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

**2012 BURKINA FASO  
END OF SPRAY REPORT**

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END OF SPRAY REPORT**

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# ACRONYMS

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<b>AIS</b>	Health Outreach Agents
<b>AIRS</b>	Africa Indoor Residual Spraying
<b>BMP</b>	Best Management Practices
<b>CMA</b>	Centre Médical avec Antenne chirurgicale
<b>CSPS</b>	Centre de Santé et de Promotion Sociale/ Center for Health and Social Promotion
<b>DHMT</b>	District Health Management Team
<b>ECD</b>	Equipe Cadre du District/District Health Management Team (DHMT)
<b>ECO</b>	Environmental Compliance Officer
<b>GOBF</b>	Government of Burkina Faso
<b>ICP</b>	Health Post Chief Nurses
<b>IEC</b>	Information, Education, and Communication
<b>IRS</b>	Indoor Residual Spray (Pulvérisation Intra Domiciliaire)
<b>LLIN</b>	Long-Lasting Insecticidal Net
<b>LNSP</b>	Laboratoire Nationale de Santé Publique/National Laboratory for Public Health
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MEDD</b>	Ministère de l'Environnement et du Développement Durable/ Ministry of the Environment and Sustainable Development
<b>MOH</b>	Ministry of Health
<b>NMCP/PNLP</b>	National Malaria Control Program/Programme National de Lutte contre le Paludisme
<b>PMI</b>	President's Malaria Initiative
<b>PPE</b>	Personal Protective Equipment
<b>RBM</b>	Roll Back Malaria
<b>RTI</b>	Research Triangle International
<b>SEA</b>	Supplemental Environmental Assessment
<b>SESA</b>	Service de l'éducation sanitaire (Health Education and Sanitation Services)
<b>SIECA</b>	Service de l'Information, Education, Communication et Assainissement (Information and Education Communication and Sanitation Services)
<b>TOT</b>	Training of Trainers
<b>UNICEF</b>	United Nations Children's Fund
<b>USAID</b>	United States Agency for International Development
<b>USG</b>	United States Government
<b>WHO</b>	World Health Organization



# EXECUTIVE SUMMARY

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Under its IRS2 Task Order Four contract, Abt has assumed the role of lead implementing partner for the United States Agency for International Development (USAID) financed Indoor Residual Spraying project in Burkina Faso, and 13 other sub-Saharan countries. In November 2011, Abt established its project office in Ouagadougou and began planning and implementing the IRS program under the project name, Africa Indoor Residual Spraying (AIRS) Burkina Faso. The key objective of AIRS Burkina Faso in 2012 was to reduce malaria-associated morbidity and mortality in the district of Diebougou in the country's South West region, through indoor residual spraying in 35,000 eligible structures, thereby protecting as many individuals as possible in that district through blanket spraying.

In March 2012, Abt Associates conducted planning activities for implementation of the third and final year of US Government- funded IRS in Burkina Faso, including national level stakeholder meetings and visits at the regional and district level to inform local authorities about IRS start-up activities. In the same month, AIRS Burkina Faso developed the detailed implementation plan at the district level, in collaboration with PNLPH the regional health directorate, and the District Health Management Team (DHMT). This year's IRS campaign took place in the same district (Diebougou) as the first and second rounds. Seventeen sites corresponding to the locations of 17 health and social promotion centers (CSPS) in the five communes of Diebougou were organized for IRS activities. The DHMT, health post chief nurses (ICP), and health outreach agents (AIS) were all involved in the coordination, supervision, and monitoring of IRS campaign activities. A total of 176 spray operators, 44 team leaders and 289 IEC mobilizers were deployed in the 17 sites that conducted spray activities.

The 2012 spray campaign was carried out over the course of 21 days between July 13th and August 4th with the exceptions of Bapla, which started spray activities on the 14th, and Iolonioro which sprayed for 21 days but finished on August 5th due to rainfall.

AIRS Burkina Faso achieved the following results during the 2012 campaign:

- Trained 755 staff (83,8% men and 16,2% women), including 275 spray operators (99,3% men and 0,7% women)
- Sprayed 36,870 structures out of 37,126 structures found by spray operators, representing 99.3% coverage
- Protected 115,638 people from malaria transmission, including 2,188 pregnant women, and 23,118 children under 5 years of age.

Abt subcontracted IRSS/Centre Muraz to conduct routine entomological monitoring activities before, during and after the IRS campaign. From June to November 2012, IRSS/Centre Muraz carried out entomological activities including: 1) Identification of species, vector distribution, and seasonality of malaria vectors 2) Sporozoite rates 3) Vector susceptibility and mechanism of resistance 4) Quality assurance of IRS and 5) Vector feeding time and location.

Key lessons from the 2012 campaign include:

- The engagement of the CSPS staff in the identification and recruitment of IEC mobilizers facilitated the supervision of IEC activities by health center workers. Their close involvement was also useful to address several early implementation issues like a temporary soak pit filtration problem.
- Social mobilization is crucial for IRS operations and should involve all actors. A daily debriefing of supervisors helped improve the quality of spray operations through the application of recommendations made.

Close supervision of all IRS implementation areas was critical, particularly with respect to environmental compliance, spray performance, and insecticide tracking.

# I. COUNTRY BACKGROUND

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Although Burkina Faso is not a PMI focus country, it still benefits from USAID support to malaria programs, including IRS. In late 2009, USAID assisted the PNLP in identifying a suitable target area for an IRS pilot activity. The location chosen was Diébougou district, located in Bougouriba province in the South West region. Based on vector susceptibility assessments completed in 2009, Burkina Faso chose carbamates to begin their spray operations. Indoor Residual Spraying was introduced in 2010 with funding from USAID, and continued through 2011 through the incumbent implementing partner. During the 2010 spray round, 34,284 structures were found, out of which 33,897 were sprayed (98.9% coverage rate), protecting 118,691 persons including 24,587 children under five years old and 2,317 pregnant women. The 2011 spray round targets were the same as the previous year, resulting in 34,067 structures found, out of which 33,832 were sprayed (99.31% coverage rate), protecting 110,064 persons including 23,403 children under five years old and 1,967 pregnant women.

In August 2011, Abt Associates was awarded a three-year Africa-wide IRS project, funded by the President's Malaria Initiative. The objective of the project is to limit exposure to malaria and reduce incidence and prevalence of malaria in up to 17 countries in sub-Saharan Africa, including Burkina Faso. Malaria is a leading public health problem in Burkina Faso. Over 5.7 million cases of malaria and over nine thousand malaria-related deaths (*Annuaire statistique 2010*) were reported in 2010 among the population of approximately 15.7 million people (*Annuaire statistique de santé 2011*).

## I.1 OBJECTIVES FOR 2012 IRS CAMPAIGN

Under the supervision of USAID West Africa in Burkina Faso, and in collaboration with the Ministry of Health (MOH)/PNLP, the Regional Health Directorate and District Health Management Team (DHMT), and other Roll Back Malaria partners, the key objectives for Burkina Faso's 2012 IRS campaign as stated in the 2012 AIRS Burkina Faso work plan include the following:

- I. Build capacity at the national, district and local levels to manage IRS operations, including planning, spraying, resource allocation, and evaluation;
- II. Provide technical, strategic, managerial, and operational support to implement a successful IRS program in Diébougou;
- III. Reach up to 35,000 structures targeted for IRS, protecting 125,000 people from malaria.

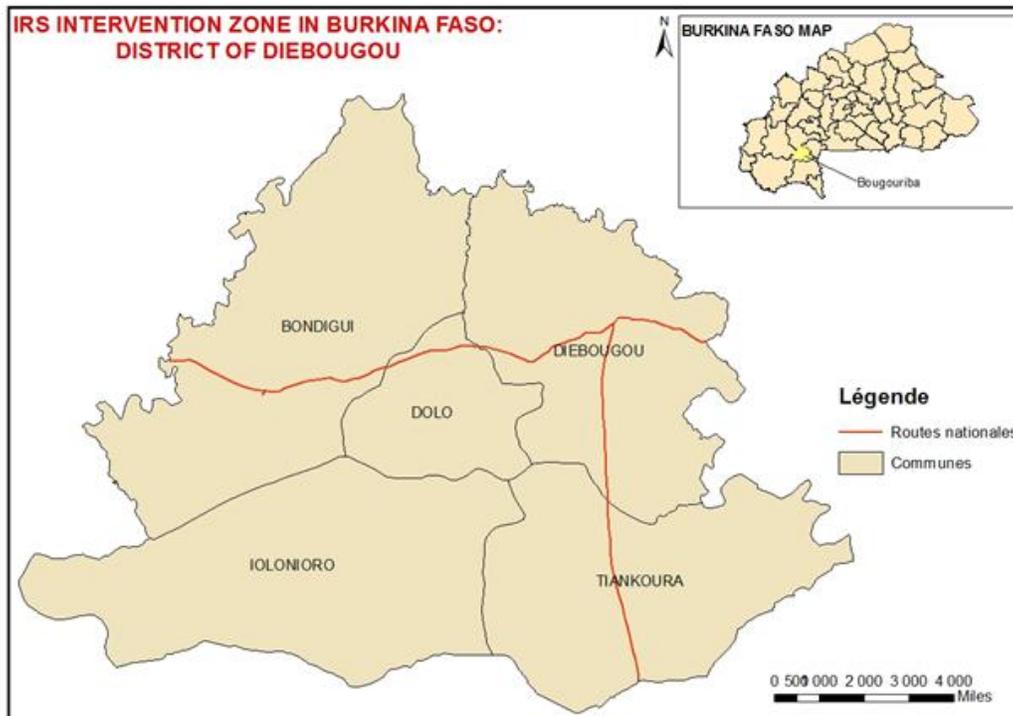
AIRS Burkina Faso provided support in all of the following areas:

- Planning of IRS activities at national and district levels
- Logistics and procurement, both international and local
- IRS implementation in the target district of Diébougou
- Community education (IEC/BCC) for IRS
- Environmental compliance
- Monitoring and evaluation
- Entomological monitoring
- Local capacity building (PNLP, etc.)
- Development of a national IRS training manual (Adaptation to Burkina Faso Guidelines)

## 1.2 DISTRICT SELECTION

During the first IRS round the district of Dieboukou in the province of Bougouriba (Figure 2 below) was selected for IRS implementation based on high malaria prevalence rates in the South West. In both 2011, and 2012, USAID provided funding to continue indoor residual spraying of the households in the same target area of Dieboukou District.

**FIGURE 1: IRS-TARGET DISTRICT MAP- DIEBOUGOU DISTRICT  
(REGIONAL HEALTH DIRECTORATE OF GAOUA)**



## 2. PREPARATION FOR IRS CAMPAIGN

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### 2.1 IRS CAMPAIGN PLANNING

#### 2.1.1 PLANNING AT THE NATIONAL LEVEL

A national planning workshop for this year's IRS campaign was held in March 2012. The workshop was carried out through a series of presentations and discussions. This workshop was attended by representatives from the following: WHO, UNICEF, USAID, Abt Associates, the National Public Health Laboratory (LNSP), Centre Muraz, South West Regional Health Director, Diébougou health district and PNL. The observations and recommendations that ensued from the workshop are summarized as follows:

- Reinforce the monitoring system put in place by the Diebougou DHMT.
- Take results and processes from previous campaigns into account in the development of IRS documents in Burkina Faso, especially training and IEC documents.
- Think about a funding strategy for IRS, and research other sources of funding in order to carry out IRS activities in the future.
- Provide evidence of the advantageous impact of IRS on the epidemiology of malaria in Burkina in order to convince donors to support the country on the development of a strategy.

