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FARMER TO FARMER PROGRAMMATIC PESTICIDE EVALUATION REPORT AND SAFE USE ACTION PLAN (PERSUAP)



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PROGRAMMATIC PESTICIDE EVALUATION REPORT and SAFE USE ACTION PLAN (PERSUAP)

Activity Location:	Global: activities in over 30 countries including Egypt, Lebanon, Ghana, Mali, Nigeria, Kenya, Uganda, Tanzania, Georgia, Moldova, Tajikistan, Serbia, Uzbekistan, Angola, Malawi, Mozambique, Dominican Republic, Guyana, Haiti, Nicaragua, South Africa, Belarus, Dominic, Grenada, Mexico, Guatemala, El Salvador, Peru, Colombia, Bolivia, Dominican Republic, Sumatra, Ethiopia, Uganda, St. Kitts and Nevis
Activity Title:	John Ogonowski Farmer-to-Farmer Volunteer Programs
Life of Project:	FY 2009-FY 2013
Program Funding:	$75 million

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Acronyms

EC ..... European Community
EGAT .....Economic Growth, Agriculture, and Trade (Office of USAID)
EU ..... European Union
EUREP ..... Euro-Retailer Produce Working Group
FAO ..... Food and Agriculture Organization (United Nations)
FTF ..... Farmer to Farmer
GAP .....Good Agricultural Practices
GUP ..... General Use Pesticide
IEE ..... Initial Environmental Examination
IPM ..... Integrated Pest Management
MRL ..... Maximum Residue Level
OP ..... Organophosphate Pesticides
PANNA ..... Pesticide Action Network – North America
PERSUAP ..... Pesticide Evaluation Report-Safe Use Action Plan
PIC .....Prior Informed Consent
POP ..... Persistent Organic Pollutants
RUP .....Restricted Use Pesticide
SOW ..... Scope of Work
SPS .....Sanitary and Phyto-Sanitary
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

Pesticide Evaluation Report

Scope of the Programmatic Review

In accordance with the Scope of Work, (Pesticide Evaluation Report, Attachment A), this Programmatic PERSUAP evaluates the Farmer-to-Farmer (FTF) Program's proposed assistance for the use of pesticides in 21 countries in which FTF currently has active programs. Also, given the "programmatic" nature of this PERSUAP, it can be applied to countries where FTF is not currently working in, but where FTF may implement volunteer programs in the future.

The target value chains (VCs) for each country program are listed in Section 1.2. In addition to these, FTF may be requested to provide assistance in a VC not among the current target VCs. Again, given its "programmatic" nature, this PERSUAP is intended to cover VCs that are not yet included as part of a FTF country program.

The PERSUAP also covers yet-to-be-programmed FTF support through Associate Awards (USAID Mission funded), the Special Program Support Project (through Weidemann Associates), and "flex assignments" (part of existing FTF contracts). These types of FTF activities may take place in one of the existing FTF countries or in countries that currently have no FTF program; and they may work with FTF target VCs, or with new VCs. In sum, this Programmatic PERSUAP covers FTF volunteer technical assistance and the associated administrative, consultant, training, and technical assistance under the FTF Programs. This includes the core country FTF projects, flexible assignments, and volunteer services under Associate Awards and other mechanisms whereby Missions or other offices fund FTF programs.

Given the types of support FTF provides (described in Section 1.2), this Programmatic PERSUAP is able to recommend safeguards to ensure—no matter the country or the VC—that FTF "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 FTF Programmatic PERSUAP provides guidance for FTF implementing partners to ensure that their actions involving the use of pesticides (actions constituting "use" are described in Section 1.2) will have no adverse impacts and aim to have positive effects. Safeguards and guidance are provided as part of the *Safe Use Action Plan* (SUAP, Section 4).

Prior to the preparation and approval of this PERSUAP, FTF volunteers were informed of USAID's Environmental Procedures, including the pesticide requirements, and were told that they were not allowed to provide advice on pesticide use. This allowed the FTF Program to remain in compliance with the FTF IEE (discussed in Section 1.1). Although there is a need, FTF implementing partners avoided assignments that directly related to pesticide use. This PERSUAP is expected to give volunteers the flexibility to provide advice on pesticide use, and to recommend pesticides, in an Integrated Pest Management (IPM) context, and within the framework of a safe use program. Rather than avoid pesticide issues, FTF volunteers can now provide recommendations on use of least toxic pesticides and alternatives to pesticides, provide safe use and IPM recommendations, and can recommend improved practices in transport, storage, mixing, application, and disposal of pesticides.

Scope of the Pesticide Analysis

The pesticides analyzed in this PERSUAP were compiled by each FTF implementing partner based on best knowledge of the pesticides recommended for current VCs, and for the pests and diseases encountered in their country. Each FTF implementing partner was asked to provide a list of active ingredients and products that the country program intends to "use or recommend" over the five-year FTF implementation period—this required some prediction on the part of FTF country programs. The

intention was to compile as complete a list as possible to minimize the need for future amendments to the PERSUAP.

Active ingredients provided by each FTF country program were then analyzed to determine if they were registered by the U.S. Environmental Protection Agency (US EPA) and for their World Health Organization (WHO) toxicity class (see PER-Attachment B). Active ingredients/chemicals that are not registered by US EPA or were cancelled by US EPA are shown in PER-Attachment B, table 2). These shall not be recommended for use or procurement or used in FTF programs. Active ingredients that are WHO 1a and 1b (high acute toxicity; toxicity classes are described in PER-Attachment B) are also shown in PER-Attachment B, table 2, and as well shall not be recommended for use or procurement or used in FTF programs.

Active ingredients were further analyzed for toxicity based on "PAN Bad Actor" classification (Pesticide Action Network's term for more highly toxic pesticides; a description of this classification is in PER-Attachment B). "PAN Bad Actor" classification is one ranking that can be used to identify specific mitigation measures (see *Safe Use Action Plan*) to minimize risks from use of pesticides to human health and the environment.

This PERSUAP requests approval for pesticide active ingredients proposed for use (recommended for use/procurement or directly used) by FTF country programs that at a minimum are: registered by the US EPA and that are WHO toxicity class II and above (SUAP-Attachment A contains the list of pesticide active ingredients that FTF volunteers may use/recommend based on US EPA registration and WHO toxicity class). Various products made up of these active ingredients are available to farmers in FTF host countries.

Specific products (brand and trade names) that are comprised of these US EPA-registered active ingredients may or may not be registered by US EPA—US EPA registers active ingredients and products. For the US EPA to register a product, a company must submit the product to the EPA for registration. This can be a timely and costly process, and explains why many of the products requested for use by FTF programs are not registered by the US EPA. In many cases, a product may not be registered by the US EPA but may be registered and used in FTF countries.

