

USAID/GHANA ENVIRONMENTAL COMPLIANCE FIELD EVALUATION OF PRESIDENT'S MALARIA INITIATIVE: INDOOR RESIDUAL SPRAYING ACTIVITIES

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Introduction

In 2008, the United States President's Malaria Initiative (PMI) began supporting Indoor Residual Spraying (IRS) for malaria control in Ghana with a focus on local capacity building, strict environmental compliance, and entomological monitoring. In consultations with the Ghana Health Service (GHS), a cluster of districts in the Northern Region was selected for IRS due to the high burden of malaria (greater than 40% parasitemia, children under 5), poor healthcare and economic International, in close collaboration with GHS and local communities, began implementing IRS with the support of PMI by spraying five districts with pyrethroids in the northern region (Tolon-Kumbungu, Savelugu-Nanton, West Mamprusi, Gushegu, and Karaga), which protected approximately 601,000 people. By the end of 2011, the number of beneficiary districts grew to nine with the addition of four new districts (East Mamprusi, Saboba, Chereponi, and Bunkpuru gu-Yunyoo), protected approximately 926,699 people. In 2013, IRS was scaled down to four districts due to emerging pyrethroid resistance and a mandatory switch to more expensive insecticides (carbamates) (Savelugu-Nanton, East Mamprusi, West Mamprusi and Bunkpurugu-Yunyoo), which resulted in 197,354 structures sprayed and 534,060 people protected.

In August 2011, Abt Associates was awarded a four-year Africa-wide Indoor Residual Spraying (AIRS) project, which was funded by USAID under PMI. In September 2014, Abt Associates was awarded another four-year follow-on project called the PMI AIRS Project to support the implementation of IRS in 15 African countries, including Ghana. Abt works in close collaboration with the Ministries of Health (MOHs), National Malaria Control Programs (NMCPs), district health offices, local non-governmental organizations, and community and business leaders to ensure that the government, the private sector, and communities are able to sustain and direct future IRS and malaria control programs.

This paper evaluates the environmental assessment of the PMI AIRs project for the 2015 spray season in Ghana. *The views expressed are that of the author and not necessarily that of USAID. The author conducted a field inspection in the 2016 spray season to confirm all that is presented in this paper and has followed up on VectorLinks till date.*

Targeted Districts

The 2015 spray campaign targeted five districts in the northern region: Bunkurugu/Yunyoo, East Mamprusi, Kumbungu, Mamprugu Moaduri, and West Mamprusi. The campaign targeted approximately 231,345 structures and sought to protect 596,706 people using the long-lasting IRS product containing Actellic 300 CS™ - pirimiphos-methyl, an organophosphate insecticide. Due to IRS's potential high risk related to environmental pollution, user-safety, and health hazards, regular monitoring is required to ensure appropriate implementation of mitigation practices in order to reduce the risk. The spraying operations took place and ran concurrently in all target-districts before the rains and the consequent peak malaria transmission period. This period ran from April 14 through May 18 2015 in all the target-districts. The environmental compliance inspection on which this paper is based coincided with this spray period.

Objective

The primary objective of the assignment was to conduct an environmental compliance field evaluation of PMI spray activities in conjunction with the Abt-administered IRS campaign in five districts of the Northern

region of Ghana. The evaluation used the USAID-approved Environmental Mitigation and Monitoring Plan (EMMP) for PMI Indoor Residual Spraying (IRS) activities, which was found in the approved (2015) Supplementary Environmental Assessment (SEA), and the Best Management Practices (BMPs) for IRS activities developed collaboratively between the Global Health Bureau and implementing partners (IPs) through the PMI program. Another objective was to provide problem-solving support, as required, to the USAID Mission and the PMI IP (and any sub-contracting entities). This field evaluation also highlights the risks associated with particular program activities and therefore strengthens program monitoring and training.

Scope

Workers and community health and safety are a crucial component of IRS activities sponsored by PMI and implemented by Abt and its partners. This report assesses the extent to which the PMI-IRS Program in Ghana fulfilled the minimum mitigation and monitoring requirements expected of the IRS Program, the extent to which the IRS Program adhered to environmental compliance requirements specified in the BMP and SEA, and the ways in which Abt's mitigation monitoring procedures may be improved.