As a result of the national planning workshop, the team produced a comprehensive calendar that took all aspects and actors of the campaign into account for a timely and successful implementation of the 2012 IRS campaign.

#### 2.1.2 MICRO-PLANNING AT THE DISTRICT LEVEL

In March 2012, AIRS Burkina Faso also held a workshop in the Diebougou health district with the goal of developing detailed plans for the implementation of IRS activities. Thirty four people coming from the health district, the national health directorate, the provincial environment and sustainable development Directorate, PNL, and Abt Associates participated in the event. The format of the workshop was also a combination of presentations and discussions.

Two new conclusions emerged from these discussions including: 1) the need to build CSPS sites in Werinkira and Saptan in order to reduce travel distances, ensure sustainability of activities and to provide more clarity on the role of the Health Post Chief Nurses (ICPs) and 2) the use of bicycles with baskets as a means of transportation for operators was widely supported.

The micro-planning workshop also yielded the following recommendations:

1. Inform actors at the peripheral level about campaign management procedures
2. Send supervision plan to the IRS coordinator at the district level as soon as possible. Plan should take villages and culture hamlets into account.
3. Make sure resources are available for snacks, before the start of each day
4. Do not use public « crieurs »
5. Observe Sundays as a rest day during the spray

6. Should no longer use “accoucheuses” as pump maintenance technicians, should use mechanic instead.
7. Support communal CSPS team to improve social mobilization
8. Procurement of 40 temporary fences (secco) to surround soak pits
9. Inform communities of the importance of IRS and the need to continue use of Long Lasting Impregnated Nets (LLINs) in addition to the IRS
10. Inform the community that IRS is financed by the government of the United States of America.
11. The rinsing of spray tanks should be done by the pump technicians.

### 2.1.3 OPERATIONAL PLANNING AT THE SITE LEVEL

Operational planning at the site level was conducted by the Spray Operations Coordinator and the project’s logistician with the support from Allan Were, Director of Operations for AIRS. It was thanks to Mr. Were’s support that the AIRS Burkina team was able to develop and properly implement a spray performance tracking sheet for all operational sites.

## 2.2 PRE-SPRAY ENVIRONMENTAL ASSESSMENT

### 2.2.1 GEOGRAPHIC RECONNAISSANCE

Geographic reconnaissance was conducted between March 13-14, 2012 in Diebougou covering all of the target sites. Site visits were conducted by PNLP, Abt and the District Health Management Team. This exercise was conducted to develop an inventory of facilities used throughout the campaign. The team visited 15 CSPS that host IRS facilities focusing on primary and secondary warehouses, as well as wash areas, soak pits, trails and individual structures.

### 2.2.2 PRE-SPRAY ENVIRONMENTAL INSPECTIONS

From June 7-9, 2012 AIRS Burkina Faso conducted the environmental pre-inspection of IRS sites in the Diebougou to gauge their level of preparedness for the campaign. Site visits were conducted by the PNLP, the Ministry of Environment and Sustainable Development (MEDD), Abt Associates, and the DHMT.

The result of the visits to the various areas was very similar to that of the geographical reconnaissance. There were still various upgrades and/or renovations necessary at the sites which is why we decided to carry these out two or three weeks before the beginning of the IRS campaign. During micro-planning at the district level, two new sites were added in order to mitigate the distances of the stores and the rinsing areas from the target spray areas.

#### a. Strength identified

The strengths identified during the pre-spray inspection include:

- Some of the sites are linked to Diebougou by paved roads therefore, this facilitates access to the concerned sites. It is the case of Loto, Bamako, Niceo, Bondigui, Bapla, Tiankoura and Tioyo;
- Most warehouses (windows, doors, roofs) were in good condition and available for the 2012 campaign;
- Most of the ICPs had already bought the fences to enclose their sites. That was the case for Diourao, Tioyo, Dankoblé, Loto, Bamako, Dolo, Nicéo and Iolonioro.

#### b. Areas for improvement

The following points were highlighted as areas needing improvement:

- Some of sites were linked to Diébougou through ways which are not easily accessible during the IRS campaign. Sites included Diourao, Dankoblé, Iolonioro, Dolo, Nabéré, Diassara and Nahirindon which are located far from Diébougou with very difficult roads, limiting access during the rainy season;
- Some warehouses did not have double locks. Others had iron bars to barricade the door or chain others were fitted with a padlock;
- Roofs in Diassara site had leaks;
- The warehouse windows did not have protective bars or screens to keep insects out;
- Warehouses and sites needed to be cleaned before the beginning of the IRS campaign;
- Soakpits from Bapla, Bondigui and Iolonioro had infiltration problems. The wash water was stagnant overnight;
- Most wash areas required small repairs because of small cracks. However those of Bapla and Iolonioro had to undergo more significant repairs as demonstrated in Figure 3 below.
- Many of the sites (15) were near (under 100 meters) health centers

**FIGURE 2: SELECT PICTURES OF WASH AREAS AND STORES NEEDING REPAIRS**



F2.a. Wash area in Bapla



F2. b. Cracks in in Dankoblé wash



F2.c. Polytank area in Iolonioro



F2.d. Wash area in Tiankoura



F2.e. Diassara Warehouse



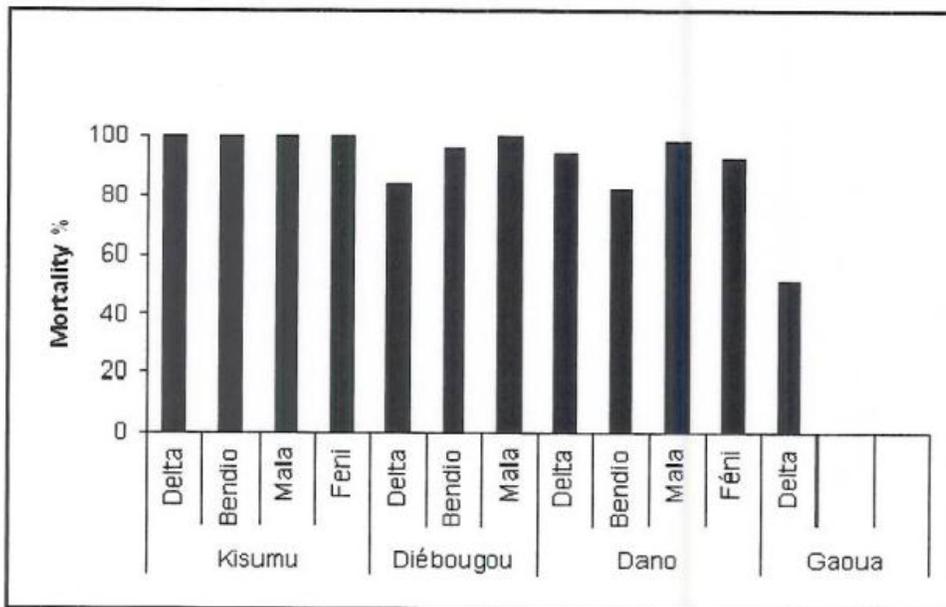
F2.f. Tiankoura Warehouse

## 2.3 CURRENT BURKINA FASO SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT (SEA)

The Supplemental Environmental Assessment was signed by the Bureau Environmental Officer, Global Health on January 27, 2010 covering implementation of IRS activities in the South West region of Burkina Faso initially targeting Bougouriba Province. The South West Region has four Provinces (Bougouriba, Ioba, Poni, and Nounbeï) which are covered by the SEA although the IRS activities are taking place in one province of Bougouriba covering Diebougou, Dolo, Iolonioro, Boundigui and Tiankoura. The approved SEA is at class level, covering all classes of insecticide except DDT. This gives flexibility for Burkina Faso in terms of insecticide selection and resistance management. The current SEA expires in 2015.

## 2.4 INSECTICIDE SELECTION

Results from 2011 entomological monitoring indicated continued susceptibility of the vector to bendiocarb, albeit with slight indications of developing resistance. Specifically, the results showed that mosquitoes were resistant to deltamethrin in Diebougou (84% mortality) but more or less susceptible to bendiocarb (96%) and malathion (100%). In Dano, resistance to deltamethrin and bendiocarb was recorded (94% and 82% respectively), and full susceptibility to malathion were observed (99%). The figure below shows that mortality of *Anopheles gambiae* after one-hour exposure to different insecticides impregnated in WHO tubes.



Source: Centre Muraz, IRSS, January 2011 Entomological Report

Based on these results, the MOH proposed to continue using carbamates (bendiocarb) for the 2012 spraying round. However, the entomological efficacy tests have shown that the residual effect of the bendiocarb does not last more than 4 months and in some areas of Burkina Faso it might not exceed 2-3 months. Therefore, in 2012, the spray campaign was delayed to start in July (as opposed to a June start date as in the first year) to ensure that the insecticide covered the peak transmission period.

The last Sahelian pesticide committee session was held June 4-8, 2012 in Burkina. During this session Ficam VC was granted temporary authorization for sale and use.

## 2.5 LOGISTICS PLANNING AND PROCUREMENT

### 2.5.1 PPE AND INSECTICIDE INVENTORY AND PROCUREMENT

The logistics needs assessment started with the development of the 2012 IRS work plan. Table I below shows the key commodities the project procured internationally and domestically for this spray round. As mentioned above, AIRS Burkina Faso, together with the PNL and the DHMT, decided to use 17 operational sites for this year's campaign. The central warehouse continued to be in Diebougou. All of the sites were located in the health center facilities at the CSPA level. Both the site stores and the central warehouse location were provided by communities at no cost, however, the project invested in several repairs and refurbishments to comply with warehousing standards.

Abt Headquarters in Bethesda carried out the procurement of insecticide, pumps, PPE and other materials and worked with the vendors and shipping agents to ensure timely delivery prior to the spraying activities. USAID and the U.S. Embassy assisted AIRS Burkina Faso with the customs clearance of insecticides, pumps, PPE and other materials.

**TABLE I: KEY INTERNATIONAL AND LOCAL PROCUREMENTS**

Items designation	Quantity
<b>International</b>	
Insecticide	22,560
Spray pumps	60
Nozzle Assembly 8002E (Tip T-Jet)	100
Nylon Filter	100
Shoulder Strap 2' Wide	50
Face shields	60
Face shields brackets	60
Gloves	200
Dust masks (carton of 50)	160
First aid kits	20
Coveralls (medium size)	25
Pregnancy test kits	50
Gum boots (size 11)	30
<b>Local</b>	
Bassin	14
Graduated bucket (15 liters)	60
Danger signs	17
Latex Gloves	150
Flash-light (torch)	70
Batteries for flash-light	2,600
Towel	200
Pen	1,500
Protective glass	60
IEC brochures	10,000
IRS Cards	25,000

The AIRS Burkina Faso team assessed the local procurement needs and proceeded with acquisitions. The selection of the suppliers was done through written quotation procedures per Abt and USAID policies as well as Burkina Faso’s commercial regulations. The best offers were selected for suppliers of vehicles, stationery, data forms, and other goods.

During the national level planning meeting on March 1 – 2, 2012, participants proposed to proceed with the use of bicycles for operators’ transportation in the field as it had been done in previous spray rounds. This means of transportation was optimal during the rainy season in places where vehicles couldn’t access spraying sites due to poor road conditions. The project gave operators a stipend for repair and maintenance of their personal bikes during the spray period.

## 2.5.2 ESTABLISHING LOGISTICAL NEEDS FOR 2012 IRS CAMPAIGN AND DEVELOPMENT OF NEW OPERATIONAL BASES

In June 2012, the AIRS Burkina Faso team worked with the Diebouyou DMHT to plan the logistics and transportation for implementation of the IRS campaign. Two specific issues that were addressed included:

- Identification of flood zones in order to avoid isolation challenges.
- Creation of two new sites to reduce distances from spray areas

The PPE and other materials were distributed 10 days before the beginning of the IRS campaign. As for the insecticide, it was distributed the day before. Table 2 shows the distribution of key items among the operational sites.