In addition, if a product is registered by US EPA, it may be a Restricted Use Pesticide (RUP) or a General Use Pesticide (GUP)—US EPA makes the distinction between RUP and GUP at the product level, not at the active ingredient level. An RUP classification places more serious restrictions on a product than is placed on a GUP. An RUP classification may be given to a product for a variety of reasons: accident history, potential for groundwater contamination, acute toxicity to humans, application scenario is likely to be hazardous (e.g., fumigants), toxicity to non-target plants or animals, or carcinogenic or mutagenic properties. A GUP is a pesticide product that is not classified by the EPA for restricted use as specified in 40 CFR 152.175 (United States' Code of Federal Regulations).

Typically, an unregistered product similar to an US EPA registered product (percent active ingredients, type of product: wettable powder, granules, etc.) may be approved in a PERSUAP if the active ingredients are US EPA registered. However, approval to use or procure an RUP is *never* made in a PERSUAP.

According to USAID's Environmental Procedures, 22 CFR 216.3(b) Pesticide Procedures: "when a project includes assistance for procurement or use, or both of pesticides registered for the same or similar uses by US EPA **without restriction** [a GUP], the Initial Environmental Examination for the project shall include a separate section evaluating the economic, social, and environmental risks and benefits of the planned pesticide use…" In the case of an RUP, prior to providing assistance for the use or procurement, an

Environmental Assessment must be conducted. Therefore, since this PERSUAP analyzes pesticides at the active ingredient level and not down to the product level, it requires that FTF volunteers ensure that the products they use or recommend (for use or procurement) are GUPs or similar (if the product is not US EPA registered). RUPs or similar shall not be used or recommended (for use of procurement) by FTF volunteers.

In addition, based on concentrations and combinations of active ingredients, US EPA assigns toxicity levels. Since this programmatic PERSUAP only evaluates pesticides at the active ingredient level, it is incumbent upon FTF volunteers to ensure that products they use/recommend (for use or procurement) are US EPA toxicity level II (or similar) products and above. US EPA toxicity level I products (or similar) shall not be used or recommended (for use or procurement) by FTF program volunteers.

Descriptions of EPA classifications for toxicity level, RUP, and GUP are included in PER-Attachment B and SUAP-Attachment A.

In addition, this PERSUAP allows for a range of chemical families to be used so that pesticide resistance is less likely to occur; it requires that FTF volunteers recommend/use least toxic alternatives; it requires that active ingredients and products must be registered by the host country government; and that all assistance for the use or procurement of a pesticide is provided within the framework of an integrated pest management (IPM) approach.

Several FTF offices requested approval to provide assistance for the use of oral or injectable veterinary treatments, such as de-wormers and other anti-parasitics, and antibiotics. While definitions of pesticides are typically quite broad, they usually exclude drugs used to control diseases of humans or animals (such as livestock and pets). These are typically not considered pesticides; in the U.S., such drugs are regulated by the Food and Drug Administration. In addition, fertilizers, nutrients, and other substances used to promote plant survival and health are not considered plant growth regulators and thus are not considered pesticides. Therefore, approval in a PERSUAP is not needed for FTF programs to provide support for the use or procurement of oral and injectable veterinary drugs.

Summary of Findings

PER- Attachment B includes all pesticide active ingredients that were submitted by FTF country programs, including those *rejected* by this analysis, and reason(s) for rejection. SUAP-Attachment A includes only the active ingredients approved for use by the FTF program. The FTF program is requesting approval to assist in the use or procurement of the pesticides shown in SUAP-Attachment A. FTF volunteers who are involved in providing assistance for the use or procurement of pesticides shall comply with the conditions of this PERSUAP. "Assistance for the use or procurement of pesticides" is defined in Section 1.

The selection of pesticide active ingredients in this PERSUAP is the safest regarding human health and the environment, and is expected to provide the necessary protection against crop pests and diseases, when used in conjunction with an IPM program, and takes into account the need to vary pesticide families to ensure against pest resistance. While this Programmatic PERSUAP requests the least toxic pesticides, all pesticides are hazardous to the environment and to human health to some degree, and the PERSUAP recommends measures (Section 4, SUAP) for mitigating adverse effects of pesticide use on the environment and human health.

With the mitigation measures described in Section 4, FTF program assistance for the use or procurement of pesticides is expected to have no adverse effects on the environment and human health.

Summary of Recommendations

If any FTF program intends to provide assistance for the use or procurement of pesticide active ingredients other than those approved in SUAP-Attachment A, an amendment to this Programmatic PERSUAP must be prepared and approved by the EGAT Bureau Environmental Officer (BEO) prior to providing such assistance.

The following measures, presented in summary below, and in full in the SUAP (Section 4), shall be implemented by FTF Implementing Partners:

(1) FTF implementing partners shall retain a copy of this PERSUAP in all headquarter and country offices.

(2) Individual country lists of approved/registered pesticides shall be kept on file at the FTF country office.

(3) IPM practices, submitted as part of this PERSUAP, shall be retained in FTF country office files; and they should be built on and strengthened by knowledgeable FTF program volunteers.

(4) FTF implementing partners shall retain in country offices, tools, forms, protocols, and plans that volunteers develop, such as scouting protocols, IPM monitoring forms, and measures to monitor the efficacy of pesticides.

The following measures shall be implemented by FTF volunteers, with assistance from and oversight by FTF Country Offices. FTF Home Offices are responsible for ensuring these measures are implemented, and that reporting is submitted as required in Section 4, to USAID/EGAT COTR.

(1) FTF volunteers shall recommend and encourage the use of US EPA registered, least toxic pesticide active ingredients (WHO Toxicity Class II and above).

(2) FTF volunteers shall recommend and encourage the use only of products made up of least toxic active ingredients.

(3) FTF volunteers shall recommend and encourage the use only of pesticide products that are GUPs or the equivalent and that are US EPA toxicity level II and above or the equivalent.

(4) FTF volunteers shall provide advice and recommendations for specific pesticides only in conjunction with recommendations for appropriate protective gear, and other safety precautions to mitigate pesticide impacts to human health (SUAP-Attachment B).

(5) FTF volunteers shall provide advice and recommendations for specific pesticides only in conjunction with recommendations to mitigate environmental impacts (SUAP-Attachment C).

(6) FTF volunteers shall recommend the use only of pesticides that are approved by the host country government.

(7) FTF volunteers whose assignments will involve providing recommendations and advice on specific pesticide active ingredients and products shall review the http://www.epa.gov/ site for recent actions/decisions taken by US EPA.

(8) FTF volunteers shall not recommend and shall strongly discourage the use of chemicals listed in Attachment E of the SUAP.

(9) FTF volunteers shall provide assistance for the use or procurement of pesticides only within the context of an IPM approach.

(10) FTF volunteers shall provide training in and shall leave host country partners with the applicable tools (see SUAP-Attachment G) they will need once the volunteer departs the country.

