAIGN OBJECTIVES

As stated in the 2015 AIRS Mali work plan, the program's five objectives in 2015 were:

- Cover at least 85 percent of targeted and eligible structures (135,971) found in two districts (Baroueli and Koulikoro) and protect an estimated population of 502,453.

- Promote participatory implementation by the Ministry of Health (MOH) and NMCP at all levels of the IRS operations in the two districts.
- Continue developing national and local capacity in organizing, planning, implementing, and evaluating IRS campaigns.
- Participate in the continued development and finalization of a national IRS strategy to ensure that the scale-up and sustainability approaches are included in the national plans.
- Complete quality entomological monitoring for the 2015 IRS campaign. This includes the collection of information on vector susceptibility and the residual life of OP, to ensure the NMCP and PMI have sufficient information to select which insecticide will be used during the 2016 IRS campaign.
- Support orientation and dissemination workshops regarding the application of national IRS strategic documents to the sub regional levels.

1.2 2015 RESULTS SUMMARY

The following results respond to the 2015 objectives listed in Section 1.1:

- By the end of the 2015 spray campaign, AIRS Mali achieved 98.2 percent coverage (133,527 structures) protecting 494,205 people in the two districts.
- The project worked closely with government counterparts: both district- and national-level partners were involved in planning, scheduling of the IRS roll-out and sensitization of communities.
- AIRS Mali organized a workshop in May with representatives from the NMCP, Ministry of Health (MOH), Ministry of Environment (MOE), and National Directorate for Sanitation and Pollution Control (DNACPN) to continue building skills and knowledge among central-level personnel in the different IRS components (planning, environmental compliance, training, and implementation).
- The project successfully produced the *National Indoor Residual Spraying (IRS) Strategic Plan for Malaria Prevention and Control (2016–2020)*. After all in-country partners provided input, AIRS Mali finalized the document and submitted a translated (French) final version to the MOH for use in discussions with donor agencies to fund future efforts according to the developed strategic plan.
- AIRS Mali conducted timely spray quality tests that indicated almost 100 percent mortality within 24 hours after spraying and continues to collect data on monthly insecticide residual life. The project is also implementing a second year of data collection to study the impact of new combination long-lasting insecticidal net products on entomological measures of malaria transmission. AIRS Mali reported the results from 2014 in a separate document¹.

¹ Africa IRS (AIRS) Project Indoor Residual Spraying Task Order Four. *Progress Report for the Study of the Impact of New Combination Long-Lasting Insecticidal Net Products on Entomological Measures of Malaria Transmission in Southern Mali*. December 2014. Bethesda, MD. Abt Associates Inc.

2. PREPARATION FOR IRS CAMPAIGN

2.1 IRS CAMPAIGN PLANNING

The following activities were undertaken to plan and organize the 2015 IRS campaign:

- *Internal IRS Campaign Planning (January–June):* In January, the AIRS Mali team began detailed planning for all activities of the IRS campaign. AIRS Mali staff met regularly to review campaign organization and planning. At the meetings, the team discussed revisions of training programs and materials, and setting standards for the campaign. AIRS Mali inventoried IRS equipment and commodities left over from the 2014 campaign, and then did local and international procurement of goods needed for successful implementation of the 2015 campaign.
- *Meeting with IRS Steering Committee (March):* All activities were planned and implemented in collaboration with government technical partners (NMCP, DNACPN, MOE, Ministry of Agriculture, and other government and non-government stakeholders) at the national, regional, district, and community levels. At the steering committee meeting, all key partners agreed on their roles as well as objectives, targets, and needs for the spray campaign.
- *Meeting with Community Leaders in Koulikoro and Baroueli (March):* Meetings with community leaders included discussions regarding the dates for the IRS campaign.
- *Meetings with Local Partners (May and June):* The project held meetings with Community Health Association (ASACO) and health center technical directors (DTCs) throughout the spray districts to ensure that communities were aware of the dates for IRS campaign implementation and to establish the roles and commitments of ASACO and DTCs in implementing the campaign.

2.2 INSECTICIDE SELECTION AND PROCUREMENT

Based on entomological monitoring and insecticide resistance results after the 2014 IRS campaign, insecticide from the OP class (Actellic CS) was selected for spraying in the 2015 IRS campaign. AIRS Mali calculated that 64,235 bottles of Actellic CS would be needed to cover a total of 135,971 structures in the two spray districts. Because AIRS Mali had 9,948 bottles of Actellic CS left over from the 2014 campaign, an order was placed for 54,287 bottles of OPs (the slightly different numbers of insecticides ordered vs. needed are a result of packaging). The OPs arrived in Mali in June after Abt Associates successfully tested the quality of the insecticide at CEMA, a UK-based independent laboratory.

2.3 LOGISTICS PLANNING AND PROCUREMENT

2.3.1 INVENTORY ASSESSMENTS AND PROCUREMENT

Prior to the spray campaign, AIRS Mali did a full inventory in both district warehouses, located in Segou (Baroueli) and Koulikoro (Koulikoro). Using the inventory results and needs assessed for the 2015 campaign, AIRS Mali initiated requests for international procurement to the project home office team at the Abt Associates office in Bethesda, Maryland, and completed local, in-country procurement. Local procurement involved an open competitive tendering process. The AIRS Mali procurement committee selected suppliers based on the lowest-cost, technically acceptable bid according to the criteria given in the solicitation for the quotations. The tables in Annex A include a detailed list of items procured locally and internationally.

2.3.2 LOGISTICAL NEEDS ASSESSMENTS

During the internal planning meetings, the AIRS Mali team developed the logistics and commodity distribution schedules for the 2015 IRS campaign. In May and June, the operations manager, logistics coordinator, and environmental compliance officer (ECO) visited all 41 operational sites and finalized the plans for moving IRS commodities to each site on June 29-30, 2015. Table 1 shows the quantities of key IRS commodities distributed to each district for the spray campaign, and Table 2 shows the vehicles distributed. Annex B includes details of vehicle usage in both districts in 2015.

TABLE 1: DISTRIBUTION OF SELECTED IRS COMMODITIES TO OPERATIONAL SITES

Operation Sites	Number of Teams	Overalls	Boots	Helmets/ faceshields	Spray Pumps	Gloves	Masks/ Respirators
Koulikoro	44	690	311	242	203	501	10250
Baroueli	65	1057	442	324	326	637	15860
Total	109	1747	753	566	529	1138	26110

TABLE 2: DISTRIBUTION OF VEHICLES

District	Minibuses	Pick-up/4x4	Taxini
Koulikoro	12	3	22
Baroueli	17	3	34
Total	29	6	56

2.4 HUMAN RESOURCES

To implement the 2015 IRS campaign, AIRS Mali hired 1,282 seasonal staff, 1,062 men and 220 (17 percent) women. Table 3 provides a breakdown of the seasonal staff by position and gender.

TABLE 3: SEASONAL STAFF HIRED IN 2015, BY POSITION AND GENDER

Position	Men	Women	Total
District logisticians	2	0	2
Data clerks	5	10	15
Pump mechanics	4	0	4
District warehouse managers	3	0	3
Finance assistants	1	1	2
IRS data transporters	6	0	6
Spray operators	357	34	391
Community supervisors	39	2	41
Team leaders	97	12	109
Storekeepers	33	8	41
IEC mobilizers	376	78	454
Washers	0	70	70

Position	Men	Women	Total
Entomological technicians	10	5	15
Security guards	40	0	40
Drivers	89	0	89
Total	1062	220	1282

Note: IEC=Information, Education, and Communication

Priority was given to hiring seasonal staff from previous IRS campaigns who performed well. Spray operators (SOPs), team leaders, pump mechanics, and washers were recruited in each spray area by the head of the ASACO and the DTC, based on criteria developed by the AIRS Mali technical team. Hiring criteria for SOPs included: 1) ability to read and write, 2) ability to carry spray pumps for several hours per day, and 3) having a certified note from a doctor stating that the candidate was in good health. The DTCs gave all SOPs a medical exam at the health post, a process closely supervised by AIRS. Women applicants also had to present a note from the doctor stating that they were not pregnant.

2.5 TRAININGS

AIRS Mali held 13 trainings to ensure that all seasonal staff were aware of their roles, understood how the IRS campaign would function, and had the technical knowledge and skills to perform their jobs well. Additionally, the trainings covered what to do in emergency situations (such as insecticide poisoning), and reinforced the value of preventing malaria transmission. Brief descriptions of trainings are in Annex C.

All the trainings were implemented with the support and involvement of government technical partners. The trainings took place June 16-30. As shown in Table 4, in total, AIRS Mali trained 1,370 people, 226 (16.5 percent) of whom were women (compared to 13.12 percent women in 2014).

TABLE 4: SEASONAL STAFF TRAINED, BY TOPIC AND GENDER

Categories of Persons Trained			Training on IRS Delivery						Other Trainings														Total Trained				
	Training of Trainers		Spraying Operations training		Medical Treatment of Intoxication Cases Training		Supervisor Training		Data Capture Training		Logistics Training		Coveralls Washing		Structure Enumeration/ IEC Training		Transport/ Security training		Stores security training		District Team Training			Entomological monitoring training		Radio hosts Training	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F	M	F
DTCs	37	4																									41
District coordinators	2	0																									2
*Spray operators			357	34																							391
*Team leaders			97	12																							109
*Clinicians					37	4																					41
*Community supervisors							40	1																			41
Data clerks									5	10																	15
Storekeepers											33	8															41
Washers													0	70													70
Mobilizer agents															376	78											454
Drivers																	89	0									89
Security guards																			40	0							40
District logisticians																					2	0					2
Warehouse keepers																					3	0					3
Entomologist technicians																							10	5			15
Radio hosts																									16	0	16
TOTAL M/F District	39	4	454	46	37	4	40	1	5	10	33	8	0	70	376	78	89	0	40	0	5	0	10	5	16	0	1370
Total Trained	43		500		41		41		15		41		70		454		89		40		5		15		16	1370	

*Based on the PMI indicator definition. It includes only spray personnel such as spray operators, team leaders, supervisors, and clinicians. It excludes data clerks, Information, Education and Communication mobilizers, drivers, washers, porters, pump technicians, and security guards.

3. COMMUNICATIONS

The AIRS Mali staff developed the 2015 communication activities taking into account the lessons learned and experiences gained by IRS teams in the 2011–2014 spray rounds. One month before the start of the 2015 campaign, AIRS Mali began working with staff at the national and district level, ASACO members, and the DTC to make initial contacts with community leaders (traditional village chiefs, religious leaders, and other community organizations and associations, especially youth and women’s associations) to inform them that the 2015 IRS campaign would start on July 1. Community meetings were arranged between AIRS Mali staff and community leaders to begin the IRS campaign sensitization process, in particular to ask community leaders to begin discussing with community members how to prepare their structures for the IRS campaign.

AIRS Mali completed the following communication activities in 2015:

Radio Broadcasts: Because radio is widely available and listened to in the spray districts, AIRS Mali used radio broadcasts to ensure wide dissemination of IRS spray campaign information. AIRS Mali worked with 12 local radio stations to broadcast 2,532 radio spots aired in French and Bambara to promote the IRS campaign. Radio announcers visited spray communities and conducted interviews with SOPs, washers, team leaders, and district coordinators about how their work was progressing. Radio announcers also interviewed DTCs, ASACO members, AIRS Mali staff, and village chiefs to discuss what they have observed during the IRS campaign.

In various communities, radio stations put together and broadcast live programs on which griots and other musicians played songs about malaria and IRS, and station staff and AIRS Mali discussed key messages about the 2015 IRS campaign. The listeners were quizzed about the IRS campaign and people who answered questions correctly received an IRS campaign t-shirt or cap. Approximately 490,000 area residents could have been reached with the radio broadcasts.

Sensitization: In 2015, 188 mobilizers were in charge of sensitization in two districts prior to the IRS campaign. This differed from the 2014 campaign, when AIRS Mali used 760 mobilizers. To reduce the cost of mobilization, AIRS Mali replaced door-to-door mobilization with mass mobilization and assigned one or two community mobilizers to each spray team depending on the size of the village. This approach didn’t work as well as expected. Not all residents were able to hear the spray schedule announcements on the radio. Due to the diffuse nature of spray operations and the need for help preparing households on the day of spraying, the mobilizer that had been assigned to a spray team was unable to arrive earlier to the targeted villages. Therefore, the mobilizer worked with another mobilizer and the village crier to sensitize residents about spray dates and preparation requirements before the spray teams arrived in the village. During spray operations, mobilizers accompanied the IRS teams to provide more information to households just before and after spraying was completed. AIRS Mali team will be reviewing other approaches to mobilization for the 2016 campaign, possibly including a one mobilizer per village or a group of nearby villages, focusing particularly on what households need to do before, during, and after spray operations. Mobilizers discussed the following topics with residents:

- IRS impact on reducing malaria
- When to expect the spray operator and how to prepare a house for spraying
- Observing a two-hour waiting time after spraying to re-enter the structure
- Keeping animals away from the structure during and after spraying
- Sweeping and disposing of any insects killed by spraying

- Importance of continuous use of mosquito nets
- Replastering to be done not earlier than January 2016

One day before the spray team arrived, mobilizers visited the village to notify households of the spray schedule and remind them to properly prepare their structures for spraying.