Several reports and environmental compliance documents were reviewed in order to provide a solid understanding of the IRS program in Ghana and the requirements of the USAID environmental regulations. A list of all the documents reviewed during preparation of this report can be found in the references.

Briefing Sessions prior to Trip to the Field and Key Subject Areas Inspected

Briefing sessions were held with USAID PMI staff, Ghana Health Service (GHS), Abt's IRS program Chief of Party, Environmental Compliance Officer and key staff, to get their advice, pointers, concerns, participation, specific information they would like to get from the evaluation report and, above all, to understand the program from their unique perspectives.

The key subject-areas inspected during the evaluations, consistent with the BMP, include the following:

- Management and supervision;
- Resident health and safety/Information, Education and Communication (IEC);
- Worker health and safety;
- Storage and stock control: central, district and parish stores;
- Transportation of pesticides and equipment;
- Spraying operations;
- Clean-up facilities, post-spraying activities and liquid waste disposal; and
- Solid waste disposal.

Region, districts, sites and sub-sites visited:

The field evaluation occurred concurrently with the PMI implementing partner's (Abt Associates') spray campaign in the five selected districts in the Northern region of Ghana.

Details of the specific places visited are as follows:

- **Accra:** Ghana Health Service Office, USAID Ghana Mission;
- **Tamale:** IRS office, Environmental Protection Agency, GHS, IRS central warehouse
- **West Mamprusi District:** Wungu operational site, IRS Site Office Stores, and communities and Kpasinkpe operational site and District Assembly;
- **East Mamprusi District:** IRS Office Staff, District Assembly, IRS stores, IRS operational Sites in Langbisi, Gambaga and Sakogo.

- **Bunkpurugu/Yunyoo District:** District Assembly, Operational Sites (Nakpanduri, Bindi and Gbunkurugu, IRS stores and communities)
- **Mamprugu Moaduri District:** District Assembly, IRS Site offices and stores, soak pits (Kubori and Yizesi) and selected communities.
- **Kumbungu District:** District Assembly, IRS Site offices and stores, soak pits (Dalun and Kumbungu) and selected communities.

Environmental Compliance Findings & Success Stories (Spraying Operations)

The spray operators demonstrated their understanding of best spray practices and the established best environmental management practices (detailed below) and by observation, they appeared to follow them both to the best of their ability.

- Pumps are checked and tested prior to being issued out to spray operators by the team leaders and supervisors at each IRS operational site.
- All the stores visited had a first aid box with recommended medicines and supplies and storekeepers have been trained in first aid and in treating insecticide exposure. Based on interviews, all storekeepers know where the nearest health clinic is located.
- During the start of a typical workday, the storekeeper and supervisor arrive early in the morning of the workday; count and record the number of insecticide bottles in order to maintain an up-to-date record of stocks received, held, and issued. Meanwhile, the SOs receive breakfast before they start the day's activities. After eating, the SOs congregate for a briefing session after which the equipment and insecticide are issued to them by the team leaders who arrange all the clean PPE and spraying equipment outside for the spray operators in their teams. The full set of appropriately-sized PPE which the spray operators receive and wear prior to receiving their final instructions include: face shield, nose-and mouth-covering mask, overalls, gloves, boots, and a flashlight.
- The storekeepers and supervisors were all observed to be wearing appropriate PPE prior to dispatching spray operators.
- Interviews with spray operators confirmed that they kept their eyes on the pressure gauge to ensure that the pressure was always close to 3.8 bar (55psi).
- The observed spray operators at various locations were never seen eating, smoking, or drinking water while spraying.
- The spray operators were observed to be applying all the best management practices associated with distance from the wall, use of vertical swaths with downward and upward motion, observance of pressure gauge, overlapping of spray swaths by 5cm, evenness of spraying, and how to deal with clogged nozzles.
- All walls, thatch roof, and wooden or straw doors were sprayed according to the specific instructions provided.
- Spray operators interviewed confirmed their adherence to the practice that floors, metal roofs, doors, glass, inside of cupboards, food storage structures, curtains, latrines, and animal pens should not to be sprayed.
- The sprayers add leftover insecticide and water from triple rinse for the day to the pumps to be used the next day when they prepare to fill their spray tanks.