1.0 Introduction and 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). Because of the high risk concerns of pesticide use, the USAID Environmental Procedures require that the 12 factors outlined in 22 CFR 216.3 (b)(1)(i) (a through l) be addressed.

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. The separate section of an IEE has come to be known as a PERSUAP—a Pesticide Evaluation Report-Safe Use Action Plan. The 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 that is designed specifically for the subject program.

USAID Environmental Procedures, 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-l). As described below, FTF country programs and FTF volunteers are not involved in the procurement of pesticides. "Assistance for the use" is interpreted broadly to include the FTF volunteer assistance in 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 in pesticide use and management. "Assistance for the use of pesticides" is said to occur if a volunteer provides recommendations for specific pesticides, including a recommendation to procure certain pesticides. This includes training curricula with information on safe pesticide use even if training does not involve actual application of pesticides. **This definition of "assistance for the use of pesticides" applies throughout this Programmatic PERSUAP.**

While the FTF program 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). It also offers opportunities to provide *sound* advice directly to farmers and pesticide applicators, extension officers, agro-input dealers, and others directly involved with pesticide use.

The FTF Program typically provides technical assistance to host organizations in the form of short-term voluntary services. Volunteers and FTF Program implementers have little control over activities carried out by hosts and FTF Programs are not intended to involve any procurement or direct use of pesticides. However, pesticides are used in most agricultural production systems and, even when volunteers are not working directly with pesticides or pest control, attention to pesticide use systems is important to marketing, crop and livestock management, business plan development, and other activities with which the volunteer may be involved. Frequently, pesticides are misused or mishandled and volunteers have an opportunity to promote safer use through training or advisory services.

Therefore, in accordance with Reg. 216 and the definition of "assistance for the use" above, this PERSUAP analyzes FTF activities that involve provision of advice and recommendations on procurement, handling, transport, storage, mixing, loading, application, clean up of spray equipment, and disposal of pesticides; provision of technical assistance in the use of specific pesticides; and provision of formal classroom training courses and field courses. More information on the different types of FTF assignments, their relation to pesticide use, and the application of mitigation measures to these assignments is described in Section 1.2 and in the SUAP.

Prior to the preparation and approval of this PERSUAP, FTF volunteers were informed of USAID's Environmental Procedures, including the pesticide requirements, and were told that they were not allowed to recommend specific pesticides. This allowed the FTF Program to remain in compliance with the FTF IEE (discussed in Section 1.1). Although there is a need, FTF implementing partners avoided assignments that directly related to pesticide. This PERSUAP is expected to give 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. Without this PERSUAP, FTF volunteers could only provide training on safe use of pesticides; this presented serious constraints for volunteer assignments involving agricultural production activities since specific pesticides could not be recommended. Rather than avoid pesticide issues, FTF volunteers can now provide recommendations on use of least toxic pesticides and alternatives to pesticides, provide safe use and IPM recommendations, and can recommend improved practices in transport, storage, mixing, application, and disposal of pesticides.

1.1 Purpose and Scope of the Farmer to Farmer IEE/PERSUAP

Purpose of the FTF PERSUAP

The IEE for the Farmer to Farmer Volunteer Program (December 2007) recommended a *Negative Determination with conditions* (216.3(a)(2)(iii)). The mandatory conditions (that apply to pesticide use) for the Negative Determination are that the EGAT COTR shall ensure 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 EGAT Bureau Environmental Officer. This includes pesticides used in research for eventual dissemination.*
- *All cooperators will be provided with and familiarize themselves with the environmental brochures (created specifically for FTF volunteers) on how to integrate environmental concerns into their assistance activities.*

The IEE also states that:

A Negative Determination with Conditions is recommended for the case of training on the use of pesticides, as per 22 CFR 216.2 (e) Pesticides. Although there will be no procurement or physical use of pesticides, the training in how to decide when to use them and how to use them safely can be seen as constituting a "use." Therefore the following conditions are recommended, in summary they are:

- *The syllabus for each training event will be reviewed and approved by the Mission Environmental Officer and/or the USAID COTR.*
- *A representative from USAID (preferably the Mission) should attend the training sessions to the extent possible.*
- *If any specific pesticides are to be used, procured or recommended for use, the USAID Pesticide Procedures (§216.3(b) must be followed, and an amended IEE will need to be prepared.*

An amendment to the December 2007 IEE was submitted in January 2009. The amendment recommended a Negative Determination with conditions, and states, in summary, that:

During the course of FTF Program implementation in 2007-08 and during planning for the new FTF Program for FY 2009 – FY 2013 (i.e., the program funded FY 2008 – FY 2012), it became clear that volunteer training and advisory services often must address issues related to pesticide use (and misuse)

by the host agricultural enterprises with which they work. Few, if any, volunteer assignments involve direct recommendations on new use of pesticides, but some need to assist farmers in procedures for safe use of pesticides, as continuous improvement in pest management and control is essential to producing the necessary quantity and quality of agricultural output while maintaining environmental diversity. This goal is achieved through the development and promotion of IPM strategies.

Under the FTF programs to which this amended IEE applies, no pesticides will be provided, used, or sold. The programs will allow provision of training in an IPM context and training on safe use of pesticides to volunteer host institutions in need of this training. If an opportunity for pesticide procurement or use arises, the COTR shall ensure that no funds are spent on such procurement or use, until after an amendment to this IEE that addresses the pesticide procedures outlined under 22 CFR 216.3(b) and includes a Pesticide Evaluation and Safe Use Action Plan is completed and approved in writing by the EGAT Bureau Environmental Officer.

If, during implementation, activities are considered other than those described above and in the original "Initial Environmental Examination and Request for Categorical Exclusions," prepared December 12, 2007, an amended IEE shall be submitted and approved, prior to implementation.

The 2007 IEE and 2009 amendment restricted "assistance for the use of pesticides" to providing safe use recommendations within an IPM context. However, given the definition of pesticide "use," and the opportunities for volunteers to provide broader technical assistance and training in pesticide use, including advice on specific pesticides, the USAID COTR, in collaboration with the EGAT BEO, determined that an amendment to the IEE--a PERSUAP—was needed to give FTF volunteers greater flexibility in working with pesticides and IPM. The COTR and BEO reasoned that a Programmatic PERSUAP would provide FTF volunteers with not only the regulatory clearance to provide advice and assistance in pesticide use and IPM, but would also provide information and tools they would need to assist in the use of pesticides within the context of the USAID-funded FTF program.

To that end, this Programmatic PERSUAP provides FTF volunteers with a list of active ingredients that they may use and recommend (including recommending the active ingredient, providing advice on procurement, storage, mixing, application, and disposal). Based on this PERSUAP, volunteers may provide this advice providing that the active ingredients and any products comprised of these active ingredients are registered in the host country; and any specific products used/recommended be US EPA toxicity class II or higher (or the equivalent for products not registered by the US EPA); and that specific products be GUPs or the equivalent for products not registered by the US EPA. It requires that this assistance be given within the context of an IPM approach and that safe use measures are also strongly recommended (see Section 4, the SUAP).