**TABLE 2: DISTRIBUTION OF KEY ITEMS TO OPERATIONAL SITES**

Sites	Overalls	Boots	Helmets	Pumps
Bamako	34	19	16	17
Bapla	34	19	16	17
Bondigui	56	31	26	27
Communal	68	38	31	32
Dankoblé	24	14	11	11
Diassara	46	26	21	22
Diourao	14	9	6	6
Dolo	24	14	11	12
Iolonioro	36	21	16	17
Loto	24	14	11	11
Naberé	24	14	11	11
Niceo	24	14	11	11
Tiankoura	34	19	16	17
Tioyo	14	9	6	7
Nahirindon	24	14	11	11
Saptan	14	9	6	6
Werinkera	24	14	11	11
<b>TOTAL</b>	<b>518</b>	<b>298</b>	<b>237</b>	<b>246</b>

## 2.6 HUMAN RESOURCES

The project recruited and employed 631 seasonal workers, 23% of whom were female. Workers were recruited between April and May 2012 and trainings began in June. Table 3 below summarizes the number of staff hired by site.

Forty-four team leaders coordinated and managed 176 spray operators during the IRS campaign. Eighteen IEC supervisors and 17 IRS supervisors ensured close supervision focusing on environmental, technical and data collection aspects. Eighteen storekeepers, 22 pump technicians, 22 washers, 17 security guards, 1 data clerk supervisor, and 6 data entry clerks supported the operations. One district coordinator managed IRS activities at the district level.

**TABLE 3: SEASONAL STAFF HIRED FOR THE 2012 IRS CAMPAIGN PER SITE**

Site	SOPs	Team leaders	IRS supervisors	IEC supervisors	Mobilizers	Washers	Store keepers	Pump techs	Security guards	Data clerks	Data clerk supervisors	Dst. Coord	TOTAL
Bamako	12	3	1	1	28	1	1	1	1				49
Bapla	12	3	1	1	24	1	1	1	1				45
Bondigui	20	5	1	1	31	2	1	2	1				64
Communal	24	6	1	2	47	3	2	3	1				89
Dankoblé	8	2	1	1	18	1	1	1	1				34
Diassara	16	4	1	1	21	2	1	2	1				49
Diourao	4	1	1	1	7	1	1	1	1				18
Dolo	8	2	1	1	10	1	1	1	1				26
Iolonioro	12	3	1	1	23	2	1	2	1				46
Loto	8	2	1	1	15	1	1	1	1				31
Naberé	8	2	1	1	9	1	1	1	1				25
Niceo	8	2	1	1	5	1	1	1	1				21
Tiankoura	12	3	1	1	20	1	1	1	1				41
Tioyo	4	1	1	1	8	1	1	1	1				19
Nahiredon	8	2	1	1	8	1	1	1	1				24
Saptan	4	1	1	1	7	1	1	1	1				18
Werinkera	8	2	1	1	8	1	1	1	1				24
<b>Total</b>	<b>176</b>	<b>44</b>	<b>17</b>	<b>18</b>	<b>289</b>	<b>22</b>	<b>18</b>	<b>22</b>	<b>17</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>631</b>

## 2.7 TRAININGS

### 2.7.1 TRAINING OF TRAINERS (TOT)

The four-day TOT took place in Diebougou on May 21-24, 2012 and was conducted by representatives from PNL, South West Regional Health Directorate, Regional Environmental and Sustainable Development, AIRS Burkina Faso, and the District Health Management Team. The training covered the essential preparatory activities needed to conduct safe and effective spraying, which included monitoring, management, procurement and logistics, security and environment, and pre- and post-campaign compliance. Twenty-nine participants completed the training.

### 2.7.2 TRAINING OF SPRAY OPERATORS (SOP)

The training of spray operators (n=275, ~84% male) was held in eight different locations simultaneously from June 21-24, 2012 and was conducted by supervisors (TOTs) that had been previously trained in IRS. The trainers were supported by staff from Abt, PNL, DHMT, and South West Regional Health Directorate. At each training center, there was IRS staff from two to three IRS sites for a total of 275 participants. Of the attendees, 176 were hired as spray operators and 44 as team leaders. The team leader selection was based on ability to carry out specific activities during the training, availability during the campaign, medical clearance and community reputation.

### 2.7.3 OTHER TRAININGS

Other IRS trainings held in Diebougou included trainings for 36 IEC supervisors and 290 mobilizers in April and July, respectively. The DHMT provided training on poison management for 18 health workers that came from Centre Medical avec Antenne Chirurgicale (CMA) and CSPA and 10 people from the DHMT on June 29, 2012. Additionally, 6 data clerks and 1 data supervisor were trained on June 27-28 and 11 security guards, 3 drivers and 22 washers were trained on July 5, 2012. Finally, 23 pump repairmen and 18 storekeepers were trained in separate sessions on July 6.

During the week of February 21, 2012, Abt Associates' home office conducted two separate trainings in Bamako, Mali: (1) Monitoring and Evaluation for the M&E and Operators Managers, and (2) Environmental Compliance (EC) for the EC Officers from the AIRS francophone countries. Finance and Administration Managers were trained in Dakar January 9-13, 2012, and in Bethesda April 13-16, 2012. Rose Tingueri, AIRS Burkina Faso M&E Manager attended the M&E Manager and Operation Manager training, and Laure Ouedraogo, AIRS Burkina Faso Environmental Compliance Officer attended the Environmental Compliance training in Bamako. Francis Niada, AIRS Burkina Faso Spray Operations Coordinator, attended both trainings held in Bamako.

**TABLE 4: SUMMARY OF TRAINERS AND PEOPLE TRAINED IN IRS BY ROLE<sup>1</sup>**

Categories of Persons Trained	Training on IRS Delivery										Others Trainings										Total	
	Training of trainers		Spray operators		Data capture/management		Logistics		Technical maintenance		BBC/IEC Mobilization		Poison management		washers		Security		Drivers			
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M		
CNSS														1								1
Data clerks					1	5																6
Data supervisor						1																1
DPEDD-BGB		1		1																		2
Drivers																					3	3
DRS/SO		2		1					1		1											5
DS/Diébouyou	1	6		5		1		1	1		4			10								29
Health workers													3	15								18
IEC supervisors											11	25										36
IRS Supervisors	2	15	1	15								2										35
Mobilizers											67	223										290
PNLP		1										2										3
Repaimen									23													23
Security guard																		11				11
Spray operators			1	207																		208
Storekeepers							13	5														18
Team leader				44																		44
Washers														22								22
<b>Total F/M</b>	<b>3</b>	<b>25</b>	<b>2</b>	<b>273</b>	<b>1</b>	<b>7</b>	<b>13</b>	<b>6</b>	<b>0</b>	<b>25</b>	<b>78</b>	<b>257</b>	<b>3</b>	<b>26</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>3</b>		<b>755</b>
<b>TOTAL</b>	<b>28</b>		<b>275</b>		<b>8</b>		<b>19</b>		<b>25</b>		<b>335</b>		<b>29</b>		<b>22</b>		<b>11</b>		<b>3</b>			

<sup>1</sup> CNSS: Caisse Nationale de Securite Sociale

DPEDD-BGB: Direction Provinciale de l'Environnement et du Développement Durable de la Bougouriba

DRS/SO: Direction Régionale de la Santé du Sud-Ouest

DS: District Sanitaire de Diebouyou

## 2.8 BCC/IEC MOBILIZATION

The AIRS Burkina Faso team worked in collaboration with the PNLP's communication unit, the Directorate of Public Hygiene and Health Education, the Health Education and Sanitation Services (SESA) at the regional level, and the Information and Education Communication and Sanitation Services (SIECA) at the district level to oversee the community sensitization and mobilization process. The project aligned the communication and mobilization activities with current IRS communication policies developed by the Government of Burkina Faso. The communications activities implemented by AIRS Burkina Faso are outlined in more detail in Table 6, but are also briefly noted here:

- A workshop/advocacy meeting to review all key messages and communication tools;
- Development of a micro program
- Magazine production and distribution
- Radio spots
- Radio broadcast of High Commissioner
- BCC/IEC door-to-door mobilization in all communes.

A BCC/IEC door-to-door mobilization campaign was conducted before and during spray operations. The campaign raised awareness of IRS as a malaria prevention strategy and increased the acceptance of spray in target communities. IRS messages disseminated during mobilization, including program beneficiary home-related responsibilities before, during and after the spray operations reduced the number of 'revisits' to homes due to unprepared structures for spray.s. Mobilizers visited 21,175 households, disseminating IRS messages to 49,990 persons (56.1% female.) IRS brochures were distributed only in Diebouyou because literacy rates are very low in the other target areas. Table 5 summarizes the results of the project's door-to-door mobilization activities by site.

**TABLE 5: SUMMARY OF DOOR-TO-DOOR MOBILIZATION ACTIVITIES BY SITE**

Communes /Sites	No. HH sensitized	No. HH not sensitized	Most common reason not sensitized	No. Adults Reached			BCC/IEC Materials Distributed
				Male	Female	Total	
<b>Bondigui</b>	<b>3421</b>	<b>2</b>	<b>Absent, Refusal</b>	<b>3994</b>	<b>5109</b>	<b>9103</b>	<b>0</b>
Bondigui	2097	0		2507	3201	5708	0
Nabere	658	0		810	988	1798	0
Nahirindon	666	2		677	920	1597	0
<b>Diebouyou</b>	<b>9919</b>	<b>50</b>	<b>Refusal</b>	<b>9583</b>	<b>11384</b>	<b>20965</b>	<b>2530</b>
Bamako	2752	2		2655	2960	5614	0
Bapla	1927	0		2440	2743	5183	0
Communal	3052	48		2465	3268	5732	2530
Dankoble	1143	0		1427	1532	2959	0
Loto	1045	0		596	881	1477	0
<b>Dolo</b>	<b>1618</b>	<b>0</b>	<b>Absent, Refusal</b>	<b>1884</b>	<b>2628</b>	<b>4511</b>	<b>0</b>
Dolo	759	0		629	907	1536	0
Niceo	612	0		1054	1399	2452	0
Saptan	247	0		201	322	523	0

Communes /Sites	No. HH sensitized	No. HH not sensitized	Most common reason not sensitized	No. Adults Reached			BCC/IEC Materials Distributed
				Male	Female	Total	
<b>Iolonioro</b>	<b>3947</b>	<b>1</b>	<b>Absent</b>	<b>3857</b>	<b>5027</b>	<b>8883</b>	<b>0</b>
Diassara	1625	1		1420	1783	3202	0
Iolonioro	1389	0		1400	1956	3356	0
Werinkera	933	0		1037	1288	2325	0
<b>Tiankoura</b>	<b>2270</b>	<b>4</b>	<b>Absent</b>	<b>2657</b>	<b>3873</b>	<b>6528</b>	<b>0</b>
Diourao	462	0		524	800	1324	0
Tiankoura	1232	4		1331	1894	3223	0
Tioyo	576	0		802	1179	1981	0
Total	21175	57		21975	28021	49990	2530

More than 99% of structures sensitized during mobilization accepted IRS. However, the most common reason a structure was not sensitized was due to refusals among households (<1%), specifically from those living in urban settings. City residents complained that the trouble they undertake moving household items outside of the home before spraying, outweighs the benefits they see from having their homes sprayed.