4. IMPLEMENTATION OF IRS ACTIVITIES

4.1 SPRAY CAMPAIGN

The 2015 IRS campaign lasted for 37 operational days, from July 1 through August 9, 2015. A total of 109 spray teams were deployed during the campaign in 39 sites. The distribution of spray teams was determined by the number of eligible structures per district and the geography/terrain that the spray teams would cover (Table 5).

TABLE 5: DISTRIBUTION OF SPRAY TEAMS BY DISTRICT

District	No. of Spray Teams	No. of Eligible Targeted Structures
Baroueli	44	72,504
Koulikoro	65	63,467
Total	109	135,971

. Spray teams consisted of four or five SOPs and one team leader. Field supervisors were deployed to monitor four spray teams each. Supervisors also monitored the work of the spray teams and the movement of vehicles to and from spray sites. The supervisors, in turn, were supervised by the district coordinator and informally by the DTC. The DTC's role was to provide supervision to the campaign when SOPs set off in the morning and when they returned in the afternoon. They also supervised spraying in some villages and made sure that the spray forms were properly filled out. Information on number of supervisory inspections and common gaps identified is included in Annex D.

During the spray campaign, each operational site had a storekeeper, guards, and washers. Spray operations began at 6 am when the spray personnel met at their designated operational sites to put on personal protective equipment (PPE) and pick up pumps and insecticide for the day. Once these were distributed, the supervisor met with the spray team leaders, shared the spray schedule for that day, and the route to take to reach each community.

The spray teams departed for the communities at 6 am to carry out spraying and returned to the operational site around noon or 1 pm. At the soak pit, the SOPs lined up to do progressive rinsing of spray pumps and then they removed their coveralls and PPE for washing. They returned all insecticide bottles (both empty and unused bottles) to the site storekeeper. The storekeeper also counted/verified the number of empty bottles against the number of bottles reported having been used; the storekeeper then placed empty bottles in a drum located in the storeroom to await transport to a recycling facility after the IRS campaign. The unused bottles were returned to the available stock-on-hand and were distributed the following day.

IRS district teams consisting of a district coordinator, central warehouse manager, logistician, monitors and pump technicians in close collaboration with the DTCs, provided oversight to achieve AIRS Mali's goal of providing day-to-day operational management and support for IRS implementation, including all aspects of monitoring and quality assurance for spray operations.

4.2 INNOVATIONS AND SPRAY CAMPAIGN IMPROVEMENTS

Operations planners worked to minimize the cost of operations in 2015. As a result, during the spray campaign, AIRS Mali pilot tested or expanded implementation of several innovations that increased efficiency and reduced costs. These included:

4.2.1 EXPANDING USE OF MOBILE SOAK PITS

In 2014, AIRS Mali introduced the use of mobile soak pits (MSPs) in six spray sites. This was successful, and in 2015, the project doubled the number of sites using an MSP, for a total of 12. With the MSPs, spray teams can camp in the villages where they spray, because they need not return to a permanent soak pit each night. This has produced the following results:

- Reduced SOP travel time to and from the operational site
- Reduced daily logistics costs (fuel, rental costs)
- Increased the time the team has to sensitize the community about the benefits of IRS
- Allowed spray teams to start spray operations earlier in the morning and thus to spray more structures per day

The team compared the 2015 spray results in the six MSP spray sites with the 2014 data when the project used permanent soak pits. In 2015, four sites demonstrated an increase in the total number of sprayed structures ranging 4.77 – 15.58. The same four sites finished the spray operations 1-5 days earlier when using MSPs. The remaining two districts demonstrated a decrease in structures sprayed by 0.84 and 4.96 as compared to 2014 results. As an added cost saving, it is cheaper in Mali to build an MSP than to build – or even to maintain – a permanent one because local materials are used. The MSP costs about US\$50 to build, whereas the cost of building a permanent soak pit is estimated at US\$500 and its annual maintenance and repair are estimated at US\$150.

4.2.2 USE OF TAXINIS

During the 2014 IRS campaign, AIRS Mali introduced use of taxinis (motorbikes with carts attached) in the six areas using MSPs. Taxinis can negotiate roads that are inaccessible to larger vehicles. They also are less expensive to rent and operate. Thus, their use lowers IRS operational costs.

In 2015, AIRS Mali expanded its use of taxinis into many more areas, even those with permanent soak pits, for a total of 56 taxinis. Because a standard taxini is rather smaller than the minibus previously used, the project sometimes had to rent a larger taxini or use two standard ones. Even this yielded a cost savings, because the rental of the two taxinis combined was still less expensive than that of one minibus.



Taxini that transported SOPs to a village, Koulikoro district

Thus, in 2015, instead of renting 57 minibuses at a cost of US\$3,855/day (1US\$ = 584 FCFA on June 15, 2015 <http://www.oanda.com/currency/converter/>) AIRS Mali rented 29 minibuses and 56 taxinis at a cost of US\$3,304/day, for an estimated savings of US\$

22,000 over the 40-day campaign (Table 6).² Beyond this financial gain, the arrival of the IRS team in a *taxini* significantly increased the importance and acceptance of the spray teams in the communities, thus producing a “mobilization effect.”

TABLE 6: ESTIMATED SAVINGS FROM TAXINI USAGE IN 2015

	Mini buses + <i>Taxinis</i>			Minibuses only		
	Number	Unit Cost, US\$	Total/day	Number	Unit Cost, US\$	Total/day
Minibuses	29	67.63	1,961.27	57	67.63	3,854.91
<i>Taxinis</i>	56	24	1,344	N/A		
			3,305.27			3,854.91
Gain per day, US\$			2549.64			
Gain for the entire campaign, US\$			549.64* 40 = 21,985.60			

4.2.3 MOBILE PAYMENTS

The use of mobile money to pay seasonal staff is an approach that many projects have used for some time. AIRS Mali adopted this payment method in 2015 in Koulikoro district. The payment was transferred through Orange Money, a local mobile phone operator and the method proved to be much cheaper than what AIRS Mali used before. The total cost of the payment process (for seasonal workers in two districts) in 2015 was US\$ 7,421, about half of the amount spent in three districts in the preceding three years (Table 7). AIRS Mali will expand the mobile payment system to all districts next year.

TABLE 7: COST OF SEASONAL WORKERS PAYMENT, 2012-2015

2012 (3 districts)	2013 (3 districts)	2014 (3 districts)	2015 (2 districts)
US\$ 25,390	US\$ 26,476	US\$ 24,793	US\$ 7,421

Note: Cost include bank fees, 1 travel and transport only; excludes workers' wages.

4.2.4 CONTROL FLOW VALVES

In 2015, the PMI AIRS Project made an effort to institutionalize the use of control flow valves (CFV) in several country programs. CFVs are used to ensure a consistent flow of insecticide mix during spraying. During the IRS trainings in Mali, the project team made detailed presentations on and answered questions about the use of CFVs. However, during spray operations, many SOPs had the recurring problem of CFVs getting clogged very quickly. In accordance with project procedures, the SOPs had to wait for assistance from the team leader or supervisors to clean the CFVs. Thus, acceptance and use of CFVs among SOPs was less than expected.



Cylinder exploded inside the pump

² Budgeting of the *taxinis* during the IRS planning period used the 2014 cost of a *taxini*, US\$ 17.12/day, for a total expected saving of US\$ 37,397. By the time of the 2015 campaign, the cost of a *taxini* had risen to US\$ 24/day, reducing the saving to US\$ 22,000.

In addition, AIRS Mali uses very old Hudson pumps – most were purchased in 2008. During the 2015 campaign, two pumps exploded, as shown in the photo.

For 2016, the project intends to replace unusable pumps (220 total for two districts) and will consider procuring Goizper pumps, which have valves installed during manufacture, based on PMI's experience using these pumps to date.

4.2.5 MHEALTH ACTIVITIES: SMARTPHONES FOR SUPERVISION, SMS FOR DAILY REPORTING

Since 2013, AIRS Mali has used smartphones to conduct environmental compliance inspections before, during, and after the IRS campaign. In 2015, with support from Dimagi, the PMI AIRS project technology partner, the Mali team extended the use of smartphones to conduct routine supervision during IRS. In addition, Dimagi introduced the use of Java-enabled phones to transfer daily spray progress data via text messages, also called the Performance Monitoring Tracker (PMT).

The introduction of neither approach went well although use smoothed out. Main problems were:

- The poor quality of phones procured at a local market
- Confusion of tasks and responsibilities during team leader / supervisor training
- Confusion regarding delivery receipt message
- Incomplete confirmation of team leaders' phone numbers in CommCare for PMT
- Incomplete coverage of geographical area when using one telecom provider
- Difficulties with maintaining sufficient phone credit.

For 2016, the AIRS Mali team will devise ways to avoid such problems significantly in advance of the campaign.

4.3 STOCK MANAGEMENT DURING THE IRS CAMPAIGN

Good management of the PPE stock and especially the insecticide is a major priority during an IRS campaign. There must be a balance in the procurement, storage, and consumption of products, so nothing is out of stock.

4.3.1 ELECTRONIC INVENTORY MANAGEMENT

For two years, AIRS Mali has used a program that allows it to do computerized management of PPE and insecticide stocks at the central (district) and secondary stores. The central warehouse managers in Segou and Koulikoro use a remote access function available in an Access-based inventory database. The application works on a simple but effective principle, "perpetual inventory," which records on a daily basis the movement of insecticide stock (input-output), especially during the campaign. This enabled the AIRS Mali office in Bamako to know in real time:

- The inventory of insecticides at the central stores
- The dispatching of supplies from the main store to the secondary store
- The movements of the stock at the central and secondary stores
- The level of supply of each primary and secondary store

4.3.2 INVENTORY MANAGEMENT AT OPERATIONAL SITE LEVEL

AIRS Mali recruited two district logisticians for the IRS campaign to serve as a link between the operational site storekeepers and the district warehouse managers. The logisticians worked to coordinate supply chains to move needed IRS materials to the appropriate operational site, and to ensure the correct use and accuracy of stock cards for inventory record-keeping. The district logisticians regularly checked with storekeepers regarding their stock levels and, when needed, arranged for the transport of IRS commodities from the district warehouses to the operational sites.

AIRS Mali used inventory control cards (ICC) to record each item in the two district warehouses and operational sites. Storekeepers updated the ICC daily regarding the movement of stock in or out of the storeroom. Storekeepers were also required to conduct daily physical stock counts to ensure that the actual stock in storerooms matched the ICC record.

Every morning during the spray campaign, the team leaders, with the storekeepers, would organize, distribute, and sign out all PPE to be used for the spray operations. The storekeepers also organized and distributed all PPE to the washers and other IRS staff as needed. At the end of each day, the PPE was turned over to the washers for cleaning. After the PPE was washed, the washers returned the PPE to the storekeepers and team leaders, who did another inventory count to ensure that all PPE had been returned.

At each operational site, storekeepers handed over to the team leaders the number of bottles of OP that each SOP would use for spraying that day. The team leaders signed a special card to acknowledge receipt of the bottles. The cards also noted the codes of the bottles, for further tracking if needed. The team leader noted on a separate card the number of bottles provided to each SOP and the bottle codes.

At the end of each spray day, SOPs turned in their used and unused bottles to the team leader, who collated these and submitted them to the site storekeeper. The storekeeper recorded the returned full bottles on the stock card as a positive adjustment and updated the stock balance. The used bottles were registered on a daily utilization record form that helped AIRS Mali calculate trends in insecticide use.

Also at the end of each spray day, every site storekeeper sent a text message to the central warehouse managers, reporting bottles consumed and remaining full bottles. The district warehouse managers compiled this information into a database to produce a daily summary, which was used to predict site stock-outs and resupply the site before the stock-out occurred.

Additionally, the storekeepers prepared a comprehensive weekly stock report and submitted it to the district logisticians and the AIRS Mali logistics coordinator, who then generated aggregated total stock balances for the IRS campaign and noted where PPE and insecticide needed to be sent from the district warehouses to prevent stock-outs.

Mid-way through the campaign, the district logisticians completed a physical inventory in each operational site in their districts and reconciled the physical counts with the warehouse inventories in each district. The AIRS Mali logistics coordinator reviewed these mid-campaign inventory balances and used them to send needed IRS commodities to each site during the second half of the campaign.

5. MONITORING AND EVALUATION

Monitoring and evaluation (M&E) for the 2015 IRS campaign closely followed the processes outlined in the 2015 AIRS Mali Work Plan and the M&E Concept Paper developed by the AIRS core team. M&E activities, under the supervision of the Chief of Party (COP), were led by the AIRS Mali M&E manager and the database manager. A previously used secure and reliable Access database was updated by the database manager to reflect minor changes to the 2015 AIRS M&E system, and deployed to the data entry centers in Bamako and Ségou. Eight data entry clerks worked in the Ségou data center, which received data from Baroueli district; seven clerks worked in the Bamako data center and entered data from Koulikoro district.

5.1 KEY OBJECTIVES

The key objectives of AIRS Mali M&E activities are:

- To emphasize accuracy of both the data collection and data entry processes through comprehensive training and supervision at all levels
- To streamline and standardize data flow, minimize errors, and facilitate timely reporting
- To ensure IRS data security and storage for future reference through the establishment and enforcement of proper protocols
- To document lessons learned and good practices observed in the implementation of the project activities and apply these to future project years

5.2 DATA MANAGEMENT

The AIRS Mali team made revisions to the data collection process to reflect the updates to the AIRS M&E system for the 2015 spray campaigns, such as installing a cleaner software on the computers of the data entry clerks. As noted above, all updates were incorporated into the Access database to ensure accuracy and consistency of data entry and reporting.

