

John Ogonowski and Doug Bereuter Farmer-to-Farmer Program (FY2019-23) Pesticide Evaluation Report-Safer Use Action Plan (PERSUAP)

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Acronyms

AI	Active ingredient
BEO	Bureau Environmental Officer
BFS	Bureau of Food Security
EA	Environmental Assessment
EC	European Community
EU	European Union
EUREP	Euro-Retailer Produce Working Group
F2F	Farmer to Farmer
FAO	Food and Agriculture Organization (United Nations)
FFDCA	Federal Food, Drug, and Cosmetic Act
FQPA	Federal Food Quality Protection Act of 1996
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FTF	Feed the Future
FY	Fiscal year
GAP	Good Agricultural Practices
GUP	General Use Pesticide
IEE	Initial Environmental Examination
IP	Implementing Partner
IPM	Integrated Pest Management
LOP	life of project
LWA	Leader with Associates
MOA	Ministry of Agriculture
MRL	Maximum Residue Level
MSDS	Material Safety Data Sheets
MSI	Minority Serving Institutions
OP	Organophosphate Pesticides
PAN	Pesticide Action Network
PANNA	Pesticide Action Network – North America
PERSUAP	Pesticide Evaluation Report-Safe Use Action Plan
PIC	Prior Informed Consent
POP	Persistent Organic Pollutants
PPE	Personal protective equipment
REI	Restricted Entry Interval
RUP	Restricted Use Pesticide
SOW	Scope of Work
SPS	Sanitary and Phyto-Sanitary

SUAP	Safe Use Action Plan
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
US EPA	United States Environmental Protection Agency
VC	Value Chain
WHO	World Health Organization
WTO	World Trade Organization

Programmatic Pesticide Evaluation Report

Section 1. Introduction and Background

1.1 PERSUAP Background

All USAID activities are subject to evaluation via, at a minimum, an Initial Environmental Examination (IEE) and if significant environmental effects are expected, an Environmental Assessment (EA). USAID's Pesticide Procedures (a sub-section of USAID's Environmental Procedures, found at 22 CFR Part 216, also known as "Reg. 216") state that all projects involving **assistance for the procurement or use, or both, of pesticides shall be subject to the procedures prescribed in 22 CFR 216.3 (b)(1)(i)(a through l)**.

Because of the high risks of pesticide use, USAID's Environmental Procedures require that 12 factors (in 22 CFR 216.3(b)(1)(i)(a **through l**) be addressed prior to providing assistance for the procurement or use of pesticides. The 12 factors are required to be addressed in a separate section of an IEE in which economic, social, and environmental risks and benefits of the planned pesticide use are evaluated to determine if a significant environmental impact will result. USAID refers to this analysis as a PERSUAP—a Pesticide Evaluation Report-Safer Use Action Plan. A PERSUAP focuses on the particular circumstances of the program being evaluated and the activities involving pesticide use and/or procurement, the pesticide management choices available, and the implementation of a safe use action plan (SUAP), designed specifically for the subject program.

It is unlikely that Farmer to Farmer (F2F) country programs and F2F volunteers will be involved in the procurement of pesticides. However, "**assistance for the use**" is interpreted broadly to include handling, transport, storage, mixing, loading, application, clean up of spray equipment, and disposal of pesticides, as well as providing fuel for transport of pesticides, and providing technical assistance and training in pesticide use and management. "Assistance for the use of pesticides" is said to occur if recommendations are provided for specific pesticides, including a recommendation to procure certain pesticides. This includes training courses in pesticide use, and includes information on safe pesticide use even if training does not involve actual application of pesticides. This broad interpretation of "assistance for the use of pesticides" applies throughout this Programmatic PERSUAP ("programmatic" because it applies to the entire F2F Program).

While the F2F program (see Attachment I for a description of F2F) presents some challenges for preparing a programmatic PERSUAP, it also provides opportunities, especially for acquiring targeted expertise in pesticide use and integrated pest management (IPM). Among the opportunities are the possibility of providing *sound* advice on pesticide use directly to farmers and pesticide applicators, extension officers, agro-input dealers, and others directly involved with pesticides.

1.2 Roles of F2F Volunteers as they relate to Pesticide Use

F2F volunteer Scopes of Work (SOW) focus on a variety of tasks; some volunteers will work directly with pesticides, some indirectly, and others not at all. For example, for volunteers who work in agricultural production (including post-harvest handling, aquaculture, and beekeeping), processing/value addition, or livestock production (cattle, goats, poultry, dairy, etc.), pesticides and IPM are likely to be integral to the volunteers' tasks and the volunteer may be required to recommend specific pesticides. In some cases, volunteers may be requested to provide training in pesticides, safe use, and IPM. These volunteers are expected to have an in-depth knowledge of pesticides and IPM, and would be expected to provide specific recommendations on pesticides to use, methods of application, etc. For purposes of this PERSUAP, these are considered **Type 1 Assignments**: these volunteers will likely be required to provide recommendations for specific pesticides (active ingredients (AIs) and/or products).

In other cases, such as vegetable, fruit, honey, and fish/seafood marketing, product branding, and business plan development, pesticide issues may arise, but may not be an integral part of the assignment, unless assistance involves addressing pesticide residues, particularly for export products to the U.S., Europe, and other developed countries with strict pesticide residue requirements. For purposes of the PERSUAP, these are considered **Type 2 Assignments**: these volunteers may encounter issues involving pesticide storage, disposal, application, safe use, etc. and may have opportunities to provide information and advice on safe use of pesticides. But they would not be expected to provide recommendations for specific pesticides.

Type 3 Assignments cover volunteers whose tasks typically would not involve pesticides, such as those volunteers involved with institutional strengthening, business plan development, training in financial management, etc.

Type 4 Assignments are volunteers who will be working directly on a USAID project other than F2F. These volunteers have an option of using that project's list of approved pesticides, if a pesticide the volunteer plans to recommend is not included in the F2F list of approved pesticides, but is included in the project PERSUAP (this might be a mission-wide, sector-wide, or project PERSUAP) approved pesticide list. Other than for specific pesticides, a Type IV volunteer should follow the F2F Safe Use Action Plan (SUAP, See Section 3), including the reporting requirements.

This Programmatic PERSUAP considers and covers all four types of assignments:

- F2F volunteers who will recommend specific pesticides (Type 1);
- F2F volunteers who, because of the nature of their assignments, may have opportunities to provide advice on safe use of pesticides (Type 2);
- Volunteers whose assignment will not include pesticides (these volunteers only need to be familiar with the Environmental Brochure (see below), and understand that in accordance with USAID's Pesticide Procedures, they may not provide advice or recommendations on pesticide use or procurement) (Type 3); and
- F2F volunteers working directly on USAID projects (these volunteers may comply with an existing project/sector/mission-level PERSUAP list of approved pesticides, as necessary) (Type 4).

“Flexible assignments” are also included in this PERSUAP. These are any F2F volunteer assignments programmed outside of a Country F2F project. Flexible assignments are used to: respond to targets of opportunity for substantial developmental impact, carry out exploratory activities in new areas or sectors,

and respond to unforeseen needs and opportunities of USAID Mission programs and partners. Flexible assignments may be in any country, within or outside of the geographic region for the core country F2F programs.