Scope of the FTF PERSUAP

In accordance with the Terms of Reference, (PER-Attachment A), this Programmatic PERSUAP evaluates the FTF Program's proposed assistance for the use of pesticides in 21 countries in which FTF currently has active programs. Also, given the "programmatic" nature of this PERSUAP, it includes countries that FTF is not currently working in, but where FTF volunteers may be placed in the future.

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

The target value chains (VCs) for each country program are listed below. In addition to these, FTF may be requested to provide assistance for a VC not among the targets. Again, given the "programmatic" nature of this PERSUAP, it is intended to cover VCs that are not yet included as part of an FTF country program. Because of the broad range of VCs, and because at this time it is impossible to predict the full range of VCs that an FTF volunteer may be requested to assist with, the PERSUAP provides guidance for volunteers to ensure that their recommendations/advice on pesticide use are VC-specific.

The PERSUAP also covers yet-to-be-programmed FTF support through Associate Awards, Special Program Support, and "flex assignments." These types of FTF activities may take place in one of the existing FTF countries or in countries that currently have no FTF program; and they may work with FTF target VCs, or with new VCs. In sum, this Programmatic PERSUAP covers FTF volunteer technical assistance and the associated administrative, consultant, training, and technical assistance under the FTF Programs. This includes the core country FTF projects, flexible assignments, and volunteer services under Associate Awards and other mechanisms whereby Missions or other offices fund FTF programs.

Given the types of support FTF provides (described in Section 1.2), this Programmatic PERSUAP is able to recommend safeguards to ensure—no matter the country or the VC—that FTF "assistance for the procurement or use, or both, of pesticides" will have no unreasonable or foreseeable adverse effects on human health or the environment. This FTF Programmatic PERSUAP provides guidance for FTF implementing partners to ensure that their actions involving the use of pesticides (actions constituting "use" are described in Section 1.2) will have no adverse impacts and aim to have positive effects. Safeguards and guidance are provided as part of the *Safe Use Action Plan* (Section 4).

This PERSUAP covers use of all pesticides--herbicides, insecticides, fungicides, nematicides, rodenticides, miticides, and other pesticides and related chemicals. It requests approval for pesticide active ingredients proposed for use (recommended for use/procurement or directly used) by FTF country programs that at a minimum are: registered by the US EPA and that are WHO toxicity class II and above (SUAP-Attachment A contains the list of pesticide active ingredients that FTF volunteers may use/recommend based on US EPA registration and WHO toxicity class). Various products comprised of these active ingredients are available to farmers in FTF host countries.

Specific products (brand and trade names) that are comprised of these US EPA-registered active ingredients may or may not be registered by US EPA—US EPA registers active ingredients and products. In many cases, a product may not be registered by the US EPA but may be registered and used in FTF countries. For the US EPA to register a product, a company must submit the product to the EPA for registration. This can be a timely and costly process, and may explain why many of the products requested for use by FTF programs are not registered by the US EPA.

According to USAID's Environmental Procedures, 22 CFR 216.3(b) Pesticide Procedures: "when a project includes assistance for procurement of use, or both of pesticides registered for the same or similar uses by USEPA **without restriction** [a GUP], the Initial Environmental Examination for the project shall include a separate section evaluating the economic, social, and environmental risks and benefits of the planned pesticide use…." In the case of an RUP, prior to providing assistance for the use or procurement, an Environmental Assessment must be conducted. Therefore, since this PERSUAP analyzes pesticides at the active ingredient level and not down to the product level, it requires that FTF volunteers ensure that the products they use or recommend (for use or procurement) are GUPs or similar (if the product is not US EPA registered). RUPs or similar shall not be used or recommended (for use or procurement) by FTF volunteers.

In addition, based on concentrations and combinations of active ingredients, US EPA assigns toxicity levels. Since this programmatic PERSUAP only evaluates pesticides at the active ingredient level, it is incumbent

upon FTF volunteers to ensure that products they use/recommend (for use or procurement) are US EPA toxicity level II (or similar) products and above. US EPA toxicity level I products (or similar) shall not be used or recommended (for use or procurement) by FTF program volunteers.

Descriptions of EPA classifications for toxicity level, RUP, and GUP are included in PER-Attachment B and SUAP-Attachment A.

In addition, this PERSUAP allows for a range of active ingredient families to be used so that pesticide resistance is less likely to occur; it requires that FTF volunteers recommend/use least toxic alternatives; it requires that the active ingredients and products must be registered by the host country government; and that all assistance for the use or procurement of a pesticide is provided within the framework of an integrated pest management (IPM) approach.

1.2 Description of the FTF Program

The FTF Program provides voluntary technical assistance to farmers, farm groups, and agribusinesses to promote sustainable improvements in food processing, production, and marketing. The program relies on the expertise of U.S. volunteers from diverse backgrounds—farms, land grant universities, cooperatives, private agribusinesses, non-profit farm organizations, and others to respond to the needs of host country farmers and organizations. Typically, volunteers spend about 20 to 30 days in the host country. Volunteers have completed over 12,000 assignments in 103 countries, since the program began in 1985. Volunteers work on a wide range of activities, providing assistance to host organizations—private farmers, cooperatives and community groups, rural credit institutions, extension services, input supply firms, agribusinesses, and others. Assignments may involve technology transfer, business planning, organizational strengthening, marketing, or environmental conservation.

US NGOs implement the FTF Program. These organizations work closely with overseas USAID missions and local partner organizations, supporting a variety of development programs aimed at reducing poverty and promoting sustainable food security. Local offices of the volunteer program implementers identify hosts and plan assignments, recruit and field volunteers, provide logistics and translation services, as needed, and follow up with host organizations on implementation of volunteer recommendations. Often the volunteer assistance is related to a larger on-going development program. The SUAP describes requirements, based on findings of this PER, for volunteers engaged in these types of activities.

Most volunteer assignments provide technical assistance services to host organizations under Country FTF Projects in FTF core countries (Table 1). Country FTF Projects may involve support service development (extension services, financial services, marketing, input supply, processing), but most focus on development of specific value chains, such as dairy development, horticulture, staple food production, grain and oilseeds, aquaculture, apiculture, agro-forestry, and small ruminants.

FTF Active Programs and Target Crops

The following are the FTF implementing partners, and the current countries and VCs in which they work. This Programmatic PERSUAP covers the countries noted below and the VCs, as well as new core country FTF projects, special projects, and associate awards, yet to be identified and programmed.