### 2.8.1 IRS CAMPAIGN COMMUNICATION MATERIALS

The communication materials disseminated during the campaign were the standard 2012 IRS Cards that note the structure serial number, household name, date of mobilization and spray, and IRS educational brochures. The AIRS Burkina Faso team printed 25,000 cards, and distributed them to the 21,175 sensitized households; 2,530 brochures were distributed to households living in Diébougou City.

### 2.8.2 IRS CAMPAIGN COMMUNICATION ACTIVITIES

- At the national level, the project worked with the PNL and other local stakeholders to promote wider acceptance of IRS as one of the core methods of malaria control and to advocate for improved IRS programming and funding.
- In collaboration with DHMT, Abt subcontracted with a local radio station in Diébougou for the broadcasting of IRS messages that were transmitted through radio programs and sensitization spots in Lobiri, Dioula, Fulfuldé and Mooré. Mobilizers disseminated 2,530 IRS brochures and the IRS Card to households during the mobilization
- The community education campaign engaged community leaders and stakeholders to inform beneficiaries of:
  - the positive benefits of IRS in controlling and preventing malaria;
  - and their responsibilities before, during and after spray operations;
  - the myths about the harmful environmental and health effects of using the the insecticides, and the misconceptions about malaria and the IRS program.

**TABLE 6: SUMMARY OF COMMUNICATION ACTIVITIES**

<b>Activity</b>	<b>Frequency</b>	<b>Comments</b>
Advocacy meeting	1	Participation of regional and provincial authorities from PNLP to discuss regional environmental and sustainable development
Development of micro program	4	Program made in French, Dagara, Djan, Dioula to inform people about IRS activities and how they should prepare their homes for spraying
Production of magazines	2	Made in French and Dioula for Diebougou district to explain the details of IRS (i.e. advantages, program goals, implementation, etc.)
Broadcasts of each magazine	80	2 broadcasts in each language each day for 40 days
Radio spots	500	100 spots in each language (French, Djan, Lobiri, Dioula and Dagara)
Broadcast of High Commissioner	6	The High Commissioner is the first authority of the Province. He was invited by the District team leader and IRS District Coordinator to speak to the population about IRS.. Through radio UNITAS, he provided background on IRS (i.e. safety, effectiveness, etc.) and urged communities to accept IRS by preparing and cooperating with the campaigns.



### 3. IMPLEMENTATION OF IRS ACTIVITIES

The 2012 spray campaign was carried out over the course of 21 days between July 13th and August 4th with the exceptions of Bapla which started spray activities on the 14th, and Iolonioro which sprayed for 21 days but finished on August 5th due to rainfall.

Seventeen sites were sprayed by 176 operators. In teams of five, the operators went to spray the villages using their own bicycles except in Sikongo and Koyanbaré, where the operators were dropped-off by the supervisors' car. SOPs departed at 6 AM after having breakfast and returned after 6 hours of work. When they began to spray in a village, they finished spraying the mobilized structures before going into another village. The second and third Sundays of the month were rest days.

Spray operators applied best practices for IRS given that they were both experienced and well trained, just like their supervisors. AIRS Burkina Faso was also very diligent in its supervision of spray operations. The use of a spray performance sheet in every store was one of the innovations in this campaign. It helped with the tracking of insecticide use as well as overall spray progress and performance of spray teams. There were no interruptions due to rains except in Iolonioro which lost only one planned day of spraying. Overall, the population was very receptive to the operators and allowed them in their homes. Beneficiaries also appreciated the quality of the spraying.

The project encountered some difficulties with water supply at Diassara, Bondigui and Dankoblé due to the breakdown of pumps, but solutions were put in place in a timely fashion. During the first week, these sites were supplied with water by Diebouyou supervisors but they were subsequently supplied by community individuals who were paid for their services.

**TABLE 7: SPRAY IMPLEMENTATION BY SITE**

S/No	Sites	No. of SOPs	Start Date	End Date
1	Bamako	12	7/13	8/4
2	Bapla	12	7/14	8/4
3	Bondigui	20	7/13	8/4
4	Communal	24	7/13	8/4
5	Dankoblé	8	7/13	8/4
6	Diassara	16	7/13	8/4
7	Diourao	4	7/13	8/4
8	Dolo	8	7/13	8/4
9	Iolonioro	12	7/13	8/5
10	Loto	8	7/13	8/4
11	Naberé	8	7/13	8/4
12	Niceo	8	7/13	8/4
13	Tiankoura	12	7/13	8/4
14	Tioyo	4	7/13	8/4
15	Nahiredon	8	7/13	8/4
16	Saptan	4	7/13	7/25
17	Werinkera	8	7/13	8/4
	<b>TOTAL</b>	<b>176</b>		

### 3.1 MONITORING AND SUPERVISION

Supervision lasted 21 days from July 13th to August 4th according to both the spray calendar and the supervision plan with the only exception of Iolonioro which ended on the 5th for the reasons mentioned above. Spray operations were supervised by six AIRS Burkina Faso staff members, six personnel from the DHMT, one person from the Regional health Directorate, one person from the Environment Directorate, and three people from PNL. Of the PNL representatives, two people participated from the beginning of the campaign for ten days, and a third person replaced them for the supervision of the following ten days. We can therefore say that the PNL supervised the campaign for duration of 20 days. Their participation in the beginning of the campaign was very important in that it increased the AIRS Burkina Faso team's ability to quickly resolve technical, logistical and/or environmental issues that arose on the ground.

The Bethesda-based Operations Director, Allan Were, also provided remote assistance and support to the supervision team.

In addition, USAID officials monitored spray operations for six days. Contributions from the USAID representative were extremely valuable, as they identified several areas that needed improvement, particularly with respect to environmental compliance.

In the field, the six supervision teams used a supervision checklist to identify spraying strengths and weaknesses. The supervisors also reviewed the spray performance sheet placed in stores to keep a good average with respect to insecticide usage rate and average number of structures sprayed per day in all sites. Supervisors met the operators and their direct supervisors to solve any issues they identified. In addition, they held a daily debriefing between the AIRS Burkina supervisors, PNL, and all other supervision team members in order to ensure best spraying practices were being used.

For the purposes of monitoring, the database and the spray performance tracking sheet helped the team track daily and weekly progress on coverage rates by site. Three weekly M&E reports were developed and sent to Abt Associate's Headquarters and USAID. The information obtained from the monitoring and the supervision showed that all sites finished spraying on schedule.

The only supervision challenge that was encountered was the inaccessibility of several remote villages including Sikongo, Koyanbre, and Nahirindon. Unfortunately, road conditions to these villages jeopardized supervision visits. When traveling to Koyanbaré and Sikongo the supervisors' cars got stuck in the mud. At Nahirindon, the Bougouriba river flowed over the bridge where the supervisors had to pass so they were forced to go to Bobo Dioulasso in order to reach Nahirindon site.

### 3.2 LOGISTICS, TRANSPORT AND WAREHOUSING

In June 2012, the project shipped local procurements to the central warehouse in Diébougou and dispatched all commodities to the 17 sites store ten days before the start of operations. The insecticide was delivered to Burkina Faso on July 10, 2012 and shipped to Diébougou the same day. The delay in the delivery of insecticide was related to difficulties getting the importation authorization letter from the host Government. Unfortunately, the project received one international procurement shipment (including pumps, PPE and others spray operations materials) on July 18th 2012, a week after the launch of spray operations. These items were transported to Diebougou on July 19th 2012.

The project used a delivery note for the delivery of items from one place to another in order to track distribution during spray operations. Then each receiver had to return a signed copy of the delivery note to the place where it was originally issued as proof of delivery. Quantities of items received were entered in the store master ledger. Stock cards were used for recording and managing each item in the warehouse and the 17 site stores. At the stores, issues and receipts of items were recorded on the card with details of transactions and quantities involved. Insecticide stock cards in every storeroom were closely monitored. Storekeepers updated the cards daily with the movement of stock in or out of the

storage facility, and conducted routine physical stock counts to ensure that the actual stock matched the stock card record.

In the site stores, insecticide sachets were only issued to team leaders who filled and signed the daily insecticide tracking sheet. The store keeper would immediately enter this in the stock card to obtain the stock balance record. At the end of each spray day, spray operators turned in their used and unused sachets to the team leader who collated and submitted them to a store keeper who then entered them on the daily insecticide tracking sheet and signed together with the team leader. The store keeper recorded the full sachets on the stock card as a positive adjustment, updated the stock balance, and returned the unused sachets to the full stock. The used/empty sachets were recorded on the daily utilization record form that tracked each store's empty sachets and utilization trends. Storekeepers were instructed to pack empty insecticide sachets in bundles of 30 to facilitate counting and storage. This reconciliation process enabled the store keepers to ensure a valid daily inventory and to alert AIRS program staff of discrepancies between the stock and the records.

With respect to stocks replenishment, storekeepers had to complete a requisition note which was sent to the central warehouse. Three pick-up vehicles (among the supervision vehicles) were used for site store replenishment.

The AIRS Burkina Faso Logistics and Procurement Coordinator collected comprehensive aggregated insecticide utilization data and replacement needs on a weekly basis. This procedure helped with planning of insecticide distribution, and provided the inventory status in order to alert the program as needed about any possible insecticide stock-outs.

Some difficulties with spray pumps were observed, including leakage problems. Most of pumps that were leaking were repaired on site. Those broken pumps that could not be repaired on site were transported to Diébougou for repair or replacement.

### 3.3 MID-SPRAY ENVIRONMENTAL INSPECTION

The mid-spray environmental inspection was conducted from July 17th to 20th 2012 by one PNLN representative, representatives from the Ministry of the Environment and Sustainable Development and the Diébougou DHMT. According to the environmental issues (breakdown of incinerator, soak pit infiltration, store management) identified since the early days of the campaign, the Environmental Compliance Officer (ECO) was committed during this period to solve these aspects.

The purpose of this mission was to ascertain that best practices were being respected by all IRS staff (managers, storekeepers, spray operators, washers and maintenance technicians) during the handling, storage, transport and spraying, and that safety was assured for IRS beneficiaries.

The environmental assessment focused on the following items:

- Warehouses' storage;
- Safety of the female spray operators;
- Overseeing spray operators on the site;
- Getting houses ready before the beginning of operations;
- Getting spray pumps ready;
- Spray Operations;
- Houses after the spray operations;
- Wash area (progressive rinsing, fences, soak pits, washing of the PPE and waste disposal);
- Pesticide exposure and behavior to be conducted during and post spray.

The following recommendations were made:

- Remind team leaders and spray operators of the pressurization technique;
- Place danger signs at the disposal of the sites that had not received enough;
- Improve the organization of progressive rinsing and ensure that pump technicians and washers are present prior to the arrival of spray operators;
- Remind the storekeepers of need to wear PPE;
- Make first aid kits available to the warehouse;
- Remind IRS personnel how to handle insecticide carefully;
- Post signs on FICAM poisoning and emergency first aid in case of poisoning

# 4. MONITORING AND EVALUATION OF 2012 IRS CAMPAIGN

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## **Key Objectives**

The AIRS Burkina M&E System was developed and implemented to:

- Emphasize accuracy of the data collection and data entry process through comprehensive trainings and supervision at all levels.
- Ensure IRS data security and storage for future reference through establishment and enforcement of proper protocols.
- Streamline and standardize data flow to minimize errors and facilitate timely reporting.

## **Data Flow and Management**

Data were collected and recorded on the mobilization form during community mobilization and on the daily spray operator form during the spray campaign. To identify and address any errors and to ensure the quality of the data, each mobilization form was verified by an IEC supervisor, and each daily spray operator form was verified by a team leader and an IRS supervisor.