Data clerks entered spray data into the database and transmitted the results to the AIRS Mali office in Bamako within 24 to 48 hours of spray for quality control purposes and the timely generation of weekly progress reports. Once the data were entered, paper forms were filed and temporarily archived at the data centers. Eventually, all data collection forms were transferred to the AIRS Mali office in Bamako for long-term storage. A daily electronic back-up of data was saved to the AIRS Mali server and to an external hard drive for data safety.

5.3 DATA QUALITY ASSURANCE AND QUALITY CONTROL

Data quality assurance was carried out daily during the IRS campaign by a variety of AIRS staff (SOPs, team leaders, district coordinators, M&E manager, database manager, etc.). Specific activities conducted to ensure data quality included:

Physical Data Verification:

- SOP level: Team leaders and the supervisors reviewed, arithmetically verified, and signed off 100 percent of spray data collected on spray operator form.

- District level: District coordinators received the paper forms from the supervisors and checked the accuracy of the spray data. Afterward, the spray operator forms were transmitted to the data centers by motorbike messengers (one from each district) each evening.
- Data entry level: Data clerks reviewed each form for typos and transcription errors and verified the arithmetic calculations on the spray operator forms were correct before entering the data into the database.

5.4 M&E DATA QUALITY ASSURANCE TOOLS AND RESULTS

By 2015, AIRS Mali had already developed many supervisory tools. Use of the data quality assurance tools in previous campaigns was less than expected, and attributed to the sheer number of tools that supervisors were responsible for completing and submitting as well as the failure of the tools to work well during the campaign because they had not been field tested prior to the campaign. Table 8 shows the percentage of records verified by AIRS Mali in 2015 using each of the data quality assurance tools.

TABLE 8: TYPES OF M&E SUPERVISORY TOOLS USED AND DATA CHECK RESULTS

M&E supervisory tools	Structure Records Verified	Structure Records Corrected	Percent of Records Correct
Error Eliminator (Support 17 form)	2535	505	80%
Data Collection Verification (Support 15 form)	524	95	82%
Data Entry Verification (Support 16 form)	1266 lines	240	81%

For 2016, AIRS Mali will streamline the set of supervisory tools; it also will translate the tools into Bambara for ease of use.

5.5 RESULTS

The complete list of all program indicators for the 2015 spray campaign is presented in the Monitoring and Evaluation Plan matrix in Annex G. The following sections provide summaries on the core PMI indicators and other spray indicators.

5.5.1 SPRAY COVERAGE

The 2015 AIRS Mali campaign sprayed 133,527 of the 135,971 structures found, for a spray coverage of 98.20 percent. In total, 494,205 people were protected by the 2015 spray campaign, including 13,219 pregnant women and 87,861 children under five, as seen in Table 9. Table 10 breaks down population protected by gender.

TABLE 9: SPRAY COVERAGE AND POPULATION PROTECTED

District	Eligible Structures Found	Structures Sprayed	Spray Coverage	Population Protected (Total)	Children <5 Protected	Pregnant Women Protected
Koulikoro	63,467	62,289	98.14%	220,524	39,263	6,920
Baroueli	72,504	71,238	98.25%	273,681	48,598	6,299
Total	135,971	133,527	98.20%	494,205	87,861	13,219

TABLE 10: POPULATION PROTECTED, DISAGGREGATED BY GENDER, AND DISTRICT

District	Total Population Protected		
	Male	Female	Total
Koulikoro	113,663	106,861	220,524
Baroueli	138,200	135,481	273,681
Total	251,863	242,342	494,205

5.5.2 INSECTICIDE USAGE

Table 11 shows insecticide availability and use in 2015. In total, 58,472 bottles of insecticides were used to spray 133,527 structures. On average, 2.3 structures were sprayed per bottle of insecticide.

TABLE 11: INSECTICIDE USAGE DURING THE 2015 IRS CAMPAIGN

Organophosphates	Balance
OP balance before the spray campaign began	9,942
OP procured for the 2015 campaign	54,287
Total number of insecticide bottles available for 2015 campaign	64,229
OP bottles used during the 2015 IRS campaign	58,472
Balance after the completion of the campaign	5,757

6. ENVIRONMENTAL HEALTH AND SAFETY COMPLIANCE

6.1 ENVIRONMENTAL DOCUMENTATION

A Supplemental Environmental Assessment (SEA) that addressed the use of pyrethroids, carbamates, and OPs was prepared and approved by USAID in February 2011. This SEA is active and valid through 2015, and covers all malaria-endemic regions of Mali. No amendments to this document were necessary, as no activities fell outside the scope of the SEA. A Letter Report was submitted prior to the campaign that listed significant changes, including the first use of OP in Koulikoro, the plan to increase the use of MSPs, and the details of the waste management plan.

6.2 PESTICIDE CHANGE/ADDITIONAL MOBILE SOAK PIT

The 2015 campaign was the first year of OP use in Koulikoro district, which previously had been sprayed with a carbamate. Because of this switch in insecticide, the district received particular attention in terms of training, inspection during campaign, and PPE supply to avoid potential health effects on spray teams and residents. To reinforce the process of triple rinsing of the empty plastic bottles, storekeepers were made responsible for confirming that bottles had been rinsed when receiving them from team leaders. This check was in addition to that performed by supervisors and teams leaders in the field.

Based on the positive experience in piloting MSPs in six districts in 2014, AIRS Mali introduced six new MSPs: in Ndjilla, Banido, and Mpebougou (Baroueli district) and in Chola, Koula, and Tombougou in Koulikoro district. This helped AIRS Mali to continue improving its environmental and safety compliance, time management, cost efficiency, and SOP convenience during the campaign.

6.3 PRE-SEASON ENVIRONMENTAL COMPLIANCE ASSESSMENT

In accordance with the 2015 action plan, the Pre-Season Environmental Compliance Assessment (PSECA) took place from February 25 to March 13 in the 68 sites in three districts, including Bla (even though Bla was not sprayed in 2015, we needed to secure our soak pits there). The PSECA was carried out by an inspection team led by the AIRS Mali ECO and including representatives from the MOE and NMCP. The objectives of the PSECA were to:

- Review the location and physical condition of soak pits and insecticide storerooms
- Check the availability of sufficient quantities of PPE and hygiene items
- Identify problems related to the storage of insecticides and equipment
- Check the availability of pesticide-specific antidote at the district health center
- Write a report containing the recommendations and a plan to rectify any problems identified

A smartphone was used to collect the PSECA information for each site and the data were then sent to Abt Associates' home office server. The server sent information on identified problems and issues automatically to the COP, Operations Manager, and ECO.

The PSECA provided a list of findings, including operational site-specific strengths and weaknesses. In response, site-specific recommendations were developed (see Annex E). Common strengths and areas that needed improvement are listed below:

Strengths

- Soak pits were located away from sensitive areas.
- Soak pits fences were in good condition.
- Special IRS secondary stores were available in almost all operational sites.
- Danger signs were visible at the store level and washing areas fences.
- All soak pits were closed with heavy slabs.
- Stores were in good condition at almost all the sites visited.
- Atropine was available at district health centers and in almost all operational site-level health centers.

Areas for Improvement

- Soak pit surrounding areas were covered with grasses/debris.
- Cracks were visible in the concrete of the washing areas.
- Some line supports (used for drying coveralls) needed repair.
- Padlocks needed to be replaced.

All needed repairs were performed before the campaign started, and all facilities were brought into compliance.

6.4 MEDICAL CLEARANCES

Before being contracted, IRS team members (SOPs, team leaders, supervisors, washers, and storekeepers) had to undergo a medical check; these were conducted in each operational site by the site's DTC. The purpose was to disqualify any unsuitable workers. In addition, pregnancy testing and counseling were provided for every woman who might have contact with pesticide. This is to avoid the recruitment of pregnant and lactating women for these positions.

6.5 MANAGEMENT OF INSECTICIDE ADVERSE EFFECTS

All spray team members (SOPs, team leaders, supervisors, washers, and storekeepers) were trained on the dangers of OP, general safety, and other best-practice management of pesticides including the use of PPE during operations. They also received instruction on the use of spill kits and first aid kits.

Drivers hired to transport IRS commodities and spray teams were trained on correct methods to secure and safely handle insecticides. Participants also learned how to manage an insecticide spill, and safely clean vehicles after each day of the IRS campaign.

A training session was organized in each district for the health practitioners (DTCs). The training went over the correct protocol and methods to be followed to treat any potential poisoning case during the IRS campaign.

Overall, the 2015 IRS campaign did not experience any insecticide poisonings or spills, and no injuries were reported. No adverse incidents or accidents were reported during spray operations. There was one vehicle mishap: a vehicle bogged down for 24 hours because the trails flooded following heavy rain.

6.6 MID-SPRAY AND POST-SPRAY INSPECTIONS

AIRS Mali used OPs in Koulikoro for the first time in 2015. To be more vigilant regarding safety and environmental compliance issues, a team of five inspectors (ECO, and two representatives from the MOE and two from the NMCP) performed inspections throughout the 2015 campaign. Representatives of environmental services at the regional and district levels were also involved with the environmental inspections. The main practices the inspections sought to enforce were: no eating/drinking during IRS operations; keeping poultry and other livestock, children, and pets away during spraying; doing secure transport of operators and insecticides; triple rinsing, checking, and collecting empty insecticide bottles; having full first aid and spill management kits at stores; carrying out the washing process at the end of the day; keeping teams supplied with soap and water (for cleaning); and properly managing sweeping by homeowners after structures were sprayed.

The inspections identified the following areas for improvement:

- Some elements of the first aid kits (cortisone and Aspirin) were not available in the first days of campaign.
- Many households did not keep poultry away from the structure during spray operation.
- Some stores lacked a laminated danger sign (printed ones were immediately provided).
- SOPs in some sites failed to triple rinse empty bottles.

All of these compliance issues were resolved in collaboration with the operations manager.

It is important to note that each inspection team had a smartphone for filling checklists and sending them to the server in Bethesda; the feedback from the server was sent to the COP, Operation Manager, and ECO for corrective measures to be taken.

6.7 WASTE MANAGEMENT PLAN

At the end of 2015 campaign, all waste was collected and transported to the central warehouses at Segou and Koulikoro, which have 20-foot containers for waste from each district. Before storing, each empty OP bottle was rigorously washed with detergent and pierced at the bottom. From warehouses, bottles and others plastic waste will be transported to the recycling partner's site in Bamako.

Other wastes like contaminated masks and papers will be incinerated by trained operators at the AIRS Mali incinerator at Noumoubougou landfill. Recycling will be done by two local recycling partners. For empty OP bottles, it will be E.T.P sarl ALLAKABO, a factory specializing on making ducts. During the revision of this report, the bottle recycling company pulled out from the agreement due to strong smell of the bottles. AIRS Mali found another company called GIE Wassa, which agreed to do the work and meets required recycling standards and protocols. Final product from recycling the bottles will be cobbles used to build roads. SICMA PLAST will recycle tarpaulin sheets and gloves. The waste disposal is expected to be finished by December.

The detailed environmental monitoring and mitigation report on 2015 IRS is included in Annex F.

7. ENTOMOLOGY

This chapter provides a brief summary of entomological data collected pre-IRS campaign as baseline and one data point after completion of IRS campaign. A comprehensive entomological surveillance report will be submitted once the field work and laboratory analysis is completed.

7.1 ENTOMOLOGICAL SURVEILLANCE BASELINE

Entomological monitoring is essential in any vector control intervention such as IRS. It helps to assess the quality and efficacy of the vector control intervention. The entomological monitoring data are used to justify decisions such as selection of insecticide and timing and interval of IRS operation. AIRS Mali implemented entomology activities aimed at:

- Assessing malaria vector species, density, and parity rates in intervention and selected control areas
- Establishing vector feeding time and location
- Monitoring the quality of insecticide application and insecticide decay rates
- Assessing vector susceptibility to insecticides approved for IRS and mechanism of resistance

Vector Species Composition, Density, Feeding Time, and Location

AIRS Mali collected baseline data from five sentinel sites to assess vector species composition, density, and behavior using human landing collections (HLC), CDC light traps, and pyrethrum spray catches (PSC). In July, data were collected in Koulikoro (spray district) and Kati districts (control site), both of which are located in Koulikoro region. Data were collected at the same time in Baroueli (spray district), and Bla and Segou districts (controls) in Segou region. *An. gambiae* s.l. was the most prevalent vector species collected from all the sites surveyed. Vector density was calculated as the average number of *An. gambiae* s.l. collected per house per day from PSC data. During baseline monitoring, the results indicated 2.80 and 2.35 *An. gambiae* s.l. per house per day for Koulikoro and Baroueli intervention districts, respectively. Data from the three control villages showed 6.05, 1.30, and 1.75 *An. gambiae* s.l. per house per day for Kati, Ségou and Bla districts, respectively.