Based on the F2F Program (FY 2019 -2023) and the illustrative tasks that may involve pesticide use, this PERSUAP provides a USAID Bureau Environmental Officer (BEO)-approved list of AIs that volunteers can choose from for specific pesticide recommendations. It also includes requirements and guidance (See the SUAP, Section 3) for volunteers (Types I, II, and IV and flex assignments) to assist in their efforts to encourage and reinforce best practices for pesticide use, management, and IPM. The SUAP takes into account the various ways that volunteers may be requested to provide pesticide advice and recommendations based on the range of pesticide knowledge the volunteers are expected to have.

USAID and this PERSUAP strongly encourage the use of IPM and alternatives to pesticides in any recommendations and training on pesticide use. Under the IPM approach, pesticides are considered a tool of last resort and the pesticide chosen should, as far as feasible, be the least toxic.

1.3 Scope of the FY 2019-2023 F2F Programmatic PERSUAP

This FY 2019-2023 F2F Programmatic PERSUAP updates the FY 2013-2017 F2F Programmatic PERSUAP so that it covers the FY 2019-2023 F2F Program. As required by USAID’s Pesticide Procedures, it evaluates and guides F2F activities that involve “assistance for the procurement or use, or both, of any pesticide.....” This FY 2019-2023 F2F PERSUAP is being submitted as part of the F2F Initial Environmental Examination for F2F, which recommends a **Negative Determination with the condition** that: *No pesticides may be procured or used, or recommended for procurement or use without first completing an amendment to this Initial Environmental Examination that addresses the requirements of 22 CFR 216.3(b) including a Pesticide Evaluation Report/Safe Use Action Plan which must be approved in writing by the BFS Bureau Environmental Officer.*

This F2F Programmatic PERSUAP requests BEO approval of the list of pesticides approved in the FY 2013-2017 PERSUAP, plus additional pesticides added in and approved by Amendment 2 to the F2F IEE, and additional AIs requested for this PERSUAP. The three sets of pesticides are included in Attachment A, Table 1 (the pesticide AIs that this PERSUAP is submitting for BEO approval). New pesticides may be added to this approved list only by being added through an amendment to the PERSUAP approved by the USID/BFS BEO.

For the 2013 PERSUAP, each F2F implementing partner (IP) had compiled a list of pesticides based on best knowledge of the pesticides recommended for current program areas and value chains (VCs), and for the pests and diseases encountered in their country. It included AIs that can be used for crops, livestock, aquaculture, beekeeping, and other agricultural enterprises for which pesticides may be needed. Over the LOP, F2F IPs identified additional pesticides for inclusion in the program, which resulted in Amendment 2 to the F2F IEE. For the FY 2019-2023 PERSUAP, IPs submitted additional pesticide AIs for screening.

Additional countries, program areas, and VCs may be added during the life of the F2F Program (LOP). Given its “programmatic” nature, this PERSUAP is intended to cover these even though they currently may not be included in F2F. Also as with the 2013 PERSUAP, this PERSUAP covers yet-to-be-programmed F2F support through Associate Awards (USAID Mission funded) consisting of technical

assistance, training, and volunteer services, the sub-award program for new F2F implementers, and “flex assignments” (part of existing F2F contracts). These types of F2F activities may take place in one of the existing F2F countries or in countries that currently have no F2F program; and they may work with F2F target VCs, or with new VCs. For flex assignments, there is no Country F2F Office; therefore, in these cases, the home office has direct responsibility for oversight of the program, which includes implementation of the PERSUAP conditions.

This Programmatic PERSUAP enables the F2F program to respond to and comply with the requirements of USAID Regulation 22 CFR 216.3(b), USAID’s Pesticide Procedures. In sum, it addresses all possible uses of pesticides by F2F volunteers and covers F2F volunteer technical assistance and associated administrative, consultant, training, and technical assistance under the F2F Program. It includes the core country F2F projects, flexible assignments, and technical assistance, training, and volunteer services under Associate Awards and other mechanisms whereby Missions or other offices fund F2F volunteers. The PERSUAP is not country-specific, but specific to the F2F Program. An amendment to the IEE/PERSUAP is not needed if the F2F Program adds additional countries or VCs; however, the conditions in the SUAP must be complied with and reported on.

This PERSUAP covers all regions in F2F program countries. Because of its programmatic nature, it is impossible to identify the ecosystem types where F2F volunteers will be working; the ecosystem types are so wide ranging. Therefore, the SUAP provides recommendations and safeguards for volunteers to use to protect important/sensitive/critical ecosystems (wetlands and waterways, important watersheds, near drinking and washing water sources, protected areas, including national parks and forests, etc.).

This PERSUAP covers all types of pesticides, including herbicides, insecticides, fungicides, nematocides, rodenticides, miticides, and other pesticides and related chemicals. It includes the oral and injectable veterinary treatments (including antibiotics) for which F2F IPs requested approval. Oral and injectable veterinary treatments do not require USAID approval in a PERSUAP, and for any additional oral and injectable veterinary treatments that are not included in Attachment A, Table 1, an amendment to this PERSUAP is not needed.

Given the types of support F2F provides (described above), this Programmatic PERSUAP is able to recommend safeguards to ensure—no matter the country or the VC—that F2F “assistance for the procurement or use, or both, of pesticides” will have no unreasonable and foreseeable adverse effects on human health or the environment. This F2F Programmatic PERSUAP provides guidance for F2F IPs to ensure that their actions involving the use of pesticides (actions constituting “use” are described above) will have minimal or no significant irreversible adverse impacts and that the potential for positive effects are maximized.

Safeguards and guidance are provided as part of the Safe Use Action Plan (Section 3). This PERSUAP gives volunteers the flexibility to provide advice on pesticide use, and to recommend pesticides, in an IPM context, and within the framework of a safe use program.

1.4 Methodology

To prepare the FY 2013-2017 PERSUAP, IPs were asked to complete a detailed questionnaire, and this was followed up with an interview of each IP. This PERSUAP builds on the research and inputs from

five years of experience implementing the FY 2013-FY 2017 F2F PERSUAP.

To prepare this PERSUAP, IPs were again sent a questionnaire in which they were asked for any additional pesticides their volunteers had requested approval for; recommendations for the follow-on PERSUAP; successes and difficulties in implementing the PERSUAP requirements; and changes in the pesticide sector in their countries since the previous PERSUAP was prepared. The PERSUAP preparer then held follow-up interviews with five of the current IPs. The pesticide safety reviews conducted during 20015-2016 by F2F projects for each core country significantly contributed to the current PERSUAP.