The data collection procedures closely followed the process described in the country work plan. The Burkina Faso team employed six data clerks to enter data at the data center in Diebouyou district. The project procured six laptops and installed microsoft access on each of them. All spray operators, mobilizers, and team leaders were assigned user IDs/codes and were imported into the database with corresponding staff names.

All paper forms were sorted by target area and spray date and filed in cabinets at the data entry center. Each paper form has an electronic copy in the database.

## **Data Quality Control/Quality Assessment**

Before the mobilization and spray campaigns began, mobilizers, spray operators, supervisors, and team leaders were trained in IRS data collection and recording methods. Data clerks were also trained in data recording for the purposes of conducting verification of the forms once they reached the data center. All data collection tools were field tested by appropriate staff before program commencement.

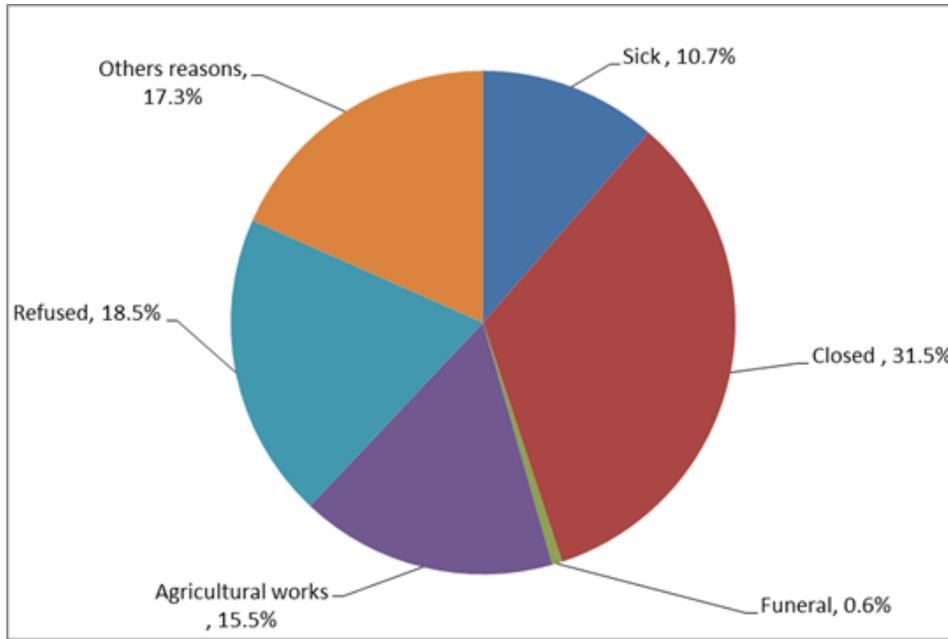
During the spray campaign, a random sample of daily spray operator forms was systematically verified by team leaders and supervisors for data accuracy. Supervisors and team leaders randomly selected 10% of forms completed by spray operators and returned to the field to verify the data with the households. As noted above, once the paper forms were delivered to the data center, data clerks verified the data on each form before data entry. Finally, double-data entry was performed as another quality control measure to ensure the validity of the data.

## **Spray Results**

During the 2012 spray campaign, spray operators found 37,126 structures and sprayed 36,870 structures for 99.3% spray coverage. As a result, 115,638 people were protected including 2,188 pregnant women and 23,118 children under five years of age. The percentage of population protected is 99.6 %. The spray campaign was carried out for 21 operational days in all sites.

The number of structures found by spray operators during the 2012 campaign was 8.97% higher than the number of structures found in 2011 (37,126 structures - 2012 vs. 34,067 structures - 2011). This difference may result from the slight update in the definition of a “structure” in Burkina Faso for the 2012 campaign. In previous years, spray operators would count several households living within the same building/structure as a singular structure. However, the structure definition was revised for the 2012 spray round where households living within close space would be independently counted as having their own “structure” (Please see Burkina Faso’s Structure Definition Document for a detailed explanation of “structure.”)

**FIGURE 3: REASON WHY STRUCTURES NOT SPRAYED**



A total of 256 structures (0.68%) found were not sprayed. The most common reason for not spraying a structure during the campaign was because residents were not home at the time spray operators arrived. Roughly a third of unsprayed structures (31.5%) were not sprayed because the structures were closed. The spray campaign occurred during August when students leave their campus housing to go home for vacation. Additionally, the spray campaign coincided with the agricultural season in the target areas, which can explain why 15.5% of unsprayed structures were not sprayed.

**TABLE 8: SUMMARY OF 2012 IRS CAMPAIGN RESULTS**

Communes/Sites	Structures found	Structures sprayed	% structures sprayed	Pop. protected	Pop. not protected	% pop. protected	Pregnant women in sprayed structures	Children <5 years in sprayed structures	Rooms found	Room sprayed	% rooms sprayed
<b>Bondigui</b>	<b>8049</b>	<b>7991</b>	<b>99.3</b>	<b>21864</b>	<b>83</b>	<b>99.6</b>	<b>544</b>	<b>4308</b>	<b>14320</b>	<b>14291</b>	<b>99.8</b>
Bondigui	4993	4972	99.6	13391	32	99.8	310	2538	9756	9729	99.7
Nabere	1511	1478	97.8	4081	46	98.9	107	805	2033	2031	99.9
Nahirindon	1545	1541	99.7	4392	5	99.9	127	965	2531	2531	100.0
<b>Diebougou</b>	<b>13300</b>	<b>13165</b>	<b>99.0</b>	<b>42853</b>	<b>267</b>	<b>99.4</b>	<b>766</b>	<b>8395</b>	<b>30104</b>	<b>30017</b>	<b>99.7</b>
Bamako	2881	2881	100.0	9911	0	100.0	173	2132	7207	7207	100.0
Bapla	3593	3593	100.0	10464	0	100.0	195	2331	7219	7219	100.0
Communal	3402	3273	96.2	11311	248	97.9	212	1610	8485	8399	99.0
Dankoble	1936	1930	99.7	6825	19	99.7	120	1588	4108	4107	100.0
Loto	1488	1488	100.0	4342		100.0	66	734	3085	3085	100.0
<b>Dolo</b>	<b>3828</b>	<b>3792</b>	<b>99.1</b>	<b>10193</b>	<b>62</b>	<b>99.4</b>	<b>166</b>	<b>1759</b>	<b>9266</b>	<b>9218</b>	<b>99.5</b>
Dolo	1829	1799	98.4	4694	45	99.1	75	858	4879	4841	99.2
Niceo	1564	1564	100.0	3980		100.0	74	695	2990	2990	100.0
Saptan	435	429	98.6	1519	17	98.9	17	206	1397	1387	99.3
<b>Iolonioro</b>	<b>8815</b>	<b>8811</b>	<b>100.0</b>	<b>27003</b>	<b>5</b>	<b>100.0</b>	<b>505</b>	<b>5785</b>	<b>16300</b>	<b>16292</b>	<b>100.0</b>
Diassara	4169	4169	100.0	10880		100.0	217	2456	5420	5418	100.0
Iolonioro	2309	2309	100.0	9163		100.0	127	1896	7485	7482	100.0
Werinkera	2337	2333	99.8	6960	5	99.9	161	1433	3395	3392	99.9
<b>Tiankoura</b>	<b>3134</b>	<b>3111</b>	<b>99.3</b>	<b>13725</b>	<b>100</b>	<b>99.3</b>	<b>207</b>	<b>2871</b>	<b>11603</b>	<b>11586</b>	<b>99.9</b>
Diourao	535	534	99.8	2530	1	100.0	42	623	2560	2558	99.9
Tiankoura	1735	1713	98.7	7220	97	98.7	112	1473	6242	6227	99.8
Tioyo	864	864	100.0	3975	2	99.9	53	775	2801	2801	100.0
<b>Total</b>	<b>37126</b>	<b>36870</b>	<b>99.3</b>	<b>115638</b>	<b>517</b>	<b>99.6</b>	<b>2188</b>	<b>23118</b>	<b>81593</b>	<b>81404</b>	<b>99.8</b>

## Bed Net Use

The total number of insecticide-treated bed nets (ITNs) reportedly available in the households that were targeted for spray is 48,744. Among the 23,118 children under five years of age protected by the IRS campaign, 20,583 (89.0%) slept under an ITN the previous night they were asked about their bed net usage. And of the 2,188 pregnant women protected, 1,886 (86.2%) slept under an ITN the previous night.

**TABLE 9: ITN AVAILABILITY AND USE**

Communes/Sites	Total ITNs found	Pregnant women sleeping under ITNs	Children <5 years sleeping under ITNs
<b>Bondigui</b>	<b>8451</b>	<b>461</b>	<b>3744</b>
Bondigui	5582	287	2352
Nabere	1571	96	723
Nahirindon	1298	78	669
<b>Diebouyou</b>	<b>19544</b>	<b>699</b>	<b>7779</b>
Bamako	4568	160	1925
Bapla	4865	190	2263
Communal	4579	175	1390
Dankoble	3272	115	1525
Loto	2260	59	676
<b>Dolo</b>	<b>4357</b>	<b>146</b>	<b>1552</b>
Dolo	2050	66	766
Niceo	1753	68	628
Saptan	554	12	158
<b>Iolonioro</b>	<b>10128</b>	<b>401</b>	<b>4886</b>
Diassara	3852	168	2002
Iolonioro	4024	123	1825
Werinkera	2252	110	1059
<b>Tiankoura</b>	<b>6264</b>	<b>179</b>	<b>2622</b>
Diourao	1227	35	567
Tiankoura	3196	97	1324
Tioyo	1841	47	731
<b>Total</b>	<b>48744</b>	<b>1886</b>	<b>20583</b>

## Insecticide Use

The number of sachets used during the 2012 campaign was 19,365. There were no sachets lost or damaged. On average, one sachet covered 1.9 structures. The average number of sachets used by a spray operator per day was 5.2, and each operator sprayed 9.9 structures a day.

**TABLE 10: INSECTICIDE USAGE**

Communes/ sites	Structures sprayed	Sachets issued	Sachets used	Sachets not used	Sachets lost/ damaged	Average no. structures sprayed/ sachet	Average no. sachets per SO/day	Average no. structures sprayed/SO/ day
<b>Bondigui</b>	<b>7991</b>	<b>4540</b>	<b>3770</b>	<b>770</b>	<b>0</b>	<b>2.1</b>	<b>5.1</b>	<b>10.78</b>
Bondigui	4972	2897	2452	445	0	2.0	5.8	11.75
Nabere	1478	782	600	182	0	2.5	3.8	9.24
Nahirindon	1541	861	718	143	0	2.1	4.5	9.75
<b>Diebougou</b>	<b>13165</b>	<b>9897</b>	<b>7333</b>	<b>2564</b>	<b>0</b>	<b>1.8</b>	<b>5.4</b>	<b>9.64</b>
Bamako	2881	1914	1406	508	0	2.0	5.1	10.51
Bapla	3593	2361	1734	627	0	2.1	7.2	14.85
Communal	3273	3437	2565	872	0	1.3	5.1	6.49
Dankoble	1930	954	740	214	0	2.6	4.4	11.35
Loto	1488	1231	888	343	0	1.7	5.0	8.45
<b>Dolo</b>	<b>3792</b>	<b>3477</b>	<b>2456</b>	<b>1021</b>	<b>0</b>	<b>1.5</b>	<b>5.8</b>	<b>8.96</b>
Dolo	1799	2105	1523	582	0	1.2	7.5	8.91
Niceo	1564	996	703	293	0	2.2	4.2	9.31
Saptan	429	376	230	146	0	1.9	4.3	8.09
<b>Iolonioro</b>	<b>8811</b>	<b>5356</b>	<b>3630</b>	<b>1726</b>	<b>0</b>	<b>2.4</b>	<b>4.9</b>	<b>11.78</b>
Diassara	4169	1984	1321	663	0	3.2	4.0	12.71
Iolonioro	2309	2555	1692	863	0	1.4	6.7	9.16
Werinkera	2333	817	617	200	0	3.8	3.7	13.89
<b>Tiankoura</b>	<b>3111</b>	<b>3005</b>	<b>2176</b>	<b>829</b>	<b>0</b>	<b>1.4</b>	<b>4.9</b>	<b>7.04</b>
Diourao	534	540	431	109	0	1.2	5.1	6.28
Tiankoura	1713	1687	1255	432	0	1.4	4.7	6.44
Tioyo	864	778	490	288	0	1.8	5.4	9.49
<b>Total</b>	<b>36870</b>	<b>26275*</b>	<b>19365</b>	<b>6910**</b>	<b>0</b>	<b>1.9</b>	<b>5.2</b>	<b>9.91</b>

\*Please note that this number is greater than the total number of sachets in stock (22,559) because each day that spray operators came back with full sachets, they were re-distributed; this figure takes that into account. In other words, the issuing of some sachets was double counted for the purposes of having an adequate daily control of the number of sachets that were issued.