Feeding location: Data on human blood seeking rate or human biting rate (HBR) of *An. gambiae* s.l. were collected using HLCs and light traps before spraying was done:

- Using HLC, the HBR before the spraying was found to be 13.50 bites per person per night indoors and 15.50 bites per person per night outdoors in Koulikoro (spray district) and 9.50 bites per person per night indoors and 13.50 bites per person per night outdoors in Kati (control). The vector seemed to exhibit endophagic and exophagic tendency in the intervention and control sites. The same behavior was observed in Segou region. The human biting rate (HBR) was very low 0.50 per person per night indoors and 0.25 per person per night outdoors in Baroueli (spray district); the situation was the same in Segou (control) where 0.25 mosquitoes per person per night indoors and outdoors were collected at the baseline. The MBR was zero in Bla (control).

- Using light traps, the HBR before the spraying was 12.75 *An. gambiae* s.l. per trap night indoors and 3.00 per trap night outdoors in Koulikoro (IRS target area) and 1.75 per trap night indoors and 0.25 per trap night outdoors in Kati (control). *An. gambiae* s.l. was not found indoors and outdoors in Baroueli (IRS target area); the situation was same in Bla (control) but was low in Segou (control) where 0.25 mosquitoes per trap night indoors and outdoors were collected at the baseline. The vector seemed to exhibit endophagic tendency in the intervention and control sites.

In August, one month after spraying was completed, AIRS Mali collected entomological data from the five sentinel sites to assess the impact of IRS on vector species composition, density, parity, and behavior, again using HLC, CDC light traps, and PSC. *An. gambiae* s.l. was still the most prevalent vector species collected from all the sites. Vector density from PSC data was 2.90 and 0.75 *An. gambiae* s.l. per house per day for Koulikoro and Baroueli intervention districts, respectively. Data from the three control villages showed 13.75, 1.80, and 12.00 *An. gambiae* s.l. per house per day in Kati, Segou, and Bla districts, respectively. Vector density per house per day was found to be higher in Kati and Bla control sites one month after spraying than the IRS sites (Koulikoro and Baroueli).

Feeding location: one month after spraying:

- Data from HLCs indicated that the HBR was 27.25 and 14.00 bites per person per night of *An. gambiae* s.l. indoors and outdoors, respectively, in Koulikoro (IRS target area). We observed a one-time increase in indoor biting rate in this site as compared to the baseline. In Kati (control site), 66.50 bites per person per night indoors and 58.75 bites per person per night outdoors of *An. gambiae* s.l. were noted, which is six times increase in both indoor and outdoor biting as compared to the baseline. In the data collected one month after IRS, the *An. gambiae* s.l. HBR was zero in Baroueli (IRS target area). At the same time, 1.75 mosquito bites per person per night indoors and 0.25 mosquito bites per person per night outdoors were noted in Segou (control) and 2.5 mosquito bites per person per night indoors and 3.00 mosquito bites per person per night outdoors in Bla (control). No *An. gambiae* s.l. was found during the baseline data collection in these two sites. The increase in HBR was higher both indoors and outdoors in the control villages, one month after spraying compared to before spraying,
- Data from CDC light traps indicated in Koulikoro (IRS target area), *An. gambiae* s.l. collected was 10 and 4 per trap night indoors and outdoors, respectively, approximately same as baseline. In Kati (the control site), 16.50 per trap night indoors and 15.75 per trap night outdoors of *An. gambiae* s.l. were noted, which was at least 10 times increase over the baseline. No *An. gambiae* s.l. was collected from Baroueli (IRS target area) one month post spraying. At the same time, 0.50 mosquito bites per person per night indoors and 0 mosquito bites per person per night outdoors were noted in Segou (control) and 1 mosquito bite per person per night indoors and 1.50 mosquito bites per person per night outdoors were noted in Bla (control). The increase in vector density per trap night was higher both indoors and outdoors in the control villages than in the intervention villages one month post spraying as compared to before spraying. No change in vector feeding location was observed.

7.2 QUALITY CONTROL TESTING AND RESIDUAL EFFICACY MONITORING

Pirimiphos methyl (OP) was sprayed in Baroueli and Koulikoro districts. At the beginning of the IRS campaign, a quality control assessment was carried out at four sentinel sites (Tienfala and Souban in Koulikoro, Konobougou and Tigui in Baroueli). The assessment aimed to assess the quality and homogeneity of insecticide treatment. The *An. gambiae* strain Kisumu, reared at the AIRS Mali insectary and susceptible to all insecticides, were used for this activity. Bioassays were performed 24 hours after

IRS, following World Health Organization (WHO) procedures. Cone bioassays were conducted in 20 structures in the two districts (Table 12).

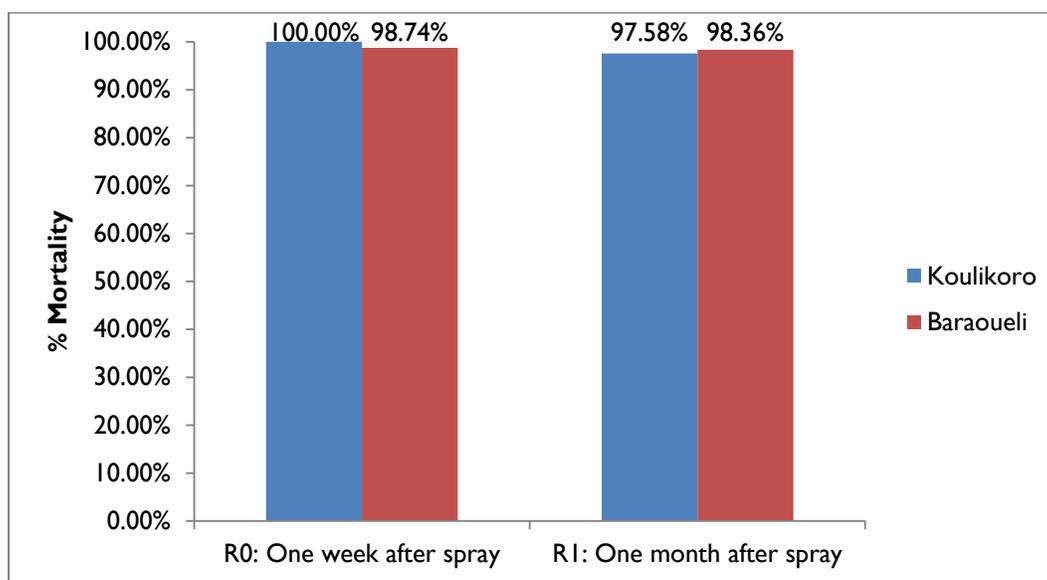
The quality assurance test results indicated good quality of spraying in Koulikoro district. However, it was lower than expected in Baroueli. There were no differences in the test mortality rates (99.07 percent to 99.53 percent) of mosquitoes exposed to the sprayed walls at three different heights (Table 13). This indicates that the spraying was homogeneous.

One month (at Round I=TI) after spraying, the test mortality rate was 97.58 percent in Koulikoro and 98.36 percent Baroueli (Figure 2).

TABLE 12: CONE BIOASSAY TEST SUMMARY RESULTS, TWO DISTRICTS

Cone Position	No. Structures	No. Mosquitoes	No. Mosquitoes Knocked Down 30 Min	% Knock Down 30 Min	No. Mosquitoes Dead after 24 Hrs.	% Observed Mortality
Top	20	215	65	30.23%	214	99.53%
Middle	20	215	55	25.58%	214	99.53%
Bottom	20	214	83	38.79%	212	99.07%
Total test	60	644	203	31.52%	640	99.38%

FIGURE 2: MORTALITY RESULTS OF AN. GAMBIAE KISUMU STRAIN AFTER 30-MINUTE EXPOSURE TO PIRIMIPHOS METHYL-SPRAYED WALLS



8. POST-SPRAY ACTIVITIES

The 2015 IRS campaign was completed on August 9, 2015. This chapter discusses activities implemented after the campaign was completed.

8.1 POST-SPRAY MEETINGS

In August, AIRS Mali staff held a review meeting in each spray district. The meetings were attended by community leaders: including the DTC, ASACO leaders, village chiefs, and representatives from community women's and youth associations, local NGOs, and mayors and prefets. Where possible, seasonal IRS campaign staff including SOPs, spray team leaders, district coordinators, and storekeepers, also attended the meeting. The meetings provided an opportunity for communities to assess the 2015 spray campaign and provide recommendations for improving IRS programming in 2016.

Overall, the communities covered by the spray campaign were appreciative. However, a few people reported that the insecticide was yellow in color, whereas it is usually white. Although effectiveness of the product remains, it leaves spots on the walls.

A meeting was held with community leaders in Bla District to explain why the IRS campaign did not cover Bla this year. The meeting was very welcomed. Leaders informed us that this year there were a lot of mosquitoes and cases of malaria have increased from last year. To support this anecdotal feedback, the team collected data from Touna, a Community Health Center in Bla as demonstrated in Table 13. In this health facility, it appears that the number of visits related to malaria increased by 44 percent as compared to 2014. However, further investigation would be needed to determine any direct association with the removal of IRS.

TABLE 13: HEALTH VISITS AND MALARIA CONFIRMED CASES, TOUNA COMMUNITY HEALTH CENTER, BLA DISTRICT

	August 1-30, 2014 (With IRS)	August 1-30, 2015 (Without IRS)
Medical visits related to malaria	451	651
Cases confirmed by the laboratory	99	329

NB: Touna health area was selected because the mayor of the community shared the feedback.

8.2 POST-SPRAY INVENTORY

Starting in August, all PPE and insecticide and other consumables left over from the 2015 IRS campaign were returned to the district warehouses, where the AIRS Mali logistics coordinator and district warehouse managers inventoried them. The results of the inventory are included in Annex A. Major statements regarding the current inventory follow:

- In 2015, AIRS Mali procured new coveralls, face shields, and brackets for face shields. Having these items improved the operational capability of SOPs during the spray campaign.
- Project motorbikes in Koulikoro District have been used for eight years and motorbikes in Baroueli have been used for four years.
- Spray pumps are showing significant wear and tear, and many need to be replaced.

- The Hudson spray pumps, most in use since 2008, need to be replaced.
- OP insecticides take up a lot of space due to packaging; both central warehouses (Koulikoro and Segou) need to be enlarged for next year's operations.

8.3 POST-SPRAY CAMPAIGN RADIO PROGRAMS

Two weeks after the end of IRS campaign, 12 radio broadcasts in Baroueli and Koulikoro districts offered short messages and programs that provided the following reinforcing information:

- The advantages and importance of sleeping in sprayed structures, to prevent malaria transmission
- The importance of continuing to use insecticide-treated bed nets even after the spraying
- Sprayed walls should not be painted or plastered until January, to allow the insecticide to remain effective against mosquitoes
- General information on malaria transmission, prevention, and treatment

9. CAPACITY-BUILDING ACTIVITIES

As in previous campaigns, AIRS Mali involved the NMCP and DNACPN at all stages of implementation, including planning, training, and supervision. The project successfully implemented the following activities as part of its 2015 capacity building:

- To engage central-level personnel in the different IRS components (IRS planning, environmental compliance, training, and implementation), a workshop was held on May 23-26 with two staff each from the NMCP, MOH, MOE, and DNACPN. The goals of the three-day workshop was to help build a knowledge base, share tools, and discuss options about IRS among these central-level personnel, so they can play a more active role in implementation.
- Updated consolidated supervisory forms were rolled out during the TOT in 2015, and AIRS wanted the district coordinators, district malaria focal points, and supervisors to play a more active role in ensuring the forms are filled out and used for decision making throughout the campaign. Therefore, these staffs were engaged in the management and implementation of the supervisory tools. They reviewed the forms on a daily/weekly basis to monitor their use and troubleshoot any issues.
- The project completed the District Mentorship Training Program for DTCs and trainees got involved in the micro planning and supervision of AIRS campaign.
- The activity to bring a government official as 'Acting Technical Manager' was revised. AIRS Mali brought on board district coordinators that were performing similar roles. Therefore, from the cost saving point, the project decided not to attract additional body(s).
- AIRS Mali also worked with the NMCP and MOH through a consultant to finalize the National IRS Strategic Plan, and provide technical guidance on plan content, lessons learned, and best practices. A final version of the Strategic Plan is translated in French and is currently with MOHCC and NMCP for the endorsement and implementation.

10. GENDER

After participating in the Kigali workshop on Gender in Rwanda, the AIRS Mali gender focal point developed an action plan to increase the number of women involved in the implementation of the 2015 IRS campaign. The gender activities conducted in 2015 were:

- Gender action plan was developed and presented to the project team, and the inputs implemented.
- Gender action plan was presented to the AIRS Steering Committee in Mali.
- Gender research protocol was presented to but rejected by the Ethics Committee of Mali.
- Gender action plan was presented at the TOT and during meetings with community leaders before the IRS campaign started.
- Recruitment of women to serve as seasonal staff was intensified during the 2015 campaign.

After all these activities, the project increased the number of women trained by 4 percent. Table 14 compares the numbers women trained in 2014 and 2015.