Table 1: Active Farmer-To-Farmer Programs

Region	Implementing Partner	Countries	Value Chains
Middle East and North Africa Region	**ACDI/VOCA**	Egypt	Dairy
			Horticulture
		Lebanon	Small Ruminant
			Horticulture
Western Africa	**ACDI/VOCA**	Ghana	Horticulture
			Staple Foods
		Mali	Staple Foods
			Small Ruminant
		Nigeria	Staple Foods
			Apiculture
			Aquaculture
Eastern Africa	**CNFA**	Kenya	Oil Seed
			Grain Crops
		Tanzania	Legumes
			Horticulture
			Grain Crops
		Uganda	Oil Seed
			Grains Crops
Europe, Caucasus, and Central Asia	**CNFA**	Georgia	Dairy
			Fruit and Vegetable
			Hazelnuts
		Moldova	Dairy
			Fruit and Vegetable
		Uzbekistan	TBD
		Tajikistan	Dairy Livestock
Southern Africa	**CNFA**	Angola	Horticulture
			Legumes
		Malawi	Groundnuts
			Horticulture
			Soya Beans
		Mozambique	Oilseeds
			Horticulture
Caribbean Basin	**Partners of the Americas**	Dominican Republic	Tree Crops
			Horticulture
		Guyana	Non-Traditional Horticulture
			Aquaculture
		Haiti	Horticulture
			Small Livestock
			Apiculture
		Nicaragua	Dairy
Caribbean Basin	**Winrock International**	El Salvador	Horticulture
			Dairy

Special Program Support Project	**Weidemann Associates**		
Kenya: Partnership for Safe Poultry in Kenya	**Winrock International**	Kenya	Avian Influenza (Partnership for Safe Poultry in Kenya)
South Africa: Institutional Strengthening	**Florida A&M University**	South Africa	Grapes, Fish and Agricultural Education
Global: Coffee Livelihood Development	**Cooperative Coffees, Inc.**	Latin America, Africa, Asia	Coffee
Eastern Caribbean: Food Security	**FAVACA**	Dominic, Grenada, St. Kitts and Nevis	Food Security
Associate Awards	**USAID Country Mission Funded**		
Angola	**CNFA**	Angola	Enterprise Development No PERSUAP needed
Lebanon	**ACDI/VOCA**	Lebanon	Laboratory Development No PERSUAP needed
Ghana	**ACDI/VOCA**	Ghana	Food Security
Georgia	**CNFA**	Georgia	Mechanization
Jamaica	**ACDI/VOCA**	Jamaica	Cocoa and Agricultural Development Project-specific PERSUAP to be prepared
Belarus	**CNFA**	Belarus	Agricultural Development

The FTF Program and Roles of Volunteers as they relate to Pesticide Use and Procurement

Using similar methods, the various FTF implementing partners recruit volunteers, develop SOWs, brief volunteers, and oversee volunteer activities while in-country. This section provides a general description of the FTF program methodology.

A request for a FTF volunteer usually originates with a host country organization (the client). Less frequently, a request may come from a USAID project. Requests from other USAID projects are more common in "flex assignments, described below. In many cases, the FTF country program already has institutional relationships with the client -- local universities, corporate entities, and other organizations, but FTF country programs may also market their services with potential host country partners.

FTF field staff are responsible for identifying potential host country organizations. Field staff develop a list of potential host organizations at the beginning of every year, along with a strategy for each host organization. FTF programs have a strategy for each value chain and there are generally a few host organizations that support each VC. Each implementing partner has a target number of volunteers they aim to recruit each year, and a target for flexible assignments, as well.

As part of each FTF contract, a number of flexible assignments are "set aside." These flex assignments may be in a core country and outside a target VC or core program area or they may be outside of a core country.

Once the need for an FTF volunteer is identified, the host country partner, in collaboration with the FTF country program, will develop an SOW. Volunteers are then recruited for the assignment. All FTF

implementing partners have volunteer databases—US national databases-- from which they can identify appropriate volunteers. Implementing partners may also recruit a volunteer who has the necessary skills without going through the database. One or more CVs may be sent to the field office for review by FTF country staff and the host organization.

Once a volunteer is identified for the assignment, the implementing partner sends a briefing packet to the volunteer. Among the items in the briefing packet, the USAID environmental brochure described in the conditions to the IEE (2007 and 2009), is included. From the point a volunteer agrees to undertake an assignment until the volunteer departs for the host country, there is usually continuous correspondence with a volunteer and the FTF office.

Typically, the FTF volunteer will work with an association or organization, and sometimes within a ministry. USAID/EGAT support to FTF implementing partners covers the costs of the volunteer. The volunteer is "free" to the host organization, but FTF implementing partners may request an in-kind contribution, such as meals, transport, etc.

Once the volunteer arrives in-country, s/he will meet with FTF country staff for a briefing, and at the end of their stay, for a de-briefing. Once a volunteer is in the field, FTF implementing partners provide different levels of support. The volunteer works directly with the host organization, and in many cases may only return to the FTF country office for a trip debriefing. In-country staff may continue to assist with translation services. In some cases, a technical staff member from the FTF country program office will travel with the volunteer at the start of an assignment, and then go back to the field to meet the volunteer at the end of an assignment. Some country programs keep in regular contact with a volunteer, communicating with them every two to three days.

FTF volunteer SOWs 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/livestock production or crop protection, pesticides and IPM are integral to the volunteers' tasks and they will likely be required to recommended 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 which pesticides to use, methods of application, etc. In the SUAP these are considered Type 1 Assignments: these volunteers will likely be required to provide recommendations for specific pesticides (active ingredients and/or products).

In other cases, such as vegetable and fruit marketing, product branding, and business plan development, pesticide issues and IPM may arise, but would not be an integral part of the assignment. In the SUAP, these are considered Type II 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. They would not be expected to provide recommendations for specific pesticides.

Type III Assignments cover volunteers whose tasks typically would not involve pesticides, such as institutional strengthening, training in financial management, etc. Type IV Assignments are volunteers who will be working directly on another USAID project, these volunteers will be covered by that projects PERSUAP or IEE and/or will not be expected to provide recommendations for specific pesticides.

This Programmatic PERSUAP considers and covers all four types of assignments: FTF volunteers who will recommend specific pesticides; FTF volunteers who may have opportunities to provide advice on

safe use of pesticides; volunteers whose assignment will not include pesticides (these volunteers only need to be familiar with this PER, and understand that in accordance with USAID's pesticide procedures, they may not provide advice or recommendations on pesticide use or procurement); and FTF volunteers working on USAID projects (these volunteers should first comply with the project-level PERSUAP, if one exists). No volunteers will be involved in procuring pesticides.

Besides, providing a list of active ingredients that volunteers can choose from for specific recommendations for protection against disease and insects, this PERSUAP provides recommendations and guidance (SUAP, Section 4) to volunteers (Types I, II, and IV) to help them to strongly 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, and the varying levels of pesticide knowledge of the volunteers.