- IRS operations are carried out with all the precautions in order to avoid contamination of both surface and underground water by conducting spraying indoors and not spraying within 100 meters from any water body. These precautions apply to all aspects of IRS spray operations, including the store and soak pit location.
- IRS insecticides that contain pirimiphos-methyl are poisonous and a danger to bees. Interviews with some of the spray operators demonstrated their understanding that spraying is not done within 100 meters from any apiary. In fact, reconnaissance trips are conducted prior to the spraying activities to ensure that there are no beekeeping operations at the spraying sites.
- All belongings, except immovable ones, had been moved outside of the room(s). Harvested produce was also moved out of the structure in which they were located so that they were not sprayed.

Solid Waste Disposal & Recycling Findings & Success Stories

Solid wastes generated include empty insecticide bottles, damaged pumps (Hudson X-pert and IK Goizper) and old, non-reusable personal protective equipment. The wastes are categorized into plastic, metal and paper. The project uses recycling and donation for reuse as the main approach for waste disposal. PMI VectorLink Ghana partnered with waste management companies such as Cyclus Elmina Plastic Recycling Company, Zoil Service Limited, Tema Steel Company Ltd. and Fine Print Ltd. to recycle the waste. The companies selected for recycling must have a permit from the EPA and allow for inspection of their premises. During the inspections, the project assesses how a waste management company complies with processes for recycling these various kinds of waste into raw materials to be further used in production of other products. During the inspection and negotiation stages, the project ensures that the final products after recycling the waste contaminated with insecticide will not be used for food-carrying items.

In recycling the plastic waste, empty bottles, damaged face shields and plastic pumps are de-labeled, shredded, washed, dried, and sometimes melted and cooled into long thin rolls of rubber, which are cut into fine pellets for industries to produce pavement block, refuse bins and showcase corners.

In 2014, the project worked with Cyclus Elmina Plastic Recycling Company Ltd. to recycle plastic waste into material that was used to produce pavement blocks. In 2015, PMI VectorLink Ghana collaborated with Zoil Service limited to produce refuse bins from the project's recycled plastic waste.

Since 2012, the PMI IRS Ghana Program has **recycled 340,626 bottles into 29,113.3 kilograms of plastic. Out of these, 97,044 showcase corners were made.**

In 2018, the project partnered with Tema Steel Company Ltd. to recycle the metal waste (damaged steel pumps). **A total of 711 damaged steel pumps weighing 2.8 tons were crushed, melted and molded into 2.2 tons of iron rods.**

Fine Print Limited recycled a total of **5,078 empty cardboard boxes weighing 8.6 tons**. These were processed into 6.5 tons of fine reels of paper used to produce inner core of toilet paper, cardboard boxes and other paper products. The PMI VectorLink Ghana Project has chosen recycling instead of burning the waste to protect the environment, because burning would have released approximately **35,084kg carbon dioxide** into the atmosphere, which is harmful for the environmental and human health.

REFERENCES

Abt Associates, January 2017. PMI/Africa IRS Project, 2017 Ghana Work Plan and Budget, January 1, 2017 – December 31, 2017. USAID.

Abt Associates, July 2017. Ghana End of Spray Report: 2017. USAID.

Abt Associates, August 2012. Assessment and Recommendations: Storage, Stock Control, and Inventory Management. USAID.

Amendment 1 To The Ghana Supplemental Environmental Assessment For Indoor Residual Spraying For Malaria Control 2015–2020

Ghana Statistical Service, 2014. 2010 Population & Housing Census: Summary Report of Final Results. Sakoa Press Limited: Accra, Ghana, May 2012.

USAID 2015, Supplemental Environmental Assessment (SEA) for indoor residual spraying (IRS) in Ghana. 2015–2020

Title 22 of the United States 22 Code of Federal Regulations 216

USEPA, 2012. Clothianidin. Pesticide Tolerance. Final Rule. 77 FR 52246. August 29, 2012.

USEPA, 2003. Pesticides Fact Sheet: Clothianidin, Conditional Registration. Office of Prevention, Pesticide and Toxic Substances (May 30, 2003).

WHO, 2013. Test Procedures for Insecticide Resistance Monitoring in Malaria Vectors. World Health Organization, Geneva.

WHO, 2012. Global Plan for Insecticide Resistance Management in Malaria Vectors. World Health Organization, Geneva.

WHO-UNEP, 2006. Sound Management of Pesticides and Diagnosis and Treatment of Pesticide Poisoning: A Resource Tool. World Health Organization, Geneva.