TABLE 14: STAFF TRAINED BY GENDER, 2014 VS 2015

Categories of Persons Trained	2014 (data from Baroueli & Koulikoro only)				2015			
	Male	Female	Total	Percent Female	Male	Female	Total	Percent Female
DTC	38	2	40	5%	37	4	41	10%
District coordinators	2	0	2	0%	2	0	2	0%
Spray Operators	311	6	317	2%	357	34	391	9%
Data clerks	6	8	14	57%	5	10	15	67%
Community supervisors	39	2	41	5%	40	1	41	3%
Team leaders	99	9	108	8%	97	12	109	11%
Washers	1	55	56	98%	0	70	70	100%
Logisticians	2	0	2	0%	2	0	2	0%
Secondary warehouse keepers	35	6	41	15%	33	8	41	20%
Central warehouse keepers	3	0	3	0%	3	0	3	0%
Doctors involved in the treatment of poisoning cases	37	4	41	9%	37	4	41	10%
Mobilizers	421	74	495	15%	376	78	454	17%
Entomology technicians	5	3	8	38%	10	5	15	33%
Guardians	41	0	41	0%	40	0	40	0%
Drivers (moto, minibus, pick-up)	93	0	93	0%	89	0	89	0%
Radio hosts	11	1	12	8%	16	0	16	0%
TOTAL M/F	1144	170	1314	13%	1144	226	1370	16.5%

The involvement of women in the IRS implementation is growing slowly but surely as community perceptions and attitudes change. Malian tradition and the weight of the pumps are mentioned as reasons for the non-involvement of women but careful observation shows that the reason is more economic – men prefer to keep this seasonal work for themselves in order to perpetuate women's financial dependence. Some nurses have set an example for women's participation by encouraging their female patients to work for AIRS; the wife of Koula's DTC is a team leader.

II. LESSONS LEARNED AND RECOMMENDATIONS

1. The electronic management system is a powerful tool that helps to avoid stock-outs, reduce counting errors, and provide real-time inventory information.
2. The using of *taxinis* reduced the cost of vehicles rental. AIRS Mali will continue expanding this means of transportation to further lower the cost of IRS.
3. Mobile payment of the seasonal employees is secure and cheaper than an older method of cash delivery to the districts by AIRS staff members.
4. If some members of communities did not receive messages about upcoming spraying (due to absence, as people are in their fields farming or otherwise not at home), it is best to resume door-to-door mobilization during the IRS campaign, to make sure households are sufficiently prepared for the campaign.
5. Replace at least 220 pumps and all motorcycles with new ones next year.
6. Purchase the mobile phones early on and make sure they work before training begins. This will be done only if additional mobile equipment is required.
7. Assign the management of the electronic warehouse inventory to the logistics officer instead of the M&E team. The team should support the logistics officer.
8. Send the Orange Money contract to the home office early on.
9. Overall, AIRS Mali will continue exploring opportunities for more cost-efficient ways to implement high quality IRS.

ANNEX A: 2015 POST-IRS INVENTORY

TABLE A-I: KOULIKORO DISTRICT INVENTORY

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
International Procurement					
Insecticide Organophosphates	0	28,691	28,691	23,225	5,466
Spray Pump Hudson	251	48	299	120	179
Spray Pump Goizper	05	00	05	00	05
Helmet	109	144	253	00	253
Red Bright Vest	40	00	40	00	40
Green Bright Vest	77	00	77	00	77
Gumboots	288	62	350	00	350
Coverall	71	684	755	00	755
Thermometer Simple /or Electronic	20	00	20	00	20
Gloves	160	1,008	1,168	844	324
Gloves for Incineration	02	00	02	01	01
Respirator Mask	9,000	8,760	17,760	9,720	8,040
Face shield	142	320	462	00	462
Support Face Shield	538	300	838	4	834
Spares Kit Hudson	21	00	21	00	21
Nozzle Tip Hardened Stainless Steel (65) 8002E Catalog	80	00	80	60	20
Nozzle Tip Hardened Stainless Steel (65) 8001E Catalog	138	00	138	00	138
Nozzle flow reg Assembly (61) Catalog/153-400E	13	00	13	04	09
Pump Filter Strainer (45)	37	201	238	31	207
Extension tube assembly only (54)	37	00	37	37	00
Nozzle flow regulator (64)	17	00	17	00	17
Cup leather only	11	550	561	231	330
Cup retainer (20D) (White)	85	00	85	85	00

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Plunger Adaptor (20C) (Black)	44	217	261	21	240
Pump Cylinder Assembly Completed for 3 & 4 Gallon (3 & 4 Gallon unit) Catalog (21)	62	00	62	5	57
Supply tube only Catalog (14) "resort de régulation"	29	00	28	01	28
Pressure Gauge with filter assembled (A)	19	00	19	07	12
Male fitting for strainer housing (43) Catalog	127	00	125	02	125
Valve /spray pump (red color)	00	268	268	236	32
Ring for valve	00	229	229	229	00
Nozzle (plastic) 8002 ^E (yellow color)	00	30	30	00	30
Kit (spare part Hudson) small size	00	20	20	05	15

Locally Procured Items

Steel Container	01	00	01	00	01
Solar Panel	0	00	00	00	00
Solar mobile lamp	03	12	15	03	12
Mobile soak pit	09	03	12	06	06
Spatula for coal load	14	00	14	00	14
Heavy battery for solar panel	0	00	00	00	00
Electric inverter	0	00	00	00	00
Ventilator /Wall	05	00	05	00	05
Bucket plastic 60/ 40/30 Liters	152	00	152	00	152
Bucket metal 10/15 liters	80	00	80	00	80
Bucket plastic /15-10-20 Liters	37	00	37	00	37
Hard plastic waste bin	36	00	36	00	36
Cup /metal /plastic 1 Liter	62	00	62	4	58
Wood seat	30	00	30	30	30
Scoreboard	20	00	20	00	20
Shovel with short handle	50	00	50	00	50
Fire extinguisher	24	00	24	00	24
Operator bag	08	271	279	114	165

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Monitor bag	01	05	06	00	06
Tent for mobile sites	18	29	47	00	47
Lifejacket	07	00	07	00	07
Tarpaulin simple	13	82	95		92
Tarpaulin for mobile soak pit floor	02	07	09	00	09
Raincoat	292	70	362	52	310
Head Lamp Operator	161	85	246	60	181
Lamp Guard	27	19	46	15	31
Whistle for Guard	22	10	32	4	28
Water Filter	226	00	226	45	181
Plastic Drum/160/200 Liters	235	00	235	65	170
Bar Angle	62	00	62	09	53
Fence	11	00	11	06	05
Metal String 1mm /Roll	07	00	07	05	02
Metal String 2.5mm/Roll	01	00	01	00	01
Pincer	03	00	03	01	02
Adjustable Wrench	04	00	04	00	04
Screw Driver	04	00	04	01	03
Binete	05	19	24	01	23
Tape 10m	03	05	08	00	08
Chair /Wood	04	02	06	00	06
Desk/Wood	01	00	01	00	01
Matt/Straw/Plastic	35	50	85	05	80
Flipchart	0	00	00	00	00
Empty Barrel/Metal 200 Liters.	01	00	01	00	01
Plastic Drum /20L	31	05	36	00	36
Houe	02	07	09	00	09
Mobile phone for supervisors	00	62	62	00	62
Portable phone charger	00	53	53	00	53
Plastic Operator Bag	383	00	383	03	380
Waste Plastic Bag	340	250	590	250	340
Plastic Roll	0	00	00	00	00

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Light Engine 1.20m source Generator	06	00	06	00	06
Ampoule 1.20m source generator	07	10	17	00	17
Light Engine 0.60m source generator	10	00	10	00	10
Ampoule 0.60m source generator	04	10	00	10	10
Light engine 0.60m source solar panel	0	00	00	00	00
Ampoule 0.60m source solar panel	0	00	00	00	00
Light engine Oval source solar panel	0	00	00	00	00
Ampoule oval source solar panel	0	00	00	00	00
Towel	146	324	470	470	00
Teflon	13	00	13	01	12
Sweeper Traditional	02	00	02	02	00
Sweeper Industrial	48	00	48	07	41
Local Procurement					
Stapler	38	00	38	02	36
Envelop A4	125	00	125	50	75
Glue Stick	29	00	29	03	26
Chrono Hard Folder	25	00	25	00	25
Folder Cartoon Simple	600	00	600	600	00
Archive box	21	00	21	00	21
Cover Cartoon	486	00	486	00	486
Flash drive	03	00	03	00	03
Ruler 1m	03	00	03	00	03
Ruler 30 Cm	33	00	33	03	30
Paper Driller	01	00	01	00	01
Pin Box of 45 Pins	98	00	98	15	83
Staples box "Agraphes"	117	00	117	27	90
Calculator	35	14	49	06	43
Copy book	0	00	00	00	00
Bloc Notes	13	00	13	13	00

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Book Register	13	20	33	22	11
Paper Ream A4	50	00	50	01	49
Sticker for Notes/"Paquet" of 100 Sheet	03	00	03	03	00
Permanent Marker	840	2000	2840	1730	1110
Pen Blue	241	1950	1950	1350	600
Pen Red	0	00	00	00	00
Plastic Folder With Cover	110	249	359	268	91
Fluid Corrector	03	00	03	01	02
Tape Transparent GF	08	36	44	25	19
Scotch en papier	00	12	12	07	05
CHEMICALS & ASSIMILATES					
Activated carbon	01	00	01	00	01
Pregnancy Test	44	45	94	59	30
First Aid Kit	02	60	62	45	17
Soap Piece	395	3456	3851	2795	1056
Soap Powder/Sachet	1332	15000	16332	13332	3000
Bleach/"Javel" 1L	16	72	88	50	38
Battery /R20	0	48	48	48	00
Battery AAA	824	432	1256	1185	71
Battery AA	1131	00	1131	171	960
Lubricant Box 1Kg	01	01	02	00	02
Distilled Water 1L	0	00	00	00	00
Glue Liquid Box 1Kg	02	00	02	00	02
Oil Motorbike/ quartz 5000 Total /Liter	05	12	17	17	00
Mixing Oil Motorbike 15W40 Shell/liter	10	60	70	70	00
MOTORBIKES & SPARE PARTS					
Motorbike with locker	05	00	05	00	05
Hemet Motorbike	05	00	05	00	05
Vilebrequin & Rod Assembly	06	00	06	02	04
Tyre Motorbike Front	07	00	07	02	05

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Tyre Motorbike Back	0	10	10	06	04
Tube Motorbike	0				
Tire	03	00	03	02	01
Segment YB100	05	00	05	01	04
“Disque” YB125	0	00	00	00	00
Odometer	0	00	00	00	00
Direction Light Single	04	00	00	00	04
Kit Motorbike “(Chain,petit pion, Grand Pion)”	0	00	00	00	00
Spares Trailer for Motorbike (roulement) YB100	05	00	05	02	03
Piston Motorbike YB100	0	03	03	02	01
Boogie YB100	03	10	13	08	05

TABLE A-2: BAROUELI DISTRICT INVENTORY

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
International Procurement					
Insecticide (Actellic 300cs)	9,942	25,596	35,538	35,247	291
Spray Pump Hudson	417	22	439		439
Spray Pump Goizper	10	0	10	0	10
Helmet	366	112	478	0	478
Red Bright Vest	84	0	84	0	84
Green Bright Vest	216	0	216	0	216
Gumboots	787	0	787	0	787
Coverall	170	671	841		841
Thermometer Simple /or Electronic	71	0	71		71
Gloves	287	360	641	506	141
Gloves for Incineration	0	0	0	0	0
Respirator Mask	14,860	10,200	25,060	10,780	14,280
Face shield	144	300	444	324	120
Support Face Shield	1,330	370	1,700		1,700
Spares Kit Hudson	65	0	65	0	65
Nozzle Tip Hardened Stainless Steel (65) 8002E Catalog	715	0	715	100	615
Nozzle Tip Hardened Stainless Steel (65) 8001E Catalog	12	0	12	0	12
Nozzle flow reg Assembly (61) Catalog/153-400E	601	0	601	130	471
Pump Filter Strainer (45)	583	0	583	70	513
Extension tube assembly only (54)	86	0	86	86	0
Nozzle flow regulator (64)	138	0	138	70	68
Cup leather only	561	0	561	330	231
Cup retainer (20D) (White)	429	0	429	80	349
Plunger Adaptor (20C) (Black)	49	0	49	5	44
Pump Cylinder Assembly Completed for 3 & 4 Gallon (3 &4 Gallon unit) Catalog (21)	88	0	88	88	0

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Supply tube only Catalog (14) "resort de régulation"	55	0	55	25	30
Pressure Gauge with filter assembled (A)	10	0	10	10	0
Male fitting for strainer housing (43) Catalog	177	0	177	31	146
Valve /spray pump (red color)	00	268	268	236	32
Ring for valve	00	229	229	229	00
Nozzle (plastic) 8002 ^E (yellow color)	00	30	30	00	30
Kit (spare part hudsonz) small size	00	20	20	05	15

Local Procurement

Steel Container	02	0	02	0	02
Solar Panel	04	04	8	0	08
Solar Mobile Lamp	0	14	14	0	14
Mobile soak pit	06	0	06	0	06
Spatula for Coal Load	0	0	0	0	0
Heavy battery for solar panel	5	4	9	0	9
Electric Inverter	1	1	2	1	1
Ventilator /Wall	11	0	11	02	09
Bucket Plastic 60/ 40/30 Liters	246	0	246	0	241
Bucket metal 10/15 liters	208	0	208	02	206
Bucket Plastic /15-10-20 Liters	29	0	29	0	29
Waste bin Hard plastic	76	0	76	0	76
Cup /metal /plastic 1 Liter	549	0	549		549
Wood seat	87	0	87	03	84
Scoreboard	50	0	50	02	48
Shovel with short handle	113	0	113	0	113
Fire extinguisher	63	0	63	0	63
Operator Bag	121	256	377	121	256
Monitor bag	10	05	15	6	9
Tent pour sites mobile	50	0	50	01	49
Life Jacket	08	0	08	0	08