Section 2. Pesticide Evaluation Report (PER): USAID's Pesticide Procedures

2.1 Factor a. USEPA registration status of the proposed pesticides

Attachment A, Table 1 lists all pesticides (AIs) requested by F2F country programs (2013 PERSUAP-approved AIs, plus amendment 2 to the F2F IEE, plus additional pesticides requested for this PERSUAP¹) for which this PERSUAP requests BEO approval, and shows USEPA registration status of each AI. AIs that are not registered by the USEPA may not be used or recommended (for use or procurement) by F2F volunteers. **The F2F Program requests approval from the USAID/Bureau of Food Security (BFS) BEO to provide assistance for the use or procurement of pesticide AIs that are listed in Attachment A, Table 1; all requested pesticide AIs are USEPA registered.**

In addition to USEPA registration status, Table 1 in Attachment A shows the WHO toxicity class of the pesticides requested. Any AI that is WHO toxicity class 1 (1a and 1b) was rejected due to its high toxicity. BEO approval is requested only for those pesticides that are WHO toxicity class 2 and above.

If a volunteer on a Type 4 Assignment (working on a USAID project other than F2F) wishes to recommend a pesticide AI not included in the list in Attachment A, Table 1, the volunteer should review the mission's other PERSUAPs, in particular, mission- or sector-wide PERSUAPs, and if that pesticide is approved, the volunteer may provide assistance for the use of that pesticide. However, the reporting requirements in this F2F PERSUAP should be followed no matter which pesticide list a volunteer uses. F2F IPs can contact the USAID mission AOR to obtain other available PERSUAPs.

USAID's Programmatic Environmental Assessment (PEA) for Fumigation of Title II Food Aid Commodities may be applicable to some F2F volunteer assignments. If a volunteer is involved in a Title II food aid project (Type IV assignment), for which the volunteer will provide assistance on fumigation, or if a volunteer is involved in an F2F activity that involves fumigation, the F2F volunteer should review the PEA (<http://www.usaidgems.org/fumigationPEA.htm>), and should comply with its requirements. The PEA allows assistance for the use of fumigants within a stringent framework.

As discussed in the SUAP, F2F volunteers must to verify that AIs and any products recommended are

¹ Potassium laurate, cinnamon, clove, cotton, and lemongrass oils, vegetable oils, diatomaceous earth, *Capsicum oleoresin*, Aromatic oil: Chevron 100 neutral oil, citronella oil, and chitin

approved/registered by the host country before an F2F volunteer recommends a specific pesticide (AI or product). For product level approvals, the F2F volunteer needs to do the due diligence to ensure that prior to recommending a specific pesticide product, it is considered a General Use Pesticide (GUP) by the USEPA or the equivalent of a GUP, and that it is USEPA toxicity level II or above or the equivalent (if the product is not USEPA registered; often products found in overseas markets are not USEPA registered). The volunteer also must ensure that the product is registered by the USEPA for the same or similar use (crop and insects/diseases) for which the volunteer is recommending it.

F2F volunteers should be aware of the often low level of understanding of the toxic effects of pesticides in many F2F countries. This situation is largely unchanged since the 2013 PERSUAP, as indicated in F2F Pesticide Safety Assessments (conducted under the auspices of F2F during 2015-2016). For example, there is a widespread misunderstanding in F2F countries that copper products are not highly toxic. According to <http://edis.ifas.ufl.edu/PI103>, the dust and powder formulations of copper compounds are irritating to the skin, respiratory tract, and particularly the eyes; and livestock seem uniquely vulnerable to copper's effects. Chronic effects have been reported by vineyard workers who experienced liver disease after 3 to 15 years of exposure to Bordeaux mixture. Yet Bordeaux mixture is very common, available, and accessible in many F2F countries, and some even perceive it to be a “natural” product.

Attachment A, Table 1 lists a range of AIs that can be recommended by F2F volunteers. Volunteers who provide recommendations for specific pesticides should also be prepared to discuss toxic effects and recommend mitigation measures (this is discussed in detail in the SUAP).

2.2 Factor b. Basis for selection of requested pesticides

For the 2013-2017 PERSUAP, F2F country programs were asked to provide the reasons they selected each of the requested pesticides. For most countries, the reasons for selecting pesticides included one or more of the following: availability, economical, very economical, inexpensive, effective, traditional use, good results, very good results, affordable, efficient, registered/approved by government, long-lasting effect, reliable, farmer-friendly, highly selective, broad-spectrum, and time-saving. As the 2013 F2F PERSUAP stated, “Notably, very few F2F programs gave a basis for selection related to environmental or health reasons. While the most common reasons for choosing the pesticides requested are valid—available, effective, and inexpensive, the replies from the country programs indicate that there is still major work that needs to be done before farmers, applicators, and extension officers, processors, and others who use pesticides consider human health and environment issues along with other reasons for selecting a specific pesticide.” From review of the F2F Pesticide Safety Assessments, the bases for selection of the requested pesticides are unchanged since the 2013 F2F PERSUAP was prepared.

The basis for selection of the additional (first-time requested) pesticides: cinnamon, clove, cotton, and lemongrass oils, vegetable oils, potassium laurate, diatomaceous earth, *Capsicum oleoresin*, Aromatic oil: Chevron 100 neutral oil, citronella oil, and chitin is to give F2F volunteers additional fairly low toxicity options to choose from, as F2F IPs had requested.

As far as how farmers (including crop, livestock, fish, and bees) and processors select the pesticides they use, the F2F Angola Pesticide Safety Assessment (2015) summarizes the issue, which is applicable-at least in part- to most F2F countries, “Farmers and applicators use products that are cost efficient without regards to personal safety, downstream consumer safety, or environmental impacts. Farmers are guided

in their pesticide use only by what their neighbors tell them.”

The SUAP includes specific recommendations for F2F volunteers to help raise awareness of the human health and environmental consequences of pesticide use with the aim of encouraging farmers, applicators, and others who use pesticides to consider human health and the environment when making pesticide choices. These recommendations will help ensure that F2F volunteers’ recommendations and advice on pesticide use have positive effects on human health and the environment.

2.3 Factor c. Extent to which the proposed pesticide use is, or could be, part of an IPM program.

USAID strongly encourages an IPM approach in agricultural production activities (crops, livestock, aquaculture, beekeeping, etc.). Under this approach, pesticides are considered a tool of ‘last resort’ and the choice of pesticide should as far as feasible be the ‘least toxic.’ Pesticide use should be judicious, and in accordance with best, safe use practices. Scouting, a routine and systematic way to gather information on crop problems and treatment efficacy, is the essential first step of an IPM program and is critical for early intervention of problems. In addition, rather than simply applying pesticides on a calendar schedule, IPM involves using threshold levels of pests to determine when to apply pesticides. When using thresholds, control action is warranted when the increased revenue expected from improved crop quality or yield will exceed the cost and adverse impacts of control. (See Attachment E for more information.)

As described in 2.2 above, most F2F country programs do not currently make their pesticide choices based on least toxic alternatives or on scouting and threshold levels. Also, over-use (as opposed to judicious use) is still common. That more highly toxic pesticides are often selected over less toxic may be due to limited availability of less toxic products, high cost of less toxic products, or lack of awareness of these products. Also, it is likely that farmers and extension officers are more accustomed to using the older, more highly toxic products. This FY 2019-2023 PERSUAP requests several additional pesticides, not included in the previous F2F PERUSAP, considered less toxic choices and that are compatible with an IPM approach.