1.3 PERSUAP Methodology

This Programmatic PERSUAP was kicked off by Weidemann Associates with a phone call to each implementing partner to discuss operating procedures of their FTF program. This was followed by an email request to submit a list of pesticides (active ingredients and product names) that FTF country programs wished to be able to recommend that would protect against major pests and diseases encountered in their country. The list was to include pesticides needed for the current program and any future VCs and was to cover the five-year life of project. Country programs were also asked to provide information on IPM use for the different crop diseases and pests, method of application of pesticides, information on the most critical pesticide issues, and availability of safety equipment in the country.

An overall list of active ingredients was compiled from each country list. The active ingredients were then analyzed to determine US EPA registration status and WHO toxicity class (see PER-Attachment B). Active ingredients/chemicals that are not registered by US EPA or were cancelled by US EPA are shown in (PER-Attachment B, table 2). These shall not be used or recommended (recommended for use or procurement) by FTF programs. Active ingredients that are WHO 1a and 1b (high acute toxicity; toxicity classes are described in PER-Attachment B) are also shown in PER-Attachment B, table 2. These shall not be used or recommended (for use or procurement) by FTF programs.

Active ingredients were further analyzed for toxicity based on "PAN Bad Actor" classification (Pesticide Action Network's classification for more highly toxic pesticides; a description of this classification is found in PER-Attachment B). "PAN Bad Actor" classification can be used to identify specific mitigation measures (see *Safe Use Action Plan*) to minimize risks to human health and the environment of pesticide use.

The SUAP was prepared based on the findings in the PER section of the evaluation. The PERSUAP was reviewed by USAID and implementing partners prior to finalizing and submitting to USAID for approval.

2.0 Pesticide Management Issues

2.1 Major Pesticide Issues

The following was compiled from information submitted by FTF country programs at the request of Weidemann Associates.

FTF implementing partners are aware of many problems associated with pesticide use in their host countries. Most FTF country programs mentioned one or more of the following concerns: over-use of pesticides, the use of inappropriate pesticides for the target crop or pest, ignorance of withholding

periods, the lack of an integrated approach to pest control, lack of knowledge about disposal, and use of expired products. Some countries mentioned the lack of knowledge about handling of pesticides in general (mixing, storage, application, and disposal). Some also mentioned that safety equipment is not readily available—it may be too expensive or it may not be carried by pesticide dealers in rural areas.

The Tajikistan FTF country program mentioned that good quality pesticides are unavailable, and usually pesticides which are available on the local market are very low quality; and that the under-developed coops/associations in the agriculture sector of Tajikistan make shipment of good quality pesticides to the country very difficult—this also helps explain why the price is so high for local farmers.

The Mali country program also mentioned the high cost of pesticides. In Mali, there is limited access to chemicals and safety equipment, and apart from farmers supported by ongoing agriculture projects and some NGOs, the majority of Malian farmers don't have the necessary knowledge of chemicals and safety equipment. The high cost of good quality pesticides and equipment push many farmers to use inappropriate chemicals.

Belarus noted that the lack of finances to replace outdated hardware and to maintain equipment is the most critical pesticide management issue.

Malawi stated that since the parastatals discontinued training in judicious use of pesticides and applicator training and supervision, safety precautions are less often used. Also, because the pesticide industry is often unwilling to assume wide-scale responsibility for pesticide stewardship at the farm level, except on a demonstration basis, pesticide safeguards are not taken as regularly as they once were. Notably, Malawi also mentioned that people do not appreciate the long-term health implications of pesticide misuse.

Haiti noted that dangerous pesticides are still being imported into the country. And farmers rely on pesticide dealers to advise them on which product to use. When a farmer brings a pesticide home, he usually carries the container (sometimes re-packaged) with other items he is bringing home—often mixed in with food items.

Uganda noted that due to poor disposal methods, contamination of water bodies is common. Also, limited knowledge about application of pesticides results in problems like resistance, crop loss, and personal accidents.

In Guyana, a survey on "the incidences of exposure to pesticides," conducted by FTF volunteers during the previous FTF Program found that it was very common for farmers to mix together pesticides with their bare hands. While some farmers used very limited protection during the handling of pesticides, the majority of farmers interviewed used none at all. Some even offered explanations as to why it made no sense for them to tie a simple handkerchief around their nostrils when applying pesticides. There were also cases reported of persons feeling nauseous while applying pesticides but they related that feeling to being hungry or being in the sun for long hours. This indicates that in Guyana there is a lack of knowledge about the health hazards of pesticides. In Guyana, disposal of pesticide containers is also a significant problem. The 2008 Annual Report of the Pesticides and Toxic Chemicals Control Board noted this problem and attributed it to "limited financial resources" which prevented the agency from dealing with this problem effectively but pointed out that "a number of proposals are currently being examined for possibly alleviating this problem."

The Dominican Republic (DR) country program also noted that disposal of containers poses a significant problem, and they are often seen disposed of in the fields. The DR country program also noted that pesticide applicators normally have a very low level of education, and it is important for

producers and extension officers to give guidance on proper application that can be understood by applicators.

Nigeria, among other countries, noted that use of agrochemicals is still fairly low due to the cost of pesticides.

The Mozambique country program identified the lack of knowledge about pesticide storage, mixing, application, disposal, and pesticide health and environmental issues as a key problem. Mozambique suggested that training is needed in:

1. Safety measures to guard against poisoning of applicators, consumers, bees, and the environment;
2. Measures to ensure proper amount of pesticide is applied at the proper time;
3. First-aid treatment for pesticide poisoning, especially training to be alert to mild symptoms so these can be treated before severe symptoms occur;
4. Transport and storage of pesticides;
5. Application equipment; and
6. Disposal of empty containers and unused pesticides.

Other key issues that FTF country programs noted, including recommendations for training, are addressed in the SUAP, Section 4.

2.2 Pesticide Management and Safeguards

Pesticide Registration in the US

The US EPA is responsible for registering pesticide products for use in the United States. The EPA is granted this authority under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) , but other laws also play a role in pesticide regulation, including the Federal Food, Drug, and Cosmetic Act (FFDCA), the Federal Food Quality Protection Act of 1996 (FQPA), and the Safe Drinking Water Act.

FIFRA requires EPA to assess the potential effects of a pesticide product on human health and the environment when used according to label directions developed for the product. Once the EPA approves a set of label directions for a pesticide product, any use of the pesticide which does not follow the label directions is a violation and may be subject to civil and/or criminal penalties. FIFRA also requires that EPA reevaluate older pesticides to ensure that they meet more recent safety standards.

Before a pesticide is registered for use on a particular commodity or site, it must be approved for that use by the EPA. Tests are performed by the manufacturers to determine whether the product or its residues on foods presents unreasonable risks to people, wildlife, fish, and plants. The EPA reviews the data submitted by the manufacturers and either approves or disapproves the studies. A summary of rejection rates for these studies shows that historically 20-50% of the manufacturers' studies submitted for evaluation of pesticides are rejected as inadequate. During the delay while the studies are being re-done, the pesticide—if it had been previously registered—can be sold as it had before, even though the health effects of exposure may be unknown.

For pesticides that are known to have the potential for causing health or environmental problems, EPA has the authority to limit the amount of pesticide applied, restrict the frequency or location of application, or require the use of specially trained, certified applicators (RUPs).

For problematic pesticides, EPA may also undertake an extensive Special Review of a pesticide or work with manufacturers and users to implement changes in a pesticide’s use to reduce exposures, such as

eliminating use on certain crops, reducing application rates, restricting the methods of application, or canceling a pesticide's uses.

Most US states also have laws governing pesticide regulation and use. California's regulatory system is the most comprehensive, perhaps because nearly 25% of all pesticides used in the U.S. are used in California.

Host Country Pesticide Registration Processes

USAID-supported programs are required to comply with host country laws and regulations. Therefore, in addition to the US EPA registration requirement and WHO toxicity levels (only WHO II and above are allowed), host country registration must be ensured before an FTF volunteer may provide assistance for the use or procurement of a specific pesticide.

Most FTF country programs submitted lists of pesticides registered in their host countries. Some of these lists are thorough, include guidance, and are well documented. Kenya's list of registered pesticides is kept up to date on a website. Others are simply lists of active ingredients and products that have been registered in the country, with no additional information—some of these lists are relatively short, and may severely limit a volunteer's recommendations.

Prior to providing assistance for the use of pesticides, FTF volunteers should acquire the country list (required by this PERSUAP to be kept at each implementing partner's headquarter office and field office), should review it, and have it available when providing recommendations for specific pesticides.

Country lists of registered pesticides available as of the preparation of this PERSUAP are: El Salvador, Nicaragua, Dominican Republic, Guyana, South Africa, Tanzania, Kenya (including pay-for-use database), Mozambique, Malawi, Uganda, Moldova, Belarus, Tajikistan, Uzbekistan, and Georgia.

For countries that did not submit a host country registered pesticide list (Mali, Nigeria, Ghana, Egypt, and Lebanon), SUAP-Attachment D provides suggestions to volunteers to help them find a contact and/or a list. The Angola FTF country program was unable to procure a list of pesticides registered in Angola. FTF volunteers in Angola who may be directly or indirectly involved with pesticides should plan to meet with the appropriate ministry to determine applicable regulations/requirements. Even for FTF countries that submitted a list, volunteers should ensure that it contains the most recent information. And for FTF volunteer assignments in non-core countries, the volunteer should check online prior to travelling to the country the assignment will involve recommending specific pesticides. These measures are included in the SUAP.

WHO Toxicity Classes

The "WHO Recommended Classification of Pesticides by Hazard" was approved by the 28th

World Health Assembly in 1975 and the classification has gained wide acceptance. Guidelines were first issued in 1978, and have been revised and reissued at two to three year intervals. In December, 2002 the United Nations Committee on Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labeling of Chemicals (UNCETDG/GHS) approved a document called "The Globally Harmonized System of Classification and Labeling of Chemicals" with the intent to provide a globally-harmonized system to address classification of chemicals, labels, and safety data sheets. Classification and labeling based on acute toxicity form a part of the GHS, but there are some differences between the GHS and the WHO traditional classification of pesticides by hazard.

WHO is in the process of adjusting the Pesticide Classification to conform to the GHS.

WHO bases its classification on the "acute risk to health"--the risk of single or multiple exposures over a relatively short period of time—that might be encountered accidentally by any person handling the product in accordance with the directions for handling by the manufacturer or in accordance with the rules laid down for storage and transportation by competent international bodies. WHO Acute Toxicity Classes are described in PER-Attachment B and SUAP Attachment A.

Prior Informed Consent (PIC) Procedure

The text of the Rotterdam Convention was adopted on 10 September 1998 by a Conference of Plenipotentiaries in Rotterdam, the Netherlands. The Convention entered into force on 24 February 2004. The United Nations Environment Programme (UNEP) and the UN's Food and Agriculture Organization (FAO) had jointly implemented the original PIC procedure, which operated until the adoption of the Rotterdam Convention (officially known as the Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade). For more information on PIC please see http://www.pic.int/home.php?type=t&id=29&sid=30. For a list of countries that are party to the convention, visit http://www.pic.int/home.php?type=t&id=63&sid=17.

The objectives of the Convention are:

- to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm; and
- to contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export, and by disseminating these decisions to Parties.

The Convention creates legally binding obligations for the implementation of the PIC procedure. It covers pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by Parties and which Parties have notified for inclusion in the PIC procedure. One notification from each of two specified regions triggers consideration of the addition of a chemical to Annex III of the Convention. Severely hazardous pesticide formulations that present a hazard under conditions of use in developing countries or countries with economies in transition may also be nominated for inclusion in Annex III (see SUAP-Attachment E for chemicals included in Annex III). As discussed in the SUAP, these active ingredients/chemicals and formulations may not be recommended (for use or procurement) by FTF volunteers in countries party to the Rotterdam Convention, as well as in countries that are not yet a party; and in addition, if a volunteer encounters any of these chemicals being used, the volunteer shall strongly discourage its use, and inform the producer/producer organization/applicator about its status, hazards, and available alternatives.

There are 40 chemicals listed in Annex III of the Convention and subject to the PIC procedure, including 25 pesticides, four severely hazardous pesticide formulations and 11 industrial chemicals. Many more chemicals are expected to be added in the future.

The Convention promotes the exchange of information on a very broad range of chemicals. It does so through:

- The requirement for a Party to inform other Parties of each national ban or severe restriction of a chemical;
- The possibility for a Party which is a developing country or a country in transition to inform other Parties that it is experiencing problems caused by a severely hazardous pesticide formulation under conditions of use in its territory;

- The requirement for a Party that plans to export a chemical that is banned or severely restricted for use within its territory, to inform the importing Party that such export will take place, before the first shipment and annually thereafter;
- The requirement for an exporting Party, when exporting chemicals that are to be used for occupational purposes, to ensure that an up-to-date safety data sheet is sent to the importer; and
- Labeling requirements for exports of chemicals included in the PIC procedure, as well as for other chemicals that are banned or severely restricted in the exporting country.

The PIC Procedure can be a powerful tool to regulate pesticides, and FTF volunteers should be aware of its ramifications.

Persistent Organic Pollutants

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife. Exposure to POPs can lead to serious health effects including certain cancers, birth defects, immune and reproductive dysfunctions, increased susceptibility to disease and even diminished intelligence. Given their long range transport, no one government acting alone can protect its citizens or its environment from POPs. In response, the Stockholm Convention, which was adopted in 2001 and entered into force in 2004, requires Parties to take measures to eliminate or reduce the release of POPs into the environment. The Convention is administered by UNEP.

Under the Stockholm Convention, also known as the "POPs treaty," countries agree to reduce or eliminate the production, use, and/or release of the following 12 POPs: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins, and dibenzofurans. The Convention specifies a scientific and procedural review process that could lead to the addition of other POPs chemicals of global concern. See Persistent Organic Pollutants, a Global Issue, a Global Response The Foundation for Global Action on Persistent Organic Pollutants: The United States Perspective (164 pp, 15.0MB, about PDF) Stockholm Convention home page and http://chm.pops.int/Convention/POPsReviewCommittee/Chemicals/tabid/243/language/en-US/Default.aspx for chemicals currently under review. The "dirty dozen" POPs are listed in SUAP-Attachment E.

Organophosphate pesticides (OPs) are among the most acutely toxic pesticides, with most of these chemicals classified by the US EPA as toxicity class I (highly toxic) or toxicity class II (moderately toxic). In addition, some OPs cause developmental or reproductive harm, some are carcinogenic, and some are known or suspected endocrine disruptors. OPs of primary concern include: azinphos-methyl, chlorpyrifos, diazinon, dichlorvos (DDVP), dimethoate, ethephon, Malathion, methamidophos, naled, and oxydemeton-methyl. Residential uses of chlorpyrifos and diazinon were recently banned by the US EPA. OPs of primary concern are included in SUAP-Attachment E.

Overview of Pesticide Registration in the European Union

The European Community (EC) has established a harmonized legal framework for the regulation of pesticides in all member countries of the EC. The Commission of the European Communities, in collaboration with member countries of the EC, is responsible for the registration of pesticide *active ingredients* (also referred to as *active substances)* for use in all EC member countries. Individual

member countries, called Member States, are responsible for the registration in their country of specific pesticide *products* containing active ingredients authorized for use by the Commission.

The EC pesticide registration procedure establishes uniform standards for both the re-evaluation of active ingredients on the market in the EC on or before July 25, 1993 (called *existing active ingredients*), and the registration of new active ingredients introduced after this date. The evaluation of a new active ingredient begins when a pesticide manufacturer submits an application, called a *dossier*, to the Member State of their choice. Once the Commission determines that all required information is included in the dossier, any Member State can grant a renewable 3-year *provisional authorization* to an active ingredient for use in their country. Provisional authorizations are granted before an active ingredient has been fully evaluated and approved by the EC.

The master list of pesticide active ingredients approved for use in the EC is included in an Indicative List in Annex I of the Directive 91/414/EEC. Individual Member States maintain records of active ingredients that have been granted provisional authorizations pending a Commission decision on their full authorization throughout the EC. For an accurate list of pesticide active ingredients registered for use in an EC country, one must consult both Annex I and the specific country's responsible authority.

For SOWs that involve trade with EU countries, the FTF volunteer should review and be aware of EU pesticide registration requirements.

The European Commission's Maximum Residue Levels

According to an EC factsheet, *New Rules for Pesticide Residues on Food* (September, 2008), maximum residue level (MRL) is the highest level of a pesticide residue that is legally tolerated in or on food or feed. The EC fixes MRLs for food and animal feed. MRLs for all crops and all pesticides can be found in the MRL database on the Commission website at http://ec.europa.eu/sanco_pesticides/public/index.cfm. Chemicals and products can be searched on this database. For SOWs that involve trade with EU countries, FTF volunteers should review this database.

To avoid the confusion that previous EC MRLs were causing, as of 1 September 2008, there is a new regulation covering all agricultural products intended for food or animal feed. This new regulation establishes MRLs for 315 fresh products, and these MRLs also apply to the same products after processing, adjusted to take account of dilution or concentration during the process. The regulation covers pesticides currently or formerly used in agriculture in or outside the EU (around 1,100 pesticides). Where a pesticide is not specifically mentioned, a general default MRL of 0.01 mg/kg applies. The regulation covers the safety of all consumer groups, including, for example, babies, children and vegetarians.

EurepGAP - GlobalGAP

The following information is summarized from www.eurepgap.org. EurepGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the globe. It is a partnership with agricultural producers and retailers who want to establish certification standards and procedures for Good Agricultural Practices (GAP). The standard is "pre-farm-gate" and includes the process of a certified product from before the seed is planted until it leaves the farm.

EurepGAP started in 1997 as an initiative by retailers belonging to the Euro-Retailer Produce Working Group (EUREP). It was a reaction to growing concerns by consumers about product safety, and environmental and labor standards. To address these concerns, EUREP started to work on harmonized standards and procedures for the development of GAP in conventional agriculture. Given its wide coverage, EurepGAP will soon become known as GlobalGAP.

EurepGAP is one of very few globally operating standardization organizations that enjoy a high level of political and financial independence from the public sector as well as from individual member influence and shareholder agendas. To keep its independence EurepGAP does not conduct the certification process itself. Farmers or farmer groups can only be certified against the EurepGAP criteria by authorized Certification Bodies. Currently EurepGAP is working with over 100 CBs in more than 70 countries.

As many other on-farm quality assurance systems had been in place prior to the existence of EurepGAP, EurepGAP has encouraged the development of regionally adjusted integrated crop management systems to prevent farmers from expensive multiple audits. Existing national or regional quality assurance schemes that have successfully completed their benchmarking process are recognized as equivalent to EurepGAP. Some FTF core countries may have their own country-GAP. For FTF volunteers working on agricultural trade with EU countries, the EurepGAP-GlobalGAP website should be checked on a regular basis to identify countries with certified GAP schemes.

FAO/WHO Codex Alimentarius

The *Codex Alimentarius* is a collection of international food safety standards that have been adopted by the *Codex Alimentarius* Commission (the "Codex"). The Codex is funded jointly by the FAO and WHO, which in the early 1960s, recognized the importance of developing international standards to protect public health and minimize disruption of international food trade. The Joint FAO/WHO Food Standards Program was established, and the *Codex Alimentarius* Commission was designated to administer the program.

Over the years, the Codex has developed over 200 standards covering processed, semi-processed or unprocessed foods intended for sale for the consumer or for intermediate processing; over 40 hygienic and technological codes of practice; evaluated over 1000 food additives and 54 veterinary drugs; set more than 3000 maximum levels for pesticide residues; and specified over 30 guidelines for contaminants (see http://www.codexalimentarius.net/web/index_en.jsp).

The Agreement on the Application of Sanitary and Phyto-sanitary Measures, also known as the SPS Agreement, is an international treaty of the World Trade Organization (WTO). It was negotiated during the Uruguay Round of the General Agreement on Tariffs and Trade, and entered into force with the establishment of the WTO at the beginning of 1995. Under the SPS agreement, the WTO sets constraints on member states' policies relating to food and safety (bacterial contaminants, pesticides, inspection, and labeling) as well as animal and plant health and imported pests and diseases. Notably, the SPS Agreement cites Codex's food safety standards, guidelines, and recommendations for facilitating international trade and protecting public health.

3.0 Pesticide Evaluation