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Tarpaulin Simple	227	0	227	05	153
Tarpaulin for soak pit mobile floor	10	0	10	0	10
Raincoat	601	80	681	05	667
Head Lamp Operator	485	72	557		532
Lamp Guard	47	10	57	16	41
Whistle for Guard	73	06	79	06	73
Water Filter	283	0	283	24	259
Plastic Drum/160/200 /55Liters	506	39	545	0	138
Bar Angle	19	0	19	12	07
Fence	03	0	03	0	03
Metal String 1mm /Roll	51	0	51	03	49
Metal String 2.5mm/Roll	0	0	0	0	0
Pincer	06	0	06	0	06
Adjustable Wrench	08	0	08	0	08
Screw Driver	17	0	17	0	17
Binete	12	07	19	0	19
Tape 10m	05	0	05	0	05
Chair	07	03	10	07	03
Desk/Wood/metal	04	0	04	0	04
Matt/Straw/Plastic	59	0	59	06	53
Flipchart	03	0	03		03
Empty Barrel/Metal 200 Liters.	04	05	09	0	09
Plastic Drum /20L	57	0	57	0	42
Plastic Operator	1083	0	1083	117	966
Waste Plastic Bag	76	0	76	0	76
Plastic Roll	0	0	0	0	0
Light Engine 1.20m source Generator	03	0	03	01	02
Ampoule 1.20m source generator	01	0	01	01	0
Light Engine 0.60m source generator	07	0	07	0	07
Ampoule 0.60m source generator	06	0	06	01	05

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Light engine 0.60m source generator	0	0	0	0	0
Ampoule 0.60m source solar panel	09	0	09	0	09
Light engine Oval source solar panel	0	0	0	0	0
Ampoule oval source generator	08	0	08	0	08
Towel	2099	336	2435	1715	720
Teflon	37	0	37	05	32
Sweeper Traditional	10	0	10	01	09
Sweeper Industrial	107	0	107	03	104
LOCAL OFFICE CONSUMABLES					
Stapler	60	0	60	0	56
Envelop A4	350	0	350	75	225
Glue Stick	55	0	55	0	55
Chrono Hard Folder	66	0	66	10	56
Folder Cartoon Simple	1004	0	1004	1004	0
Archive box	357	0	357	10	347
Cover Cartoon	0	0	0	0	0
Flash drive	05	0	05	0	05
Ruler 1m	03	0	03	0	03
Ruler 30 Cm	70	0	70	04	66
Paper Driller	02	0	02	0	02
Pin Box of 45 Pins	10	100	110	12	98
Staples box "Agraphes"	327	62	389	112	277
Calculator	80	13	93	0	93
Copy book	0	0	0	0	0
Bloc Notes	132	0	132	23	109
Book Register	15	23	38	28	10
Paper Ream A4	0	0	0	0	0
Sticker for Notes/"Paquet" of 100 Sheet	26	0	26	06	20
Permanent Marker	1954	2000	3954	1954	2000
Pen Blue	0	850	850	694	156

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Pen Red	193	0	193	0	193
Plastic Folder With Cover	53	313	366		
Fluid Corrector	17	0	17	10	07
Tape Transparent GF	34	30	64	22	42
CHEMICALS & ASSIMILATES					
Activated carbon	0	0	0	0	0
Pregnancy Test	84	62	146	74	72
First Aid Kit	84	60	144	64	80
Soap song	0	6336	6336	5664	672
Soap Powder/Sachet	5400	16850	22250	17100	5150
Bleach/"Javel" 1L	0	156	156	108	48
Battery /R20	0	48	48	48	0
Battery AAA	1226	1026	2252	2029	193
Battery AA	784	0	784	0	784
Lubricant Box 1Kg	0	0	0	0	0
Distilled Water 1L	0	0	0	0	0
Glue Liquid Box 1Kg	03	01	04	01	03
Oil Motorbike/quartz 5000 Total /Liter	27	25	52	37	15
Mixing Oil Motorbike 15W40 Shell/liter	181	0	181	41	140
MOTORBIKES & SPARE PARTS					
Motorbike with locker	10	0	10	0	10
Hemet Motorbike	10	0	10	0	10
Vilebrequin & Rod Assembly	08	0	08	0	08
Tyre Motorbike Front	10	0	10	01	09
Tyre Motorbike Back	0	0	0	0	0
Tube Motorbike	10	0	10	04	06
Wheel	01	0	01	0	01
Segment YB100	04	0	04	0	04
"Disque" YB125	03	0	03	03	0
Odometer	01	0	01	0	01
Direction Light Single	04	0	04	0	04

Item Description	Initial Stock Before IRS Campaign	Number of Item Procured	Stock Before Campaign	Consumed / Unusable Stock after IRS Campaign	Usable Stock Remaining for 2016
Kit Motorbike "(Chain,petit pion, Grand Pion)"	0	0	0	0	0
Kit Motorbike "(Chain,petit pion, Grand Pion)" YB125	0	0	0	0	0
Spares Trailer for Motorbike (roulement) YB100	03	0	03	02	01
Spares Trailer for Motorbike /pair (roulement) YB125	03	0	03	0	03
Piston Motorbike YB125	2	0	2	2	0
Piston Motorbike YB100	05	0	05	04	01
Boogie YB100	05	0	05	05	0
Boogie YB125	20	0	20	10	10

ANNEX B: IRS CAMPAIGN VEHICLE USAGE

TABLE B-1: KOULIKORO DISTRICT VEHICLE USAGE, IRS 2015

Koulikoro District					
Line	Operational Site	Taxini	Number of Teams (SOP-TL-Sup)	Minibus (Sits 12-18 people)	-Pick-up 4X4 Dble Cabin (1) -Pick-up 4x4 One Cabin (2)
1	CHOLA	02	07	0	
2	DOUMBA	02	07	0	
3	GOUNI	0	14	01	
4	KAMANI	0	07	01	
5	KENENKOUN	0	18	01	
6	MONZOMBALA	03	13	0	
7	KOULA	03	11	0	
8	KOULIKOROBA	04	15	0	
9	KOLEBOUGOU	0	16	01	
10	MASSALA	02	09	0	
11	NYAMINA	0	21	02	
12	SIRAKOROLA	0	21	02	
13	SIRAKOROBOUGOU	0	09	01	
14	SIZANI	02	07	0	
15	TAMANI	0	14	01	
16	TIENFALA	0	08	01	
17	TOMBOUGOU	04	09	0	
18	TOUGOUNI	0	14	01	
Total		22	220	12	3

3*

* 1 Dble Cabin Pick-up for District Coordinator and 2 One Cabin Pick-ups for logistics distribution.

TABLE B-2: BAROUELI DISTRICT VEHICLE USAGE, IRS 2015

Baroueli District					
Line	Operational Site	Taxini	Nbr of Team (Sop-TL-Sup)	Minibus (12-18 Sits)	Pick-up 4X4 Dble Cabin (1) Pick-up 4x4 One Cabin (2)
1	BANIDO	02	08	0	
2	BAROUELI CENTRAL	04	38	04	
3	BOIDIE	0	18	02	
4	DOTEMBOUGOU	01	08	0	
5	DIOFORONGO	01	04	0	
6	DOUGOUFE	0	10	01	
7	GOUENDO	0	13	01	
8	KALAKE	02	13	01	
9	KONOBOUGOU	02	36	03	
10	MOABOUGOU	02	12	0	
11	MPEBOUGOU	01	06	0	
12	NDJILLA	01	06	0	
13	NGASSOLA	02	08	0	
14	NIANZANA	0	14	02	3*
15	SANANDO	03	19	0	
16	SEQUELA	02	11	0	
17	SOMO	0	17	02	
18	GARNA	02	10	0	
19	TAMANI	0	14	01	
20	TESSERELA	03	14	0	
21	TIGUI	02	08	0	
22	YERBOUGOU	02	10	0	
23	WONDOBOUGOU	02	08	0	
Total		34	305	17	3

* 1 Dble Cabin Pick-up for District Coordinator and 2 One Cabin Pick-ups for logistics distribution.

ANNEX C: DESCRIPTION OF 2015 TRAININGS

Type of Training	From	To	No. of Trainings	Brief Description
IEC TOT	June 16	June 20	2 (one per district)	The trainings covered key messages for the IEC mobilizers to communicate before, during, and after the IRS campaign to prepare households for the IRS campaign, provide information on malaria prevention, and answer questions. The DTCs participated in many of these trainings, and were available to speak about the malaria outreach programming that the health centers provide.
IEC Mobilizers	June 21	June 24	36 (one two-day training at each site)	The training covered: <ul style="list-style-type: none"> • General information about malaria transmission, treatment, and prevention • Schedule and details of IRS campaign activities • Best practices and strategies for informing household members about the IRS campaign
ToT for Spray Campaign Operations	June 16	July 20	1	This was a refresher course since most of the district coordinators and DTCs had previous IRS experience.
Spray Operators	June 25	June 30	12 (six training sites in each district)	The training covered spray techniques and rinsing of spray pumps, scheduling and the methods for completing the 2015 IRS campaign with Malian government staff, and the correct ways for working with households, before, during, and after spraying. 425 people participated in the training; many of them had worked on past IRS campaigns. A post-test was provided at the end of the training, with the people that scored highest on the test becoming IRS campaign supervisors and team leaders. All participants received spray operations training, but only 391 participants became SOPs; the other 34 participants were selected for other positions within the spray campaign.
Orientation of Supervisors and Team Leaders	June 30	June 30	2 (one per district)	The session was led by the AIRS Mali team and focused on supervision tasks, strategies, and the responsibilities and tasks of the storekeepers.
Logistics	June 27	June 27	1	Secondary warehouse managers were trained on how to manage the stocks of materials and equipment at their disposal.
Washers	June 29	June 29	2	Washers were trained on best practices of

Type of Training	From	To	No. of Trainings	Brief Description
				washing and rinsing.
Store Security Guards	June 29	June 29	2	Guards were trained on their roles and responsibilities in monitoring stores.
Radio Hosts	June 17	June 17	1	Hosts of community radio stations were trained on the IEC messages to disseminate and on how to fill out the monitoring cards of broadcast messages.
District Training Teams	June 30	June 30	1	Teams composed of 3 local coordinators, 2 district supervisors, 3 logistics managers, and 3 central warehouse managers were oriented on their mission, tasks, and responsibilities.
Data Clerks	April 23	April 24	1	Data clerks gained familiarity with the IRS campaign data entry forms and the database used for uploading all IRS campaign data. Data clerks also practiced entering data.
Security Transportation Drivers	June 28	June 28	2	Drivers hired to transport IRS commodities and spray teams learned correct methods to secure and safely handle insecticides. Participants learned how to manage an insecticide spill and safely clean vehicles after each day of the IRS campaign.
Medical Staff who Manage Insecticide Intoxication Cases	June 11	June 11	2 (one per district)	The training went over the correct protocol and methods to use to treat SOPs should any be injured or fall sick from the IRS campaign. The DTCs were asked to present this information to the district health staff.
Entomology Technicians	June 15	June 15	1	Entomological technicians were trained in mosquito field collection practices, insectary maintenance, identifying mosquito breeding sites, larval and pupae collection, identification of Anopheles larvae from Culicidene, and managing HLCs.

ANNEX D: SUPERVISORY INSPECTION RESULTS

TABLE D-1: NUMBER OF INSPECTIONS/SITES

District	Number of Inspections/Number of Sites Concerned			
	Morning Mobilization	Homeowner Preparation and SOP Performance	Storekeeper Performance	End of Day Clean-up
Koulikoro	8/7	48/16	17/12	3/3
Baroueli	2/1	37/12	35/19	15/12
Total	10/8	85/28	52/32	18/15

TABLE D-2: GAPS IDENTIFIED DURING INSPECTIONS

Site	Inadequate Use of PPE or Missing PPE during Operations	Spill Kit and Response Procedures re Missing Elements	Pumps Leak
BAROUELI DISTRICT			
Banido			
Baroueli town	X	X	
Boidie			
Dioforongo			
Dougoufe			
Garna			
Gouendo			
Kalake	X		
Konobougou			
Moabougou			
M'pebougou			
N'djilla			
N'gassola			
Nianzana			
Sanando			
Seguela			
Somo			

Site	Inadequate Use of PPE or Missing PPE during Operations	Spill Kit and Response Procedures re Missing Elements	Pumps Leak
Tamani			
Tesserela	X		
Tigui			
Yerebougou			
Wondobougou			
KOULIKORO DISTRICT			
Chola		X	
Doumba			
Gouni			
Kamani			
Kenenkoun			
Kolebougou	X		
Koula		X	
Koulikoroba		X	X
Monzombala			
Nyamina			
Sirakorola			X
Sirakorobougou			X
Sizani			
Tamani			
Massala			
Tougouni	X		
Tienfala			
Tombougou			

ANNEX E: PSECA FINDING AND RECOMMENDATIONS

TABLE E-1: PSECA FINDINGS: BAROUELI DISTRICT

Site	Strengths	Areas for Improvement	Recommendations/ Repair Needed	Repair Deadline
Sanando	Double locks at the store level and washing area Soak pit well fenced Store in good condition Danger signs posted at the washing area and storeroom	Soak pit area covered by debris and grasses Cracks in the washing area	Clean the soak pit surrounding Repair the washing area	May 30
Dioforongo	Danger signs posted at the washing area and storeroom Soak pit well fenced Washing area in good condition and surrounding area clean	-	-	May 30
Tesserela	Danger signs posted at the washing area and storeroom	- Soak pit area covered by debris and grasses - Cracks in the washing area - Storeroom window in poor condition	Clean the washing area and its surroundings Repair washing area Repair storeroom window	May 30
N'Gassola	Danger signs posted at the washing area and storeroom Soak pit well fenced Double locks at the storeroom and washing area fence	Cracks in the wash area Soak pit area covered by debris and grasses	Repair the washhouse Clean the washing area	May 30
Moabougou	Danger signs posted at the washing area and storeroom Double locks at the store level and washing area	Cracks in the washing area Soak pit area covered by debris and grasses Soak pit fence fell down	Repair the washing area Repair soak pit fence	May 30
Banido	Soak pit in good condition and well fenced	No danger sign on the washing area fence Home constructed not far from the soak pit (about 10m) Washing area covered by debris Absence of padlocks at the soak pit fence	Double lock the soak pit fence Monitor the security of the washing area Post danger signs on the fence (done by the inspection team)	May 30

Site	Strengths	Areas for Improvement	Recommendations/ Repair Needed	Repair Deadline
Kalake	Danger signs posted at the washing area Soak pit well fenced	Soak pit area covered by debris and grasses Cracks in the washing area No storeroom for 2015 spray campaign (last one taken by owner)	Clean the washing area and its surroundings Repair the washing area Build/find new storeroom	May 30
NDjilla	Presence of danger signs at the washing area Clean washing area Soak pit well fenced and locked	Cracks in the washing area Storeroom roof in bad condition	Repair the wash house and the storeroom roof	May 30
Nianzana	Soak pit well fenced and locked Danger signs posted at the washing area and storeroom Soak pit in good condition	Cracks in the floor of the storeroom Soak pit surrounding area covered with debris	Repair storeroom floor Clean the soak pit surrounding area	May 30
Seguela	Danger signs posted at the washing area and the store Soak pit well fenced and locked Washing area clean	Collapse around soak pit	Repair the soak pit	May 30
Dougoufé	Danger signs posted at the washing area and the store Soak pit well fenced and locked Soak pit in good condition	Washing area covered by plant debris	Thoroughly clean the washing area	May 30
Somo	Danger signs posted at the washing area and the store Soak pit well fenced and locked Washing area is Clean	Cracks in the washing area and the storeroom floor	Repair the washing area and the storeroom floor	May 30
Garna	Danger signs posted at the washing area and the store Soak pit well fenced and locked Washing area in good condition	Cracks in the floor of the store Store roof in poor condition Storeroom door in poor condition	Repair storeroom floor and roof Repair store's door	May 30
Tamani	Danger signs posted at the washing area and the store Soak pit well fenced and locked Storeroom in a very good condition	Washing area in bad condition Plant debris in the soak pit area	Repair the washing area Clean the soak pit area	May 30
Boidie	Danger signs posted at the washing area and the store Soak pit well fenced and locked	No storeroom for the 2015 campaign (storeroom reclaimed by its owner) Cracks in the washing area Soak pit area covered by debris	Build a PID store (bricks already available at the site) Repair the washhouse Clean the washing area	May 30

Site	Strengths	Areas for Improvement	Recommendations/ Repair Needed	Repair Deadline
Dotembougou	Danger signs posted at the washing area and the store Soak pit well fenced and locked	Cracks oin the washing area Area covered by debris	Repair the washing area Clean soak pit area	May 30
Baroueli Central	Soak pit well fenced and locked	Cracks in the washing area Area covered by debris Absence of danger sign on soak pit fence	Repair the washing area Construct another soak pit Post danger signs on soak pit fence Clean the washing area and its surroundings	May 30
Wondobou gov	Soak pit well fenced and locked Danger signs posted at the washing area Soak pit in good condition Construction of a new storeroom by the community for IRS			May 30
Konobougou	Danger signs posted at the washing area and store Washing area clean Soak pit well fenced and locked	Cracks in the washing area	Repair the washing area	May 30
Tigui	Soak pit well fenced and locked Danger signs posted at the washing area and the store	Soak pit in bad condition Soak pit area covered by debris and grasses Cracks in storeroom floor	Repair the soak pit Clean the surroundings area of soak pit and washing area Repair shop floor	May 30
Yérébougou	Danger signs posted at the washing area and the store Soak pit well fenced and locked Soak pit area clean Storeroom in good condition	Cracks in the washing area and the storeroom floor	Repair the washing area and the storeroom floor	May 30
Gouendo	Danger signs posted at the washing area and the store Soak pit well fenced and locked	Soak pit area covered by debris and grasses Soak pit fence relaxed Cracks in the washing area Line for drying coveralls not well fixed Storeroom wall in bad condition	Repair the soak pit fence Repair the washing area Strengthen the drying line Repair the storeroom	May 30
MPébougou	Danger signs posted at the washing area and the store Washing area in good condition Construction of a new storeroom for the 2015 IRS	Soak pit fence collapsing	Repair the soak pit fence	May 30

TABLE E-2: PSECA FINDINGS: KOULIKORO DISTRICT

Sites	Strengths	Areas for Improvement	Recommendations/ Repair Needed	Repair Deadline
Tamani	Danger signs posted at the washing area Soak pit in good condition and well fenced Washing area clean Storeroom in very good condition and clean		-	May 30
Nyamina	Danger signs posted at the washing area Soak pit well fenced	No PID store for 2015 campaign (the 2014 was reclaimed by owner) Cracks in the washing area Soak pit area covered with grasses	Build a new storeroom (promised by the community) Repair the washing area Clean the washing area	May 30
Sirakorobougou	Danger signs posted at the washing area and the store Soak pit well fenced Washing area clean Washing area in good condition	A wall of the storeroom in bad condition	Plaster the store's wall	May 30
Tougouni	Danger signs posted at the washing area and storeroom Storeroom and washing area in good condition	Washing area covered with grasses The soak pit fence in bad condition	Clean the washing area Repair soak pit fence	May 30
Sirakorola	Danger signs posted at the washing area and storeroom Soak pit well fenced and surrounding area clean	Cracks in the washing area and the storeroom floor	Repair the washing area and storeroom floor	May 30
Tombougou	Danger signs posted at the washing area and store	Cracks in the washing area and the storeroom floor Soak pit surrounding area covered with grasses	Repair the washing area and storeroom floor Clean the washing area	May 30
Koula	Danger signs posted at the washing area and store Storeroom and soak pit in good condition	Washing area area covered with debris Soak pit fence in bad condition	Clean the washing area Repair soak pit fence	May 30

Sites	Strengths	Areas for Improvement	Recommendations/ Repair Needed	Repair Deadline
Chola	Danger signs posted at the washing area and storeroom Storeroom and soak pit in good condition Soak pit well fenced and surrounding area clean			May 30
Monzombala	Danger signs posted at the washing area and storeroom Storeroom in good condition	Soak pit fence in bad condition Cracks in the washing area	Repair the fence and the washing area	May 30
Doumba	Washing area in good condition Store in good condition	Soak pit area covered with grasses Soak pit fence in bad condition No danger sign on the soak pit fence	Repair the soak pit fence Clean the washing area Post danger sign on the soak pit fence	May 30
Sinzani	Danger signs posted at the washing area and storeroom Washing area's fence is in good condition	Cracks in the washing area and the storeroom's floor Soak pit area covered with grasses	Repair the washing area and store's floor Clean the washing area	May 30
Kamani	Washing area's fence is in good condition Store in good condition	Danger sign missing from the washing area's fence Cracks in the washing area	Post danger signs on the fence Repair the washing area Clean the washing area	May 30
Kénékoun	Danger signs posted at the washing area Soak pit well fenced Store in good condition	Cracks in the washing area Soak pit area covered with grasses	Repair the washhouse Clean the washing area	May 30
Gouni	Danger signs posted at the washing area and store Washing area in good condition	Cracks on the floor of the storeroom Soak pit surrounding area covered with grasses	Repair store's floor Clean soak pit surrounding	May 30
Kolébougou-Koulikoroba-Massala	Danger signs posted at the washing area and storeroom Washing area in good condition Store in good condition	Soak pit fence's door in bad condition Soak pit surrounding area covered with grasses	Repair the fence's door Clean the soak pit area	May 30
Tienfala	Danger signs posted at the washing area Washing area in good condition	Not yet a store for 2015 campaign Soak pit surrounding area covered with grasses Soak pit fence in bad condition	Find a new store for IRS Clean the soak pit area Repair soak pit fence	May 30

ANNEX F: ENVIRONMENTAL MONITORING AND MITIGATION REPORT

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
Ia. Pre-contract inspection and certification of vehicles used for pesticide or spray team transport.	Inspection of all vehicles involved in AIRS campaign (including <i>taxinis</i>) was completed, ECO certified 89 vehicles (required 85 for the campaign) that were compliant with the requirements	Some <i>taxinis</i> got replaced during campaign without certification by ECO	Let ECO know every new vehicle hired during campaign
Ib. Driver training.	Held two training sessions (one in Koulikoro and one in Baroueli districts) to prepare 91 drivers for the campaign.	Training certifications were not distributed to the drivers due to delay with production before the trainings occurred.	Prepare training certificates for 2016 campaign.
Ic. Cell phone, PPE, and spill kits on board during pesticide transportation.	All six pick-ups used for insecticides dispatching were provided with PPE, spill kits, and first aid kit	Drivers used their own cell phone.	
I d. Initial and 30-day pregnancy testing for female candidates for jobs with potential pesticide contact.	DTCs did the pregnancy test for all female candidates for SOP, team leader, local supervisor, storekeeper, and washer positions.	All test result has not been shared with ECO in time before the operations. The ECO received the results later in the campaign. Fortunately all tests were negative.	Sent every test result to ECO
Ie. Health fitness testing for all operators	Done for all SOPs, storekeepers and team leaders		
If. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact.	All seasonal workers, who might have potential pesticide contact were provided with adequate PPE and dressing demonstration during trainings	Regular supervision was conducted in the field to ensure compliance with the use of PPE	

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
1g. Training on mixing pesticides and the proper use and maintenance of spray pumps.	Training was completed. Four pump mechanics (2 in Koulikoro district and 2 in Baroueli district) were recruited for spray pump maintenance.		
1h. Provision of adequate facilities and supplies for end-of-day clean-up.	Washing areas have been repaired following the PSECA; detergents and soap were available for cleaning process		MSP teams have been provided with the same adequate facilities and supplies for end-of-day clean-up as the permanent soak pit.
1i. Enforce clean-up procedures.	Clean-up process was supervised by the teams leaders.	Storekeepers provided additional oversight for triple rinsing of OP bottles.	
2a. IEC campaigns to inform homeowners of responsibilities and precautions.	Used radio, local AIRS mobilizers and villages local mobilizers	Leaflets were distributed to households; content included IRS preparation procedures and homeowners' safety.	
2b. Prohibition of spraying houses that are not properly prepared.	All SOPs are prohibited from spraying an unprepared structure.	Team leaders supervised structure preparation and checked the status before spraying.	
2c. Two-hour exclusion from house after spraying	Homeowners were required to follow this instruction. Compliance with this regulation was confirmed by inspections.		
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside.	Awareness messages were delivered by SOPs and mobilizers		
3a. Indoor spraying only.	Training and supervision of SOPs were done by a team led by the project operations manager Inspections were done by inspection team led by ECO		
3b. Training on proper spray technique	Training and supervision of operators were done by a team led by the project operations manager. Inspections were done by inspection team led by ECO		In total 85 inspections were conducted and reported in the homeowners performance and SOP performance inspection forms.

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
3c. Maintenance of pumps	Four pump mechanics were recruited for the repair services during spray campaign.		
4a. Choose sites for disposal of liquid wastes according to PMI best management practices.	PSECA done and no adjustments were required for disposal of liquid waste.		
4b. Construct soak pits with charcoal to adsorb pesticide from rinse water.	Repaired all soak pit and washing areas following 2015 PSECA		Use activated charcoal for MSP and wood for fixed soak pit
4c. Maintain soak pits as necessary during season.	Inspections are conducted regularly to ensure the proper drainage and the good condition of soak pits		Supervisors were involved in the overseeing of soak pit conditions
4d. Inspection and certification of solid waste disposal sites before spray campaign.	Two inspection visits to the recycling factory and one visit to Noumoubougou landfill for AIRS incinerator's assessment were completed.		MOE representative is involved in this process
4e. Monitoring waste storage and management during campaign.	the waste was collected and stored at central warehouses in Koulikoro and Baroueli under supervision of store managers.		MOE representative is involved in this process
4f. Monitoring disposal procedures post-campaign.	According to the waste management plan, every step of waste disposal will be supervised by ECO or the operations manager.		MOE representative is involved in this process
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles.	Stock card and dispatch records for insecticides and empty bottles were checked regularly. In total, 52 forms for storekeepers performance filled during campaign inspection.	Logistics coordinators supervise each store at least once during campaign.	
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used.	Inspection checklists and data verification forms used by supervisors for that.		NMCP and DNACPN involved in this supervision
5c. Visual examination of houses sprayed to confirm pesticide application.	Done during inspection and supervision by a team led by project operations manager		

Mitigation Measure	Status of Mitigation Measures	Outstanding Issues Relating to Required Conditions	Remarks
5d. Perform physical inventory counts during the spray season.	Done during inspection and supervision by project operations manager		

ANNEX G: PMI AIRS MALI

M&E PLAN INDICATOR MATRIX

Updated: 04 September 2015

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component I: Establish cost-effective supply chain mechanisms and execute logistical plans								
I.1 Procurement								
1.1.1 Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	<i>Data source:</i> Project records – insecticide procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I; 100%	I; 100%		I; 100%	
1.1.2 Number and percentage of international insecticide procurements delivered in country, at port of entry, at least 30 days prior to the start of spray operations	<i>Data source:</i> Project records – international procurements <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I; 100%	I; 100%		I; 100%	
1.1.3 Number and percentage of international equipment procurements, including PPE, delivered in country, at port of entry, at least 30 days prior to start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	I; 100%	I; 100%	I; 100%		I; 100%	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
I.1.4 Number and percentage of local procurements for PPE delivered 14 days before the start of spray operations	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	1; 100%	1; 100%	1; 100%		1; 100%	
I.1.5 Successfully completed spray operations without an insecticide stock-out	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed		Completed	
I.2 In-Country Exemption and Custom Clearance Process								
I.2.1 Complete exemption and clearance process within the minimum 2 weeks	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed		Completed	
I.3 In-Country Logistics, Warehousing, and Training								
I.3.1 Number and percentage of logistics and warehouse managers trained in IRS supply chain management	<i>Data source:</i> Training records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign By Gender	5; 100% M=5 F=0	4; 80% M=4 F=0	TBD; 100%		TBD; 100%	
I.3.2 Number and percentage of base stores where physical inventories are verified by up-to-date stock records	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	41; 100%	41; 100%	TBD; 100%		TBD; 100%	
I.3.3 Submit up-to-date inventory records 30 days after the end of each spray campaign	<i>Data source:</i> Project records <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed		Completed	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
Component 2: Implement safe and high-quality IRS programs and provide operational management support								
2.1 Planning and Design of IRS Programs								
2.1.1 Annual PMI AIRS country work plan developed and submitted on time	<i>Data source:</i> Project records <i>Reporting frequency:</i> Annually	By Spray Campaign	Completed	Completed	Completed		Completed	
2.1.2 Percentage reduction in project operational expenses from the previous year, excluding insecticide costs.	<i>Data source:</i> Project financial records <i>Reporting frequency:</i> Annually	By Spray Campaign	5%	13% ³	5%		5%	
2.2 Support of Safety and Health Best Practices and Compliance with USAID and Host Country Environmental Regulations								
2.2.1 SEA/letter reports submitted on time based on schedule agreed upon with the-PMI COR team	<i>Data source:</i> Project records – submitted SEAs/ letter reports <i>Reporting frequency:</i> Each spray campaign	By Spray Campaign	Completed	Completed	Completed		Completed	
2.2.2 Number of spray personnel trained in environmental compliance and personal safety standards in IRS implementation	<i>Data source:</i> Project records – Training reports <i>Reporting frequency:</i> Each spray season	By Spray Campaign By Gender	728 584 (2 districts)	651 ⁴ M=527 F=124	TBD		TBD	

³ Cost comparison 2014 vs. 2015: the project-wide approach to calculating this indicator is comparing the ratio between Oracle charges for Operations code in two years and the number of structures sprayed in two years. The difference between the two ratios is considered as a percent saved. Insecticide and capital costs are excluded.

⁴ spray operators (391), team leaders (109), washer (70), storekeepers (41), Guard (40)

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.2.3 Number of health workers receiving insecticide poisoning case management training	Data source: Project records – Training reports Reporting frequency: Each spray season	By Spray Campaign By Gender	41	41	TBD		TBD	
2.2.4 Number of adverse reactions to pesticide exposure documented	Data source: Incident report forms Reporting frequency: Each spray campaign	By Spray Campaign By Residential/occupational exposure	0	0	0		0	
2.2.5 Number and percentage of soak pits and storehouses inspected and approved prior to spraying	Data source: Project records – Reports submitted by district environmental officers Reporting frequency: Each spray season	By Spray Campaign By Soak Pit By Storehouse	83; 100% 41 soak pits 42 store houses	84; 100% 41 soak pits 43 store houses	TBD; 100%		TBD; 100%	
2.3 Conduct Communications Activities and Community Mobilization								
2.3.1 Number of radio spots and talk shows aired	Data source: Project records Reporting frequency: Per spray campaign	By Spray Campaign	5,035	2,532	TBD		TBD	
2.3.2 Number of IRS print materials disseminated	Data source: Project records Reporting frequency: Semi-annually	By Spray Campaign By Type of printed material and message(s)	50,000	79,860 Caps=1,000 T-Shirt=1,000 IRS Card=67,860 Leaflet=10,000	TBD		TBD	

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
2.3.3. Number of people reached with IRS messages via door-to-door mobilization	Data source: Mobilization Data Collection Forms Reporting frequency: Daily per mobilization conducted	By Spray Campaign By Gender	NA ⁵	NA	TBD		TBD	
2.4 Spray Targeted Structures According to Technical Specifications								
2.4.1 Number of structures targeted for spraying	Data source: Previous spray campaign data, enumeration data (targets); Daily Spray Operator Forms (results) Reporting frequency: Daily per spray campaign	By Spray Campaign	135,717	135,971	TBD		TBD	
2.4.2 Number of structures sprayed with IRS	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	115,359	133,527	TBD		TBD	
2.4.3 Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per spray campaign	By Spray Campaign	85%	98.20%	85%		85%	
2.4.4 Number of people residing in structures sprayed (Number of people protected by IRS)	Data source: Daily Spray Operator Forms Reporting frequency: Daily per	By Spray Campaign By Gender	502,453 M=258,791 W= 243,662	494,205 M=251,863 W= 242,342	TBD		TBD	TBD

⁵ Door-to-door mobilization was not done this year. Instead, a mobilizer was sent only 10 days before spray and then accompanied spray teams to assist households in preparation and to sensitize them on post-spray steps.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
	spray campaign	By pregnant women By children <5 years old		13,219 87,861				
Component 3: Ongoing Monitoring and Evaluation and Quality Control Measures								
3.1 Submit PMI-approved M&E plan to PMI Mali for approval	Data source: Project records Reporting frequency: Semi-annual	By Spray Campaign	Completed	Completed	Completed		Completed	
3.2 Conduct a post-spray data quality audit within 60 days of completion of spray operations	Data source: Spray operations reports Reporting frequency: Per spray campaign	By Spray Campaign	N/A	N/A	Completed		Completed	
Component 4: Contribute to Global and Country-Level IRS Policy Setting and Develop and Disseminate Experiences and Best Practices								
4.1 Number of guidelines/checklists/tools related to IRS operations developed or refined with project support	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By Guideline/checklist/tool	6	5 ⁶	TBD		TBD	

⁶ IRS Card, Support 4, 5, 7 and 11

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
4.2 Number of articles/best practices documents published	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	2	1 ⁷	TBD		TBD	
4.3 Number of best practice presentations given at national/regional/international workshops and conferences	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign By IRS Technical Area	1	1 ⁸	TBD		TBD	
4.4 Number of enterprises engaged through public-private partnerships	Data source: Project records – Activity reports Reporting frequency: Semi-annually	By Spray Campaign	2	1 ⁹	TBD		TBD	

Component 5: Contribute to the collection and analysis of routine entomological and epidemiological data

5.1 Support entomological monitoring activities and insecticide resistance strategies

5.1.1 Number of entomological sentinel sites supported by the PMI AIRS Project established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	5	5	TBD		TBD	
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⁷ Article: Characterizing the insecticide resistance of *Anopheles gambiae* in Mali. Authors: Cisse Moussa, Keita Chitan, Dicko Abdourhamane, Dengela Dereje, Coleman Jane, Lucas Bradford, Mihigo Jules, Sadou Aboubacar, Belemvire Allison, George Kristen, Fornadel Christen, Beach Raymond, Journal: Malaria Journal

⁸ Presentation on use of taxinis in IRS to the local stakeholders.

⁹SICMA PLAST for disposal of the gloves and other plastic.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
time, and location)								
5.1.2 Number and percentage of entomological monitoring sentinel sites measuring all the five primary PMI entomological monitoring indicators	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	2; 40%	2; 40%	TBD		TBD	
5.1.3 Number and percentage of entomological monitoring sites measuring at least one secondary PMI indicator	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	4; 80%	5; 100%	TBD		TBD	
5.1.4 Number and percentage of insecticide resistance testing sites that tested at least one insecticide from each of the four classes of insecticides recommended for malaria vector control	Data source: Entomological reports Reporting frequency: Annually	By Spray Campaign	5 ¹⁰ ; 100%	4 ¹¹ ; 80%	TBD		TBD	

¹⁰ Spray sites: Koulikoro, Baroueli; Non-spray sites: Kati, Bla, and Segou

¹¹ Testing in the site of Segou was not done in the 2015 spray campaign

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
5.1.5 Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	10 ¹² wall bioassays	20 wall bioassays	TBD		TBD	
5.1.6 Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign	48 wall bioassays	14 wall for this month	TBD		TBD	
5.1.7 Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites*	Data source: Entomological reports Reporting frequency: Per spray campaign	By Spray Campaign By Type of Insecticide	12	6 ¹³	TBD		TBD	
5.2 Support Epidemiological Malaria Data Collection and Analysis								
5.2.1 Collect routine epidemiological data	Data source: <i>Project Reports</i> Reporting Frequency: Annually	By Spray Campaign	Complete	In progress ¹⁴	TBD		TBD	
5.2.2 Number of targeted health facilities with routine epidemiological malaria data collection supported by the PMI	Data source: Epidemiological reports Reporting frequency: Annually	By Spray Campaign	12 ¹⁵	In progress	TBD		TBD	

¹² Organochlorine: DDT; Pyrethroid: Lamdacyalothrine 0,05% et Deltamethrine 0,05%; Organophosphorine: Fenitrothion 1 %; Carbamate: Bendiocarb 0,1%

¹³ The six remaining tests will be completed in September 2015

¹⁴ The health facility data quality audits were performed in August and once the analysis is complete, the team will hopefully be able to begin epidemiological data collection with the health facilities who performed well.

¹⁵ This number is pending results from the Data Quality Audit that will be performed in June 2015.

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
AIRS Project								
Component 6 (cross-cutting): Capacity building, knowledge transfer, gender inclusion								
6.1 Increasing the Role of Women and Addressing Gender Barriers								
6.1.1 Number of people trained to deliver IRS in target districts *	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Spray Campaign By Gender Percentage of Women Trained	642 ¹⁶	582 ¹⁷ M=531 F= 51 9%	TBD		TBD	
6.1.2 Total number of people trained to support IRS in target districts	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Spray Campaign By Gender Percentage of	1,083	1,171 ¹⁸ M=1,015 F= 156 13,3%	TBD		TBD	

¹⁶ Spray operators (425), team leaders (135), supervisors (41), clinicians (41)

¹⁷ Spray operators (391), team leaders (109), supervisors (41), clinicians (41)

¹⁸ This number excludes washers (70), drivers (89) and security guards (40)

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
		women trained						
6.1.3 Number of women recruited for IRS employment	Data source: Project records – Recruitment reports reports Reporting frequency: Semi-annually	By Country By Percentage of women recruited	267	241	TBD		TBD	
6.1.4 Number of people trained as IRS Training of Trainers	Data source: Project records – Training reports Reporting frequency: Semi-annually	By Spray Campaign By Gender Percentage of women trained	41	41 M=37 F= 4 9,7%	TBD		TBD	
6.1.5 Total number of people hired to support IRS in target districts	Data source: Project records – Contracts signed Reporting frequency: <i>Semi-annually</i>	By Spray Campaign Gender Percentage of women hired	5	12	TBD		TBD	
6.1.6 Number of women hired in supervisory roles in target districts (includes site supervisors, team leaders, M&E assistants and others who supervise seasonal staff)	Data source: Project records – Contracts signed Reporting frequency: <i>Semi-annually</i>	By Spray Campaign Percentage of women hired	18 ¹⁹	17	TBD		TBD	
6.1.7 Number of staff (permanent and seasonal) who	Data source: Project records – Training reports	By Spray Campaign	2,066	1,370	TBD		TBD	

¹⁹ Team leaders (13) , Community supervisors (2) , Technical directors of community health center (2) , M&E assistants (1)

Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregate	Annual Targets and Results					
			Year 1		Year 2		Year 3	
			Target	Results	Target	Results	Target	Results
have completed gender awareness training	Reporting frequency: <i>Semi-annually</i>	Gender Percentage of women hired		M= 1144 F= 226 16,6%				
6.2 Capacity Building								
6.2.1 Number of government officials trained in IRS oversight	Data source: Project records – Training reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign By Gender Percentage of Women Trained	10	8 M= 7 F= 1 13%	TBD		TBD	
6.2.2 Implement all activities outlined in their yearly Capacity Building Action Plan	Data source: Project records – Capacity assessment reports Reporting frequency: <i>Semi-annually</i>	By Spray Campaign	Completed	Completed	Completed		Completed	
6.2.3 Mali government implements at least one aspect of the IRS program independently.	Data source: Project records – MOUs Reporting frequency: <i>Semi-annually</i>	By Spray Campaign	Completed	Not completed	TBD		TBD	