As stated in the Pesticide Safety Assessment for Egypt (Land O’ Lakes, 2015), “Generally, the newer products are lower toxicity, but also more expensive, so many farmers continue to use cheap and readily available older more toxic materials, e.g. OPs and carbamates.” The Egypt Pesticide Safety Assessment found that, “The programs [of local NGOs] are well-based, but there is room for improvement. Interviews with the farmers showed that there could be further significant improvement in their understanding of IPM, pesticide application, and safety issues.” The author states, “Farmers know “integrated pest management” by name, but in interviews displayed no knowledge or examples of planned and integrated approaches to handling their pest management and crop production problems.”

The Angola Pesticide Safety Assessment (2015) concurs with this; farmers choose the older conventional pesticides rather than the least toxic. The author also states that, “Few of the individuals I talked with had much training in pesticide use. None mentioned any base or continued training in agricultural chemicals or IPM.”

The Guatemala Pesticide Safety Assessment (Partners of the Americas, 2015) states that, “...even though training regarding GAPs [Good Agricultural Practices] and IPMs [sic] technology, and Personal Protective Equipment (PPE) is provided to farmers as part of their pesticide safe use technical assistance; farmers, rather not use them to not risk their yield production.”

In regard to IPM, the Lebanon Pesticide Safety Assessment (Land O' Lakes, 2015) stated that, "There was no evidence that your average farmer practiced IPM, including resistance management, monitoring for pests and only spraying when necessary. There is distrust by some growers of chemical companies who are suggesting alternative products as part of a resistance management plan. The growers think the companies are just trying to sell them something."

The Ethiopia Pesticide Safety Assessment (CRS, 2015) states that, "The MoA [Ministry of Agriculture] provides extension officers with general agricultural training with only minor focus on the safe use of pesticides and IPM." However, "There are a number of groups and organization working to popularize and promote widespread use of IPM practices in Ethiopia.... These organizations hold IPM meetings and workshops frequently but there seems to be a lack of information that reaches MoA extension officers and farmers. Furthermore, the government does not produce and distribute information on IPM. There is no evidence of support from the private sector for the safe use of pesticides or IPM by farmers."

Based on a review of the F2F Pesticide Assessments, farmers (and others who use and advise on pesticides) in many countries are becoming more aware of the hazards of unsafe pesticide use, however, due to a range of reasons, including high price (for less toxic chemicals), perception of risk involved in IPM (versus using highly toxic pesticides), and poor communications or mis-communications among extension officers, other government staff, and agro-chemical dealers and pesticide users, IPM is still not widely practiced. (An example of misinformation was provided in the Ethiopia Pesticide Assessment: Some effort to teach farmers about IPM has been spearheaded by NGOs and even though there are efforts by some government research agencies to provide research-based IPM recommendations, this has not translated into practice. What farmers have adopted are techniques which alone constitute an alternative method to pesticide use, but cannot be referred to as IPM. For example, a farmer might use ashes for the control of stem borer in maize and think by doing so he/she has an IPM program. On the other hand, extension workers are not deeply familiar with IPM and are [in]capable of providing farmers general information on IPM.)

F2F volunteers, whose assignments directly or indirectly involve pesticides, have an opportunity to raise awareness about IPM, to encourage IPM, and to discourage poor practices.

A wide range of IPM practices are used in F2F countries and there is a wide range of understanding of IPM measures. Given this range, volunteers who recommend pesticides and provide pesticide training and advice, should be prepared to provide advice on IPM tactics/best practices as part of all recommendations involving pesticides. This will ensure that F2F assistance for the use or procurement of pesticides will not have adverse impacts and may have positive environmental and health effects. Training and recommendations for use shall include an IPM approach, and pesticides should be the last resort.

IPM information, submitted as part of F2F volunteer end-of-trip reports should be retained in F2F program files for the use of subsequent volunteers. These requirements, related to promotion of IPM, are included in the SUAP. In addition, Attachment E includes information on IPM measures.

2.4 Factor d. Proposed method or methods of application, including the availability of application and safety equipment

F2F Pesticide Safety Assessments describe some of the methods that farmers and other pesticide users use to apply pesticides and provide information on the availability of safety equipment and measures for maintaining application and safety equipment. Information from Pesticide Safety Assessments that best illustrate the situations in F2F countries is quoted below.

Application methods

As in the 2009 and 2013 PERSUAPs, IPs indicated that handheld sprayers and backpack sprayers are the most commonly used application method—backpack sprayers are more common than handheld. Motor sprayers, high volume, low volume, and ultra-low volume sprayers are used in some countries, most commonly in Uganda and Malawi. Seed treatments are also widely used, and some pesticides are applied as baits. These pesticide application methods remain unchanged.

The Mozambique Pesticide Safety Assessment (2016) states that, “Most products are applied using backpack sprayers. Farmers varied greatly in the use of application technique, personal protective equipment, and precautions used during pesticide application. Pesticides are not applied to European or USA safety standards or criteria.”

The Senegal Pesticide Safety Assessment (Winrock, 2015) states that, “Backpack sprayers were the norm for most farmers, with the exception of one farm near Dakar and the SODEFITEX cotton growers in the Tambacounda region. The horticultural farm near Dakar used large, self-propelled, as well as tractor mounted sprayers (3000 liter capacity). The equipment appeared to be well maintained. In Tambacounda, the cotton farmers used hand held, battery powered, ultra-low volume (ULV) sprayers.” In addition, the Pesticide Safety Assessment for Senegal noted that “The pesticide dealers we visited throughout the country sold primarily pump-up type sprayers in sizes of 1-4 gallons. A few dealers carried gasoline powered backpack sprayers. Most of the dealers were knowledgeable about the price and quality of the sprayers they sold. We asked if they provided calibration guidance and advice to applicators. The response was usually that they told the applicators what rate to use. The proper calibration of spray equipment did not appear to be a concern for most dealers or applicators.”

The Ethiopia Pesticide Safety Assessment pointed out some of the issues with application methods in that country, most of which apply to other F2F countries:

- **Improper application of pesticide** – MoA extension officers believe that the majority of pesticides are being misapplied by farmers and thereby compromising control of targeted pest(s) with untold environmental [impacts]. One example is the decline in honeybee populations that is believed to be due to the excessive application or misapplication of pesticide. More specifically:
 - **Calibration** – Farmers typically get their guidance for what pesticide to use from MoA extension officers. However, when it comes to the actual calibration, they rely totally on the information on the pesticide label, which is [only] generally prescribed.
 - **Mixing** – Farmers will use the water at their disposal to mix their chemicals which often tends to be from lakes, ponds, rivers, streams, or canals. They do not know how water source impacts pesticide effectiveness or how mixing two or more pesticides together may cause antagonistic or synergistic effects and compromise pest control.
 - **Application timing** – Farmers make their pesticide applications when they determine they have a problem or on advice of extension officers. Thus, when they make the pesticide application it is often mistimed thereby compromising efficacy.

- **Lack of training** – Extension officers have only basic training in pesticide calibration, mixing, and application. Without additional and routine refresher training, their advice to farmers is not current thereby contributing to the problem(s).

Availability of application and safety equipment

As in the previous F2F PERSUAP, access to application and safety equipment (due to the high cost and often centralized locations of shops that sell the equipment) and willingness of farmers, applicators, and other pesticide users to purchase and use PPE are still major constraints to the use of PPE. For the 2009 and 2013 F2F PERSUAPs, most IPs stated that the expense of protective equipment is an issue and a reason that farmers and other pesticide users fail to use protective gear. The exception may be where USAID or another donor has provided vouchers or has subsidized the cost of the equipment. This remains unchanged.

The following findings from F2F Pesticide Safety Assessments are indicative of the situations in F2F countries.

The Tajikistan Pesticide Safety Assessment (ACDI/VOCA, 2015) found that, “While the safety equipment available to the farmers varied from shop to shop, in general very little was done in the way of protecting either the salesmen or the customer from coming into contact with pesticide residue.”

The Guinea Pesticide Safety Assessment (2015) stated that, extension agents agreed that even with National Plant Protection Laboratory and agricultural agents in the villages there is still misuse occurring. Misuse is reported to be rampant. The use of PPE is mandated but probably not occurring.” The author of the Guinea Pesticide Assessment stated further that, “While in Conakry interviewing Ministry Officials and legal pesticide importers I was assured that PPE was readily available and used. But that was not the situation in Kindia and Mamou. Agriculture agents and farmers both reported that the cost was prohibitive. But often even when people had the money and wanted to purchase a PPE kit none were available. One of the retailers in Mamou confirmed that there were no kits available from him right then and did not know when he would more.”

To the question, “Do agro-input suppliers carry Personal Protective Equipment (PPE)? If not, why not?” the author of the Egypt Pesticide Safety Assessment stated: “No. There is a complacency throughout the supply chain that even if readily available, farmers would not use PPE. This attitude was disappointingly confirmed by all direct interviews with farmers. Farmers offered the usual excuses for not wearing PPE: too hot (the answer to this is to apply at dawn or dusk, when temperatures are low); farmers think they have built up a resistance (they didn’t sound like they were joking when they said this); finally, a root cause surfaced – they were afraid of being teased by other farmers for being not macho enough.”

The Nicaragua Pesticide Safety Assessment (Partners of the Americas, 2015), states that “Overall, over 95% of Nicaraguan growers and farm laborers interviewed were aware of or had been taught the correct principles, laws and regulations regarding pesticide storage, transport and handling, and spray application techniques to avoid overexposure to pesticides. This, however, does not mean that 95% of growers and

farm laborers are strictly following the laws and regulations according to good agricultural practices or by following labeling on individual pesticides. In fact, the large majority of farm laborers failed to use even minimal personal protective equipment primarily due to the high heat and humidity associated with farm labor practices.” The author found that, “The majority of growers and field workers that directly work with pesticides are aware of the Nicaraguan pesticide laws and regulations. The majority of growers use pesticides according to the labels; however, the percentage of those growers and field workers using personal protection equipment was very low. Most had safety equipment available, but chose not to use them. Growers and farm owners don’t require their workers to use them since many won’t spray if they have to due to the excessive heat exhaustion that can occur while out in the fields. It does appear that the majority of spray applicators wore long sleeve shirts. It was also apparent that many workers used the same clothing for days and if these contained residues, they could have excessive exposure to pesticides from their clothing.”

The Mozambique Pesticide Safety Assessment (2016) found that, “The Department of Plant Sanitation requires Personal Protective Equipment (PPE) as noted on the label during pesticide application. Most vendors carried PPE inventory and sold safety items to applicators. Many farmers do not wear PPE and some indicated it was too expensive or uncomfortable to wear. In general, farmers were well aware of the dangers of pesticide exposure and were receptive to safe use and pesticide management techniques like IPM but due to economic conditions or other reasons they did not fully comply with the safe application portion of the label.”

Maintenance of safety equipment

Maintenance of safety equipment (including application equipment) remains a problem, as it was when the 2009 and 2013 PERSUAPs were prepared.

In response to the question, “Are applicators knowledgeable about maintenance of application equipment?” the author of the Pesticide Safety Assessment for Egypt stated that, “It is doubtful that extra checks are ever made that the old pressure gauges are really calibrated properly, or the spray tip is really as uniform as it should be (and was when it was new). Every repair is “rule of thumb” approximate.

The Senegal Pesticide Safety Assessment found that, “The farmers we spoke to seemed to understand and practice maintenance of their application equipment. The biggest concern for the farmers and dealers was the quality of some of the backpack sprayers, especially those made in China.”

The Angola Pesticide Safety Assessment stated that, “Agricultural supply store clerks seem to know about basic pesticide safety, the inventory available, and equipment repair. Only one high pressure tractor mounted sprayer was observed on a farm (Agricultiva), although several were observed in Ag supply stores. Most spraying was accomplished using backpack sprayers. These units are simple to operate and require minimum, but constant pumping to maintain an unregulated and variable spray pressure. Some units can be purchased that maintain a preset spray pressure but none of these backpack sprayers were observed. Maintenance of these units is minimal and their cost is low. Normally when a unit breaks, it is replaced and not fixed.”

Lack of secure storage of equipment is also a problem commonly mentioned by F2F IPs. The Senegal Pesticide Safety Assessment states that, “Food products are occasionally stored in pesticide storage areas and sometimes pesticides are stored in the farmer’s house for security reasons.” The Senegal assessment also found that, “By far the best storage of pesticides we encountered was by the SODEFITEX farmers in the Tambacounda region. SODEFITEX provided regional and village level storage buildings that were well constructed with lockable doors. The village-level buildings we toured held only pesticides and spray equipment. The one regional storage building we visited was used for pesticide and fertilizer storage. All of the SODEFITEX storage buildings were somewhat disorganized, having empty pesticide containers, no cabinets or shelves, and no separation of chemicals by class or kept away from fertilizers. In Saint Louis we visited a grower that stored small pesticide containers in holes in the ground that were dug just big enough for the container to fit below the ground surface. He then covered the container with dried vegetation. He said he used this method to keep the product cooler, in the shade, and hidden from children or thieves. Other farmers used small huts, shacks, or their own homes to store their pesticides and farming supplies.”

For the most part, F2F countries concur that dealers of agricultural inputs and agriculture extension workers need to be better trained on PPE and safety equipment maintenance since they are the ones who have the most interaction with farmers, and who farmers view as the experts. However, even when farmers are knowledgeable of the need for PPE, farmers refuse to use PPE due to be the perceived high cost and discomfort. More recently, the poor quality of PPE (and application equipment), mostly originating from China, is now a concern.

Even so, all IPs agreed that **the use of safety equipment can be increased by raising awareness among agro-input dealers and farmers so that they use proper safety equipment, such as waterproof aprons, masks, gloves, boots, hats, glasses, etc., in accordance with labels and that ongoing training is needed in maintenance of application equipment and PPE.**

2.5 Factor e. Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazards

Attachment A, Table 1 gives the acute and chronic human toxicity levels, based on the WHO classification system, of all F2F-requested AIs. The table also makes note of AIs considered “PAN Bad Actors,” a system denoting particularly toxic pesticides. Both the WHO classifications and PAN Bad Actors system are described in Attachment A.

Attachment A Table 1 shows all AIs that IPs requested *except* those not registered by the USEPA and those considered too highly toxic for use in F2F countries; the too highly toxic pesticides are WHO toxicity level 1a and 1b, and other AIs of concern due to human health or the environment. Table 1 in Attachment A includes only those AIs for which this PERSUAP requests BEO approval; as such, Table 1 is the list of AIs that F2F volunteers may use or recommend. Formulated products that F2F volunteers use or recommend may be comprised of only the approved AIs, and no other AIs.

The USEPA rates the toxicity of formulated products for USEPA registered products only. Many of the products available in F2F countries are not registered by the USEPA, and therefore, the label has no USEPA toxicity rating. In addition, some pesticide formulations are more toxic than their AIs alone because of surfactants, adjuvants, or other ingredients in the formulation. The SUAP requires F2F volunteers to ensure that they recommend only *products* that are the equivalent of USEPA toxicity level II and above; or if they recommend *active ingredients*, they should ensure that formulated products are

actually available in the host country at USEPA toxicity level II and above (or the equivalent for a non-USEPA registered product).

The SUAP requires mitigation measures for AIs of special concern for human health; these measures are outlined in Attachment B. Specifically, appropriate safeguards must be taken for pesticide AIs noted to have acute and long-term toxicological hazards to humans (Attachment B). **Given the responses in the F2F Pesticide Safety Assessments (conducted in 2015 and 2016) regarding limited knowledge of the human health hazards of pesticides, and the limited accessibility, use, and maintenance of protective gear, F2F volunteers should be prepared to provide sound, practical information about safeguards. In this regard, F2F volunteers should refer to Attachment B, which contains mitigation measures to minimize impacts to human health.**

To help identify potential impacts to water resources (wetlands, waterways, drinking water, etc. and fish and wildlife that rely on these resources), Attachment A provides groundwater contamination potential of approved AIs. For AIs that show high potential to contaminate groundwater, appropriate precautions should be taken as discussed in Attachment C. However, given the lack of attention to environmental hazards noted in the F2F Safety Assessments, and the potential environmental hazards presented by pesticide use, appropriate precautions to minimize adverse impacts on the environment should be taken for all pesticides. As applicable to their SOW, F2F volunteers should instill best practices in mixing, storing, applying, disposing, and transporting of *any* pesticide. **If an F2F volunteer is training in pesticide use, best practices should be encouraged for all pesticides. Attachment C includes a range of best practices to minimize impacts of pesticide use on the environment.**

F2F volunteers should be aware of the often low level of understanding of the environmental hazards of pesticides, and the widespread misuse of pesticides. Volunteers should also be aware that many farmers, applicators, and other pesticide users may have a low level of education as noted in several F2F Pesticide Safety Assessments, and may either be illiterate or unable to read and understand English, and alternatives to English training materials may be needed.

With well-informed and prepared F2F volunteers, equipped to provide guidance to F2F beneficiaries on mitigating impacts of pesticides to human health and the environment, F2F assistance for the use or procurement of pesticides is unlikely to have adverse effects; and F2F input will likely result in improved practices, with positive human health and environmental effects. The measures in Attachments B and C provide recommended mitigation measures, which should be provided in conjunction with all F2F assistance for the use or procurement of pesticides.

2.6 Factor f: Effectiveness of the requested pesticide for the proposed use

For most of the IPs, *effectiveness* was one of the primary reasons for selecting a pesticide for screening in this PERSUAP. Often, however, a pesticide is effective because it is highly toxic, and therefore, also presents a hazard to human health and the environment. As stated in the Georgia EPI PERSUAP (DCN: 2015-GEO-033), when farmers use a pesticide, they want to see the insect die right away.

Newer, sometimes more expensive pesticides may be just as effective as some of the more commonly used, but highly toxic options. Also, what are commonly considered “organic pesticides” may be just as effective (although there is a common misconception that they are not toxic at all; for more information, see Gary Fish, State of Maine, Board of Pesticides Control, “Organic Pesticide’ is not an Oxymoron”).

F2F volunteers can help farmers, processing facility facilities, applicators, and other pesticide users monitor efficacy of a pesticide product, and guidance for this is included in Attachment F. F2F volunteers can also help beneficiaries identify less toxic and efficacious pesticides (also see Attachment G for useful websites).

As confirmed in many of the Pesticide Safety Assessments (2015-2016), the problem of product adulteration continues to be a concern for most F2F country programs. Adulterated products minimize the efficacy of a product. Obsolete products are also a concern; obsolete products are also commonly sold in most F2F countries. Governments of many F2F countries are unable to adequately control adulteration or the continued sale and use of obsolete products.

Attachment F provides guidance on monitoring efficacy and adulteration, and includes measures to protect against adulteration and use of obsolete products. In addition, **F2F volunteers who recommend specific pesticides should ensure that the pesticide recommended is the most effective, while least toxic, for the proposed use.** Armed with the information in Attachment F, F2F volunteers will be able to help protect against the use of adulterated and obsolete products; will be able to help farmers and other pesticide users monitor efficacy of pesticides used; and will be able to help beneficiaries select the least toxic pesticide for the proposed use (with the condition that the recommended pesticide AI must be approved by this F2F PERSUAP).

2.7 Factor g: Compatibility of the proposed pesticide use with target and non-target ecosystems

Most of the Pesticide Safety Assessments indicated that there was little awareness and implementation of measures to avoid impacts to non-target organisms. If used improperly, all pesticides can be hazardous to non-target ecosystems, fish, wildlife, and beneficial insects, spiders or other pest predators.

Poor pesticide practices that could impact non-target ecosystems and organisms are common in F2F countries: over-use and other misuse of pesticides, such as using the wrong pesticide for the pest or disease; mixing and disposing of pesticides without using precautions to protect soil, water, and natural vegetation, lack of attention to drift, applying pesticides during times that beneficial insects, spiders and other pest predators are active, etc.

In addition, in F2F countries, broad spectrum pesticides are commonly used—pesticides that kill a wide range of organisms, and selective pesticides are less commonly used. Intact pesticide labels will normally include information on a pesticide product's effects on non-target organisms. However, in several F2F countries, pesticides are often found re-packaged and without intact labels, and as mentioned, F2F beneficiaries may be illiterate or unable to read the language of the pesticide label.

F2F volunteers should be aware of the limited knowledge in many F2F countries about pesticide effects on non-target ecosystems and organisms; and they should also be aware that possible alternative pesticides—those less hazardous to non-targets—may be inaccessible (unavailable, expensive, or not registered by the country).

Attachment C provides guidance for volunteers to help ensure their recommendations for specific pesticides will be the least hazardous to non-target ecosystems, fish, wildlife, and beneficial insects, spiders and other pest predators. Attachment C also includes precautions to take to minimize impacts to fish, birds, and wildlife, and it includes a list of pesticides that are moderately or highly toxic to honey

bees. F2F volunteers should be prepared to provide this information to F2F recipients when providing recommendations for the use or procurement of pesticides.

Though derived from natural sources, botanicals are not necessarily safer or less toxic than synthetic pesticides. In fact, most botanicals are broad-spectrum insecticides, which kill both good and bad insects indiscriminately. Some botanicals are highly toxic to fish, wildlife, and domestic animals, others cause allergic reactions in people and some may even be carcinogenic. For example, although relatively harmless to humans, pyrethrins are very highly toxic to fish and bees and moderately toxic to birds. Pyrethrins kill both beneficial and pest insects. Although pyrethrins are naturally-derived, many commercial products contain pyrethrins. All pesticides – including botanicals – should be used only as a last resort and safe practices should be applied.

As mentioned in several F2F Pesticide Safety Assessments and as discussed above, F2F beneficiaries' main concern will likely be managing the pest or disease that is affecting their crop, livestock, fisheries, or other product. They may be unconcerned about non-target organisms and ecosystems or have little or no knowledge of a pesticide's effects on non-targets. They will likely be unaware of mitigation measures to protect non-targets. F2F volunteers may have the opportunity to provide guidance and practical safeguards.

Attachment C provides a range of best practices that F2F volunteers can use and encourage others to use. These best practices should be recommended in conjunction with any pesticide recommendations (including when conducting pesticide training).

2.8 Factor h: Conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology, and soils

F2F volunteers will be working in many core countries (the 2013-2017 program worked in 26 core countries), and within F2F countries, volunteers may work in any region. In addition, over the LOP, additional countries may be added. Flex assignments will take place in non-core countries. Therefore, it is impossible in this Programmatic PERSUAP to provide information on the range of climatic, floral, faunal, geographic, hydrologic, and soil conditions that will be found in areas where F2F volunteers will be working. However, guidance is provided in the SUAP to help ensure there will be minimal or no significant irreversible adverse impacts to the environment – whatever the conditions under which pesticides will be used or recommended.

Of particular concern are aquatic resources. These act as sinks for eroded soil and effluent, and safeguards must be in place if pesticides are to be used adjacent to, or upslope from aquatic environments. Aquatic resources can be contaminated when pesticide applicators wash pesticide sprayers and other equipment in or near waterways and when applicators indiscriminately dispose of pesticide residue and pesticide containers. Contamination can also occur directly from applying pesticide on crops, livestock, and soil. This contamination could be from pesticides that enter the waterway either directly or combined with soil from field runoff after rains or from pesticide spray drift.

Each pesticide has physical characteristics, such as solubility in water and ability to bind to soil particles and be held (adsorbed) by soil so they do not enter the soil water layers and the groundwater table. This data can be found for F2F pesticides by checking each pesticide on the PAN website: <http://www.pesticideinfo.org>. The water solubility, soil adsorption, and natural breakdown rates, if available, are included at the bottom of the webpage for each parent chemical.

In general, pesticides with water solubility greater than 3 mg/liter have the *potential* to contaminate groundwater; and pesticides with an adsorption coefficient of less than 1,900 have the *potential* to contaminate groundwater (potential to contaminate groundwater is also indicated in Attachment A, Table 1). And, pesticides with an aerobic soil half-life greater than 690 days or an anaerobic soil half-life greater than nine days have the *potential* to contaminate groundwater. Pesticides with a hydrolysis half-life greater than 14 days have *potential* to contaminate groundwater. All of these statements are generalizations, but good rough guides to anticipated pesticide behavior in soil and water. However, each pesticide requires individual investigation and research.

As noted in Attachment A, Table 1, some of the F2F pesticides are potential groundwater contaminants. These pesticides in particular, but others, as well, should not be mixed, applied, stored, or disposed of adjacent to or upslope from waterways, wetlands or drinking water sources without appropriate safeguards described in the Attachment C.

Another significant concern is the group of pesticides called neonicotinoids. Neonicotinoids are systemic insecticides; they are absorbed by plants, make nectar and pollen poisonous, and therefore, they can be highly toxic to bees and other pollinators. Also, they are very long-lasting. Neonicotinoids are implicated worldwide in bee die-offs. A growing body of research also demonstrates neonicotinoid toxicity to other beneficial invertebrates such as earthworms, wasps, and lady beetles.

Neonicotinoids are the most widely used group of insecticides in the world. When registered in the mid-1990s, they were promoted as low-risk chemicals with low impact on human health, low toxicity to non-target organisms, lower application rates than other commonly used insecticides, and compatibility with IPM. Subsequent studies have shown that these claims are not valid. (See www.xerces.org/pesticides for more information about neonicotinoids.)

This PERSUAP requests approval to use three neonicotinoids, acetamiprid, thiacloprid, and thiamethoxam. In conjunction with recommendations to use neonicotinoids, the safeguards described in Attachment C should be promoted. Additional references about pesticide risks and measures to protect pollinators, can be found at:

<https://www.epa.gov/pollinator-protection>, <https://www.epa.gov/pollinator-protection/find-best-management-practices-protect-pollinators>,

<https://pesticidestewardship.org/pollinator-protection/pesticide-applicator-bmps/>.

As discussed above, given the number of countries where F2F volunteers will work, and the variety of ecosystems within each country, it is impossible at this stage to identify the flora and fauna at F2F sites. However, safeguards are available to protect non-target flora and fauna. **Attachment C includes measures to protect national parks, forests, and other protected areas. Recommended in conjunction with F2F assistance for the use or procurement of pesticides, these measures will help ensure that the F2F program will have minimal or no significant irreversible effects on a host country's protected areas, ecosystems, flora, and fauna.**

2.9 Factor i. Availability of other pesticides or non-chemical control methods

Non-chemical methods used by farmers in F2F countries are predominantly cultural and mechanical practices. For example, weed control by hand may be used instead of or before the application of

herbicides. Cultural pest management methods include crop rotation, using clean seed, variable planting times, good water management, and use of manure. In many F2F countries non-chemical methods are the most common pest control methods because they are the least expensive. The high price of pesticides is a deterrent to their use in many F2F countries; as mentioned in most F2F Pesticide Safety Assessments, many of the decisions that F2F beneficiaries make about using pesticides versus other measures, using PPE, maintaining equipment, etc., are based on cost.

While many Pesticide Safety Assessments noted that government, NGOs, and/or donors provide information and training in IPM, the assessments also stated that especially for smallholders, more could be done to increase capacity in and acceptance and use of IPM. Almost all F2F Pesticide Safety Assessments mentioned the need for more and continued training in non-chemical methods of control. In addition, less toxic pesticides are not widely known, and as mentioned, often are more expensive in F2F countries than the more highly toxic pesticides.

This PERSUAP requests that a wide range of AIs be approved (Attachment A, Table 1). They cover a range of pesticide families. If a pesticide in Attachment A, Table 1 is registered by the host country, and if it is available in-country, volunteers have a range of AIs to choose from. Accordingly, the pesticides of choice should be the least toxic alternatives. And pesticides should be used as a last resort control measure, in accordance with IPM principles. In addition, biological and organic pesticides should be investigated and encouraged. These principles and practices are included in Attachment E.

2.10 Factor j. The host country's ability to regulate or control the distribution, storage, use, and disposal of the requested pesticide

The intent of this factor is to examine the host country's existing infrastructure and human resources for managing the use (from import to disposal) of proposed pesticides. If the host country's ability to regulate pesticides is inadequate, assistance for the use or procurement of pesticides could harm the environment and put human health at risk. However, **in the absence of adequate government management of the pesticide sector, expert volunteer technical assistance can encourage and potentially improve the safe use of pesticides.**

F2F Pesticide Safety Assessments provided information on F2F host country governments' abilities to regulate pesticides. Examples of findings are:

- The government of Lebanon uses several reference countries in order to assess whether they should consider registering a pesticide in Lebanon, and the appropriate crops and use patterns to allow on the label. These countries are: US, UK, Japan, and Switzerland. One official also mentioned "Europe."
- No one in the retail arena mentioned any government compliance regarding pesticide use or sale [in Angola]. If such laws are on the books, few agriculture officials know anything about them. It is not clear how or if obsolete pesticides are dealt with in Angola but a list does exist that prohibits certain pesticides from use, importation and sale.
- The Government of Guatemala screens and safeguards the chemicals coming into the country guided by regulatory standards organizations used by global enterprises such as Food and Agriculture of the United Nations (FAO), United States Environmental Protection Agency (USEPA), US Food and Drug Administration (FDA), USDA, Codex and the Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP). Even though these regulations are in place, illegal

trade of agrochemicals through the Guatemalan border with other Central-American countries is still an issue with small farmers.

- In Guatemala, the lack of resources (financial and personnel) was also considered a big problem. For instance, to this day, only two (2) agronomical engineers are in charge of monitoring over 1,000 importers and 3,000 agro-services, as well as taking care of quality control.
- The [Kyrgyz] Department of Plant Protection and Pesticide Registration Committee under the Ministry of Agriculture and Melioration is responsible for updating the list of registered pesticides. Only about 50 % of all Kyrgyz Republic registered pesticides can be procured or used in USAID projects due to USAID limitations (Toxicity Class 1, RUP, and known carcinogenicity).
- In Egypt, official efficacy trial results are done at 233 government research stations, for all registered insecticides in Egypt. In addition, [the government research stations] conduct research on IPM systems, and most notably, biological control agents, e.g. *Trichogramma* spp., *Bt* var. *kurstacki*, *Beauveria bassiana*, and *Metarhizium anisopliae* strains. He pointed out the website – apc.gov.eg – as a good source for information on all approved pesticides in Egypt. To register a pesticide in Egypt, the initial registration dossier must contain at least 2 years of official efficacy trial data, based on local field trials. These official trials evaluate efficacy against the target pests listed on the label, potential adverse effects on beneficials, and potential for phytotoxicity or other adverse effects.
- Government of Senegal and industry representatives report there are some questions/problems with the efficacy of legally imported active ingredients and formulations, especially those from China. Government agencies and some private companies (ex. SODEFITEX) conduct educational programs on pesticide use and safety for farmers and applicators. The quality of the trainings at the farmer level is not always well monitored and the quantity of trainings falls short of reaching all farmers and applicators. The author of the Senegal Pesticide Safety Assessment found that the knowledge of government officials concerning pesticides and pest management issues seemed to be very good at both the national and regional levels.
- Pesticide registration in Armenia is done by the Ministry of Agriculture’s (MOA) State Service for Food Safety (SSFS) in cooperation with MOA’s Plant Production and Plant Protection Department along with a committee of experts from other ministries. Registration of a new pesticide product takes from 2-5 months. SSFS posts results of new pesticide registrations on its website: www.arlis.am.

Registered pesticides for each F2F country vary; some include more chemicals and products than others; some include more information (commodities the pesticide may be used on) than others. **F2F volunteers should only recommend pesticides included in Attachment A, Table 1 and that are on the host government approved list. This condition is included in the SUAP.**

Most F2F Pesticide Safety Assessments acknowledged that unregistered pesticides may be entering F2F countries. In many of these countries, regulations covering pesticide import exist, but enforcement may be weak. Obsolete and illegal pesticides cross into F2F countries through relatively porous borders. Constraints to enforcement include limited human and financial resources and limited technical capacity.

Government regulations covering transportation and labeling/packaging vary among F2F countries, and abilities to enforce these regulations also vary. F2F volunteers should be aware that pesticides are often sold after being repackaged, and may not have labels; may have “forged” labels, and may actually be obsolete products or adulterated. It is unlikely that F2F volunteers will be able to rely on intact labeling,

and should be prepared to provide advice in place of label directions.

F2F volunteers should especially be aware that few, if any F2F host countries have a program comparable to those in the US to certify applicators. And for this reason—and also because of USAID policy—no RUPs should be recommended (see recommendations in the SUAP). **Rather than relying on government control and regulations, F2F volunteers can encourage, from bottom-up, good practices in storage, use, and disposal.** “Best practices” are included in Attachments to the SUAP.

2.11 Factor k. Provision for training of users and applicators

F2F volunteers may be recruited to provide training for pesticide users, agro-input dealers, pesticide applicators, extension officers, and others involved with pesticides. However, it is up to the F2F country partner to request a volunteer and to specify the tasks. F2F country programs can market the IPM skills of their volunteers and promote the use of volunteers for training in IPM and safe use. Given the need for this type of training, as indicated by the F2F Pesticide Safety Assessments—and that the situation has improved little since the 2013 F2F PERSUAP was prepared, F2F country programs should market their volunteer IPM/safe use experts to their host countries. This would fill a gap noted by all F2F country programs, and a constraint to improved pesticide practices.

2.12 Factor l. Provisions made for monitoring the use and effectiveness of each pesticide

F2F volunteers are in-country for short periods of time, usually no more than 30 days. The technical assistance provided to producer associations, extension officers, individual farmers (e.g., crop, livestock, and aquaculture), input dealers, and others is based on an SOW with clear-cut objectives. Unless explicitly stated in the SOW, volunteers may not have the opportunity themselves to monitor the use and effectiveness of pesticides. Therefore, volunteers who provide advice on pesticide use, should be prepared to also provide information on how to monitor the use and effectiveness of the pesticides recommended.

To help farmers, processing facilities, and pesticide applicators monitor efficacy once the volunteer is gone, the F2F volunteer could draw up simple monitoring plans, and could train recipients to collect data on reduction in efficacy and other environmental impacts which should trigger a change to a different pesticide or a different method of control. **Simple forms that F2F beneficiaries can easily use are best. Volunteers who prepare such plans should submit them to the F2F country office so that subsequent volunteers can build on them, incorporating lessons learned.** In this way, the monitoring plan will be a working document, available for other volunteers. See Attachment F for recommendations for monitoring plans.