\*\*Please note that this number does not represent the number of sachets remaining in stock. It represents an accumulation of the number of sachets remaining after the individual spray days. For instance, a spray operator is handed 10 sachets, but comes back with three full sachets. Those three sachets are remaining for that given day, but they are then re-distributed for use in subsequent spray days.



# 5. ENTOMOLOGY

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## 5.1 ENTOMOLOGICAL SURVEILLANCE BASELINE

IRSS/Centre Muraz was subcontracted by AIRS Burkina Faso to conduct entomological surveillance for the 2012 IRS campaign. Since most entomological surveillance results for the 2012 IRS campaign will be reported in the final entomological report (to be completed in November 2012), this section provides a brief explanation of entomological surveillance that was completed before and during the IRS campaign.

### Adult mosquito collection

The data presented here represents an overview of the density of mosquitoes during the baseline (T0) collection and the T1<sup>2</sup> without any details on the biting rate per person and per night. Overall 7,221 mosquitoes were collected in Diebougou including collections from June and July as baseline and August as the T1. They were composed by 36% *An. gambiae* s.l., 2.72% *An. funestus*, 3.43% *Anopheles* sp, 52.4% *Culex* sp and 5.5% other culicids (*Aedes* sp, *Mansonia* sp) and represented the total collection (Table 11 at the end of Section 7). In Dano, the untreated area, overall 11,731 mosquitoes were collected for the same period including CDC indoors and outdoors and indoor resting collections by spray. They were estimated at 44.9% *An. gambiae* s.l., 9.9% *An. funestus*, <1% *Anopheles* sp, 41.8% *Culex* sp and 2.5% other culicids.

## 5.2 INITIAL BIOASSAY TESTING

### 5.2.1 IN SITU BIOASSAYS (WHO CONE TEST)

The in situ test was performed in 4 sites (Loto, Bapla, Diébougou and Bagane) in July (T0) and August (T1) and on-going for September (T2) 2012 using both the Kisumu strain (susceptible to all insecticides) and *An. gambiae* s.l. wild populations issued from larva collected in Diebougou areas and reared to adult stage in the IRSS insectary. Two to three day old adult females were then carried back to Diebougou for bioassays.

In July (T0) 557 of the 2-3 day old females of wild populations of *An. gambiae* s.l. were tested but only in three sites (Bagane, Loto and Bapla) because of the small number of females available for the test (it was quite difficult to collect larva in high numbers at the beginning of IRS application).

#### ***Anopheles gambiae* s.l “Kisumu” susceptible strain**

A total of 1589 females of *An. gambiae* “Kisumu” of 2-3 days age were used for cone bioassay test in 16 treated houses and 4 non treated houses in July (T0). The control mortality in the non-treated houses was less than 5% (3.7%) and did not differ between banco and cement walls. The overall test mortality rate was 100% without any difference between sites and type of walls (cement and banco walls) (Figure 4).

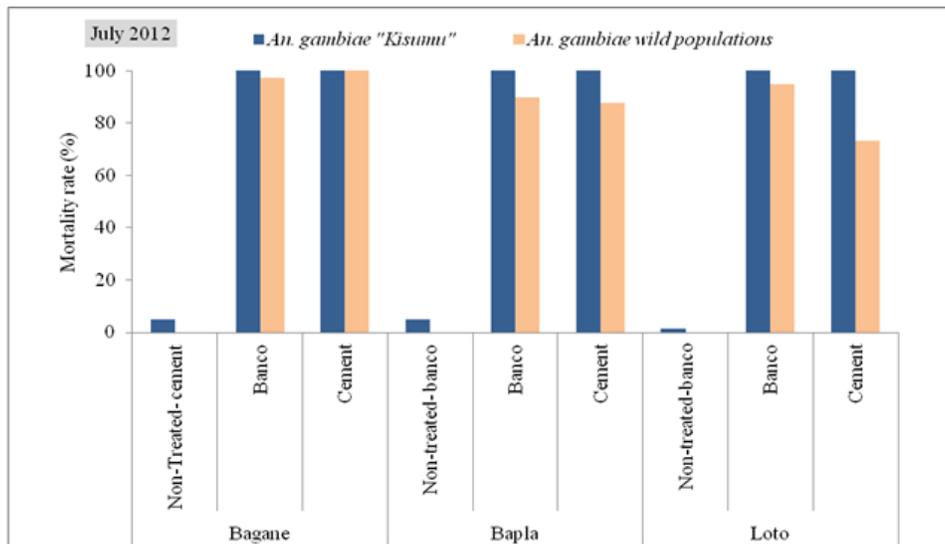
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<sup>2</sup> T0, T1, T2,etc, are the successive steps of entomological data collection

## Anopheles gambiae s.l. “Wild” strain

In July (T0) 557 of the 2-3 day old females of wild populations of *An. gambiae* s.l. were tested but only in three sites (Bagane, Loto and Bapla) because of the small number of females available for the test (it was quite difficult to collect larva in high numbers at the beginning of IRS application). Figure 4 below shows on average slightly lower cone bioassay test mortality rate of wild populations of *An. gambiae* s.l. as compared to the susceptible. The test mortality rate of the wild mosquitoes, however, was above the 80% threshold except in one study site, Loto, where the mosquitoes were exposed to surfaces made of cement. Test mortality as high as 100% was observed on a cement walls in one test site, Bagane.

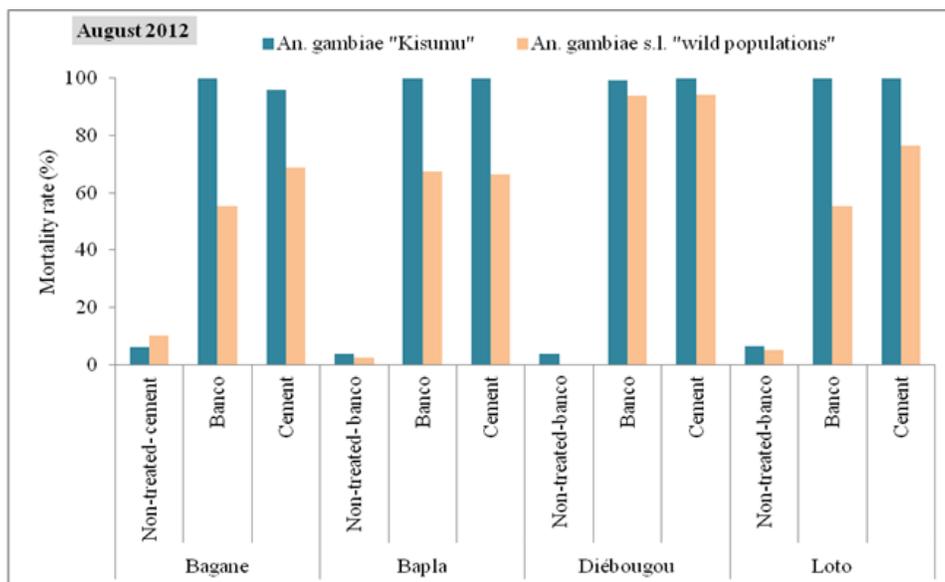
**FIGURE 4: WHO CONETEST MORTALITY RATES OF AN. GAMBIAE S.L. “KISUMU” AND LOCAL WILD POPULATIONS IN JULY (T0) AFTER 30 MINUTES EXPOSURE TO BENDIOCARB SPRAYED ON CEMENT AND CLAY MADE- WALLS**



Similar tests using mosquitoes from the two sources (Kisumu and wild) were conducted one month after spraying (T1) in August to monitor the decay rate and effectiveness of the sprayed insecticide, bendiocarb. The test mortality rate of the susceptible colony remained nearly unchanged as compared to the baseline (T0) but rapid decline in the test mortality was observed in the tests conducted using the wild mosquito populations. Though statistical analysis has not been done yet, the mortality seems to have been significantly decreased in the wild mosquito populations as compared to the baseline.

The difference in the mortality rate between the wild and the susceptible colony might be partly explained by emerging resistance individuals of the wild mosquitoes against the bendiocarb.

**FIGURE 5: WHO CONE TEST MORTALITY RATES OF AN. GAMBIAE S.L “KISUMU” AND LOCAL WILD POPULATIONS IN AUGUST (T1) AFTER 30 MINUTES EXPOSURE TO BENDIOCARB SPRAYED ON CEMENT AND CLAY MADE- WALLS**



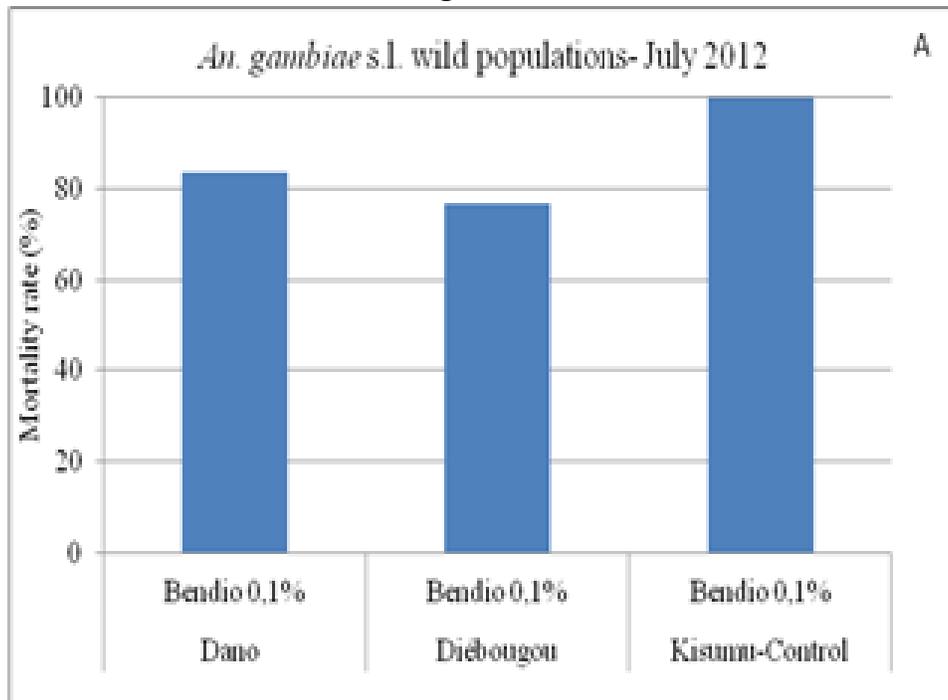
### 5.2.2 INSECTICIDE RESISTANCE MONITORING (WHO TUBE TEST)

An. gambiae s.l. larvae were collected from different larva habitats in the districts of Diébougou and Dano in July 2012 and were reared to adults. Then females aged from 2 to 3 days were subsequently subjected to bioassay following WHO standard protocol (WHO 1998). Anopheles gambiae s.l. were resistant to bendiocarb in Diébougou for the two months with 76.4% and 70% mortality respectively in July and August 2012. In Dano, An. gambiae s.l. were more or less resistant (moderate resistance status) to bendiocarb 0.1% with 83.5% and 84.25% mortality recorded in July and August 2012 respectively (Figure 6 A&B).

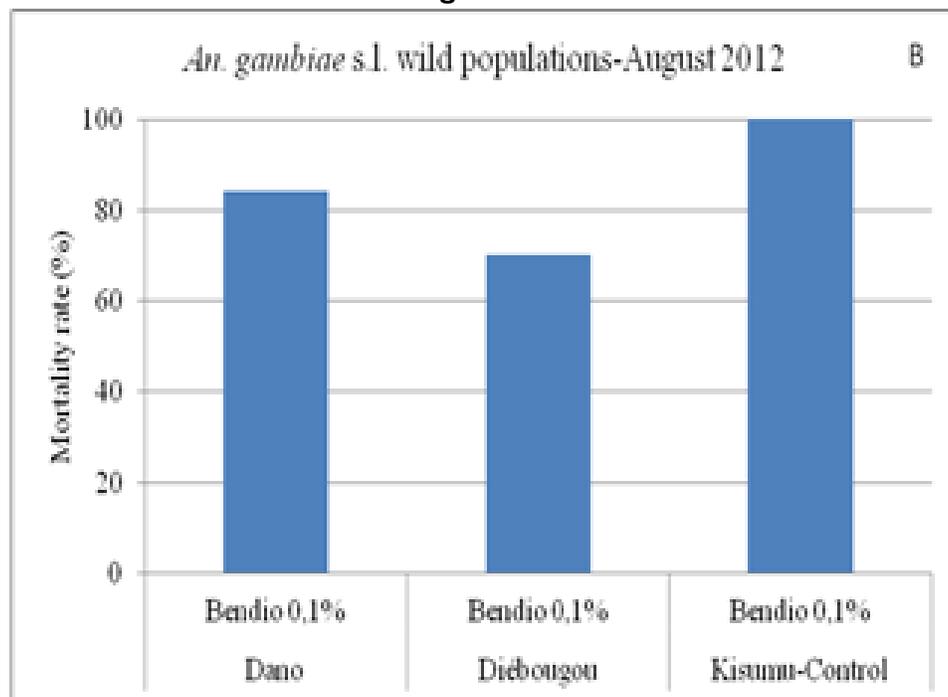
The January 2011 insecticide resistance report submitted by the incumbent and conducted by IRSS/Centre Muraz, indicated 96 percent test mortality rates in the IRS intervention area, which was the basis for the selection of bendiocarb for the 2012 IRS campaign. In 2012, IRSS/Centre Muraz also performed insecticide resistance tests in the districts of Diébougou and Dano (control village) for bendiocarb. The test mortality rate of the exposed vector, An. gambiae s.l., was 76.4 percent and 70 percent two weeks and one month after spraying in Diébougou district (IRS intervention area), respectively. According to the WHO 1998 resistance classification criteria this result falls in the resistance category. The test mortality rates for mosquitoes from the control villages in Dano district were 82 percent (according to the January 2011 report), 83.5 percent two weeks after spraying, and 84.25 percent one month spraying. Vector susceptibility to bendiocarb in the control village is decreasing and as opposed to the intervention villages, which is expected and may be related to the selection pressure of the insecticide in the intervention areas and due to the fitness cost of the resistance gene in the control villages. If consistent results are obtained in subsequent tests this year, it will provide preliminary data on the role of IRS in the selection resistance individuals in the mosquito populations of An. gambiae s.l. of Burkina at least for the study area.

**FIGURE 6 : MORTALITY RATE OF AN. GAMBIAE S.L. IN DIEBOUGOU IRS APPLIED AREA AND DANO (CONTROL FREE OF IRS RESPECTIVELY IN A) JULY (T0) AND B) AUGUST (T1) 2012 (WHO TUBE TEST)**

**Figure 6.A**



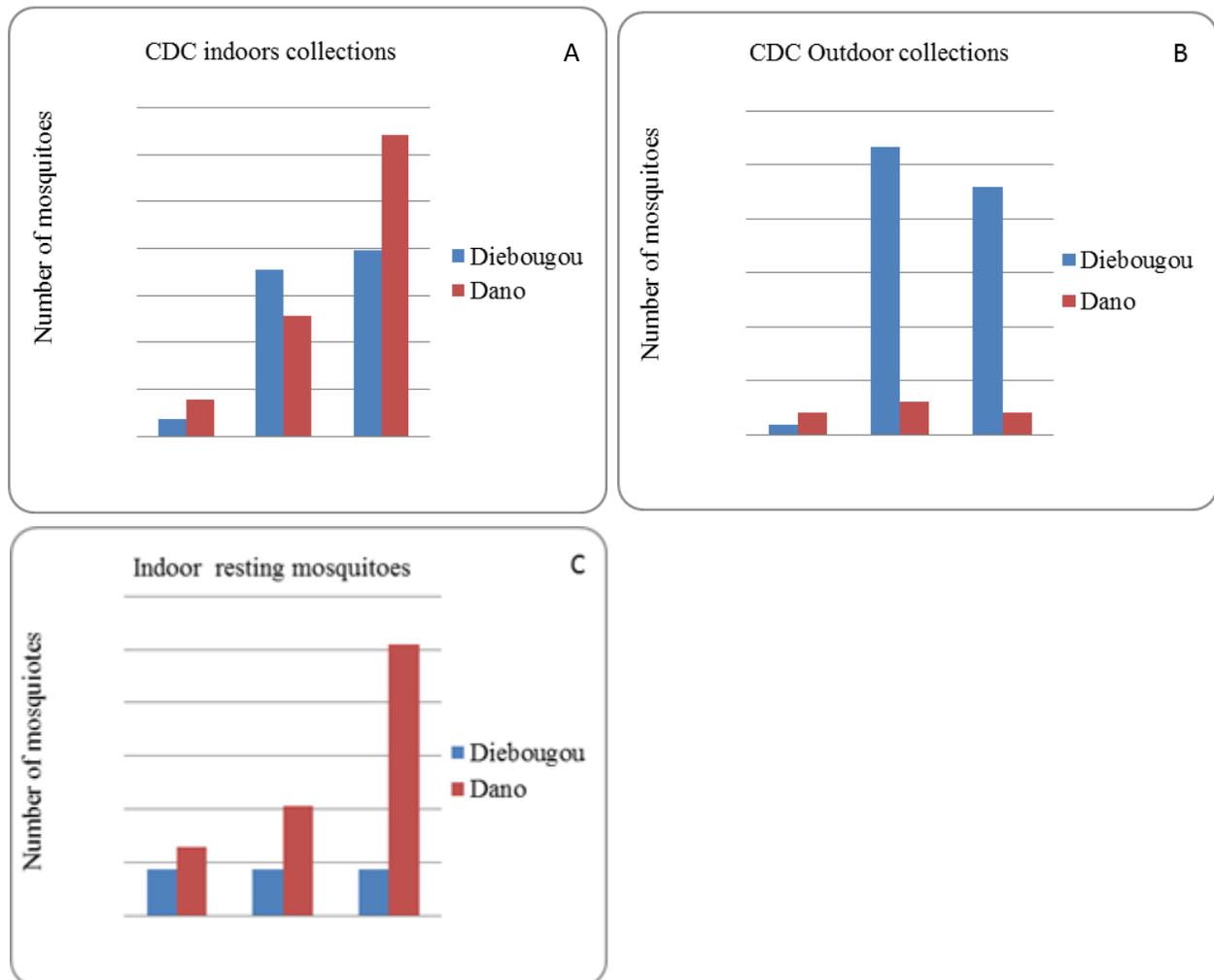
**Figure 6.B**



### 5.2.3 VECTOR DENSITY AND BEHAVIOR

Using CDC light trap collection more *An.gmbaie s.l* were collected indoors than outdoors in the control village Dano throughout the three month study period (June-August) showing that there may be high endophic tendency of the vector in the absence of an intervention, unlike Diebougou where the vector was found to feed both indoors and outdoors. Of course, even in Diebougou slightly more mosquitoes were collected feeding indoors than outdoors (Figure 7.A and B). In indoor pyrethrum spray-sheet catches, the peak collection was observed in Dano in August with 2500 *An. gambiae s.l.* per four days collection, an estimated increase of 248% (Figure 7.C) when compared to the baseline collection of July. Even though the final analyses, including the biting rate per person per night and the endophily rate per number of mosquitoes per house and per night have not yet been performed, it seems as if mosquito densities were affected by the IRS application (which was repeated during three consecutive years in Diebougou). The on-going sampling from September, October and November will give more details about the impact of IRS on biting and resting behaviour of the major malaria vectors.

**FIGURE 7 : ANOPHELES GAMBIAE S.L. DENSITY IN CDC INDOOR COLLECTION (A), OUTDOOR COLLECTION (B) AND RESTING SPRAYED COLLECTION (C) FROM JUNE TO AUGUST 2012 (WHERE JUNE AND JULY COLLECTIONS REPRESENT THE BASELINE. BAR PAIRS REPRESENT JUNE, JULY AND AUGUST.**



**TABLE II: DISTRIBUTION BY GENUS AND SPECIES OF ADULT MOSQUITOES COLLECTED FROM JUNE TO AUGUST 2012 IN DIEBOUGOU (IRS) AND DANO (CONTROL VILLAGE).**

Collections sites	CDC indoors collections			CDC outdoors collections			Pyrethrum spray collection			Total (%)	
	June*	July*	Aug+	June*	July*	Aug+	June*	July*	Aug+		
Diebougou-IRS area											
<i>Anopheles gambiae s.l.</i>	36	354	397	9	267	229	432	438	434	<b>2596</b>	<b>36,0</b>
<i>Anopheles funestus</i>	5	18	29	4	18	69	13	32	7	195	2,70
<i>Anopheles spp.</i>	34	5	60	11	16	76	35	9	2	248	3,43
<i>Culex spp.</i>	432	221	594	77	111	338	451	892	669	3785	52,42
Other culicids	19	32	143	8	56	118	8	13	0	397	5,50
( <i>Aedes sp, Mansonia sp</i> )											
<b>Total %</b>	526	630	1223	109	468	830	939	1384	1112	<b>7221</b>	<b>100</b>
Dano-Control area											
<i>Anopheles gambiae s.l.</i>	78	255	641	20	30	20	650	1027	2549	<b>5270</b>	<b>44,9</b>
<i>Anopheles funestus</i>	25	126	109	8	32	2	151	331	381	1165	9,9
<i>Anopheles spp.</i>	4	8	15	13	0	0	40	0	12	92	0,8
<i>Culex spp.</i>	105	212	1774	64	67	24	1115	718	830	4909	41,8
Other culicids	39	49	39	58	26	33	18	22	11	295	2,5
( <i>Aedes sp, Mansonia sp</i> )											
<b>Total %</b>	251	650	2578	163	155	79	1974	2098	3783	<b>11731</b>	<b>100</b>

\*Baseline data, +T1 data

# 6. POST-SPRAY ACTIVITIES

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## 6.1 CLOSING CEREMONY

Because it is the last USAID-funded IRS campaign in Burkina, the AIRS Burkina Faso Team wanted to do a closing ceremony. Although there were several attempts at scheduling the event, unfortunately it was difficult to agree on a final date with PNL. After several months of back-and-forth on the date, USAID suggested that a closing ceremony is no longer relevant.

## 6.2 POST-SPRAY MEETING/REVIEW

Summary meetings at district and national level are usually organized at the end of each spray campaign. For this year's campaign, these activities took place in Diebougou on November 12th and Ouagadougou on November 20th. Abt was represented by Dr. Evelyne Chaffa, AIRS Benin Technical Manager on behalf of the acting COP, Dr. Noe Rakotondrajaona.

## 6.3 POST-SPRAY ENVIRONMENTAL ASSESSMENT

The post-spray environmental inspection took place August 7-9, 2012. All 17 sites were visited to ensure that good practices were followed during the decommissioning of IRS facilities, and that the waste incineration was done in accordance with all appropriate standards. Fortunately, no cases of intoxication or adverse effects were reported during the 2012 spray campaign.

### 6.3.1 SOLID WASTE INCINERATION

During the environmental pre-inspection, the Environmental Compliance Officer identified that the Diebougou Health District's incinerator was not functioning. The ECO's initial recommendation was to make repairs but right before the start of the campaign, she recommended to use the Gaoua incinerator instead given that the Diebougou repairs would take too long. During the spray campaign, and after USAID's observations regarding the incomplete waste disposal plan, the ECO visited the Gaoua incinerator for an inspection and to ensure that it was suitable for waste incineration. AIRS Burkina Faso also hired the Benin ECO, Damien Kodjo for an STTA to inspect the incinerator and provide technical assistance to the Burkina ECO. With Mr. Kodjo's visit, the project made the final decision that incineration was indeed to take place in Gaoua instead of Diebougou.

Solid waste incineration started on August 7 and lasted for three days, but unfortunately, the incinerator broke down. AIRS Burkina procured the replacement pieces, and made repairs within a month in order to complete all incineration by October 15th.

Upon completion of the IRS campaign, the following solid waste was collected in order to be incinerated in Gaoua:

- 19365 empty sachets of bendiocarb
- 6,460 used masks
- 814 units of used gloves

The PNL will suspend IRS activities in Burkina Faso for the near future due to insufficient funding and reprioritization of malaria activities. Given these circumstances, in accordance with recommendations received from USAID and Abt's Environmental Compliance Manager, all soak pits were covered with

cement to ensure better protection and to avoid any environmental, human and animal health impacts. All site stores were emptied and cleaned.

### **6.3.2 POST-SPRAY INVENTORY**

From August 27th through September 1st, the AIRS Burkina Faso Logistics and Procurement Coordinator carried out a post-spray campaign inventory check in Diebougou. Table I in Annex A demonstrates the results. A final inventory will be submitted to USAID prior to close out for their recommendations on proper disposition.

# 7. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

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## 7.1 CHALLENGES

In spite of good results achieved through good training, and close monitoring and supervision, AIRS Burkina Faso also faced the following challenges during implementation:

- **International Procurement:** Normally international procurements must arrive in country several weeks before the start of the spray campaign. This was not the case for all international procurements which posed challenges for the campaign start-up.
- **IEC mobilization:** AIRS Burkina Faso used door-to-door sensitization, local radio broadcasts and some brochures for Diebougou urban residents only. The coordination between the IEC mobilization and spray activities was a big challenge. For example, some houses were mobilized but not sprayed, and some spray operators moved to some villages that had not yet been mobilized, resulting in low coverage rates on certain days. This situation happened mainly during days of heavy rainfall and it may have resulted in some refusals. These occurrences were corrected through regular meetings between IEC mobilizers and spray operators' supervisors, with support from DHMT in reviewing the IRS progression plans as needed.
- **Environmental compliance:** (i) The Diebougou incinerator must be properly repaired several months before the beginning of the next campaign; (ii) Progressive rinsing must be revised to ensure good infiltration of the soak pits; (iii) The ECO must ensure that all actors adopt good behavior (wear PPE, boots, gloves, etc);
- **PNLP and regional health directorate engagement in IRS activities:** The PNLN team and the regional hygiene and sanitation officer were fully involved in all IRS activities, including planning, training, and monitoring and supervision activities during the campaign however, they could not participate in IRS campaign supervision during 21 days because of budget constraints. The PNLN and the regional health directorate both participated in supervision of the spray campaign for 10 days with three and two representatives respectively. The Diebougou health district participated with six people during 21 days. Their involvement was very useful and appreciated as it helped resolve logistical, technical and environmental challenges raised during the daily debriefings.
- **User IDs for IRS Staff:** IRS staff (i.e. mobilizers, spray operators) were not assigned user IDs before the start of the campaign. As a result, they did not record their user IDs on the data collection forms during both the mobilization and spray campaigns. The lack of this information slowed down the data entry process for data clerks since entering the mobilizer or spray operator name is required before entering the rest of the data from. For the next campaign, we would assign staff user IDs at the end of their IRS training (before mobilization or spray) so that they have them at the start of data collection.

- **Reporting mechanism in database:** The reporting mechanism was not yet set up in the AIRS Access database at the start of mobilization and spray. In order to provide USAID with weekly reports, we had to employ a more manual data analysis approach in Microsoft Excel, which had the potential of introducing a risk to data quality and control. However, the Excel file was easy to complete and use and provided the data team with the tools it needed to produce the required reports. Beside this, it would benefit the program to ensure the database reporting system is ready and functional before the start of mobilization and spray activities.

## 7.2 LESSONS LEARNED

Lessons learned in this third IRS round in Burkina Faso include the following:

- The use of bicycles by spray operators was a cost-effective means of transportation and an effective way to access hard-to-reach areas during the rainy season.
- The DHMT took much more ownership of the program during this year's spray round particularly with the district staff roles and responsibilities in IRS coordination and supervision of IEC mobilizers and spray operators.
- The engagement of CSPS staff in the identification and recruitment of IEC mobilizers facilitated the supervision of IEC activities by health center workers.
- Social mobilization is crucial for IRS operations and should involve all actors.
- A rigorous selection of spray operators and IEC mobilizers is very important to ensure perfect IRS implementation.
- A daily debriefing of supervisors helps improve the quality of spraying operations through the application of recommendations made.
- The data entry took longer than anticipated (i.e. two extra days). We would employ a few more data clerks if there were another campaign to ensure efficient and high-quality data entry of both mobilization and spray data.

## 7.3 RECOMMENDATIONS

Even though it is the last USG-funded IRS campaign, the following recommendations could be useful for future IRS campaigns implemented in Burkina Faso:

- Ensure proper environmental compliance at each stage of IRS activities.
- Revitalize the steering committee that includes IRS at the national level.
- Ensure better coordination of the IRS campaign with the PNLP in order to facilitate the eventual transfer of responsibilities and competencies concerning IRS
- Continue close monitoring with IEC mobilizers to ensure the quality of IRS information for the population as well as information collected from them.
- Continue involving local authorities in the management of refusal cases, rumors, and absences.
- Apply all criteria for recruitment, in particular the physical fitness exam of spray operators.
- Apply all criteria for storekeeper and pump technician recruitment for better supply management and proper pump maintenance at the site level.

- Advise and demonstrate the proper handling of spraying materials and equipment while riding a bicycle.
- Integrate IRS activities into the district action plan for IRS sustainability.
- Put in place a system for side-effect case management due to insecticide intoxication or other injuries that may be related to spray activities.
- A post-spray survey would help the program better understand the targeted communities' perception of and satisfaction with IRS for program improvements and planning. This was not performed during the 2012 AIRS project year.



# ANNEX A

**TABLE I: RESULTS OF POST-SPRAY INVENTORY**

<b>N#</b>	<b>Description</b>	<b>Initial Stock</b>	<b>Stock Used</b>	<b>Stock available</b>	<b>Comments</b>
1	Desk	1		1	
2	Seat	3		3	
3	Insecticide FICAM VC WP 80	22,559	19,365	3,181	One sachet had been taken by the inspection office. The stock available still represents a 13 sachet difference that is being investigated.
4	Spray pumps	250	-	250	88 pumps are leaking
5	Kits for X-Pert Sprayers, Hudson, 148676	13	13	-	
6	Nozzle Assembly (Tip T-Jet)	100	9	91	
7	Strap XP	50	-	50	
8	Filter Nylon XP	157	47	110	
9	Gasket, Hudson,	131	3	128	
10	Body Shutoff, Hudson,	119	-	119	
11	Extension	92	4	88	
12	Coverall	525	13	512	57 are to be repaired
13	Spray operators bags	523	23	500	54 are to be repaired
14	Respirator Particulate	10,300	6,460	3,840	
15	Boots	314	314	300	Out of the boots used, 14 will have to be discarded
16	First Aid Kit	36	16	20	
17	Pregnancy Test	50	50	-	
18	Hardhats	250	-	250	
19	Hardhat Adapter	586	93	493	
20	Face shields (Visors)	433	57	376	
21	Polytanks, Supertank	17	-	17	
22	Drums (for progressive washing)	132	-	132	
23	Team leader waistcoat	41	-	41	
24	Supervisor waistcoat	19	1	18	
25	Thermometer	14	1	13	
26	Bassin	55	1	54	
27	Graduated bucket (15 liters)	316	11	305	
28	Cup (one liter)	109	7	102	
29	Plastic cover	278	114	164	34 used to cover soak pits
30	Extinguisher	3	-	3	
31	Sand bucket	18	-	18	
32	Shovel	18	-	18	

<b>N#</b>	<b>Description</b>	<b>Initial Stock</b>	<b>Stock Used</b>	<b>Stock available</b>	<b>Comments</b>
33	Danger sign	34	-	34	
34	Overall (for washers)	36	-	36	
35	Pin Cotter XP 801423, Hudson	50	-	50	
36	Cover Assembly XP 140205, Hudson	19	-	19	
37	Male Fitting For Strainer Housing 114-905, Hudson	32	-	32	
38	Adaptor Spraying System XP 114791, Hudson	41	-	41	
39	Latex Gloves	687	411	276	
40	Flash-light (torch)	234	-	234	Unusable
41	Batteries for flash-light, SOFAPIL Winner	2,696	2,696	-	
42	Towel	606	300	306	
43	Brush (Teeth), COLGATE	220	143	77	
44	Plastic bags	4,900	4,900	-	
45	Wire (Piece of 200 yards)	32	-	32	In pieces
46	Notebook	42	40	2	
47	Marker	120	113	7	
48	Pen, Schneider	1,777	1,173	604	
49	Pencil	649	642	7	
50	Eraser	232	227	5	
51	Pencil sharpener	238	237	1	
52	Staples 24/6, NOVUS	18	12	6	Box
53	Stapler 24/6, NOVUS	18	9	9	
54	IRS Cards	25,000	21,175	3,825	
55	IEC brochures	10,000	2,530	7,470	
56	Multipurpose Wrench	18	4	14	
57	Pliers	19	9	10	
58	Screwdriver	19	5	14	
60	Socks (for spray operators boots wearing)	254	123	131	Pair
61	Lock	10	9	1	
62	Padlock	17	15	2	
63	Floorcloth	20	3	17	
64	Brush broom	20	4	16	
65	Pump greasing oil	34	23	11	
66	Protective glass	60	42	18	
67	Chalk (white)	40	35	5	Box of 100
68	Chalk (color)	15	14	1	Box of 100
69	Flip chart	5	-	5	
70	Red Pens	200	120	80	
71	Pins	500	48	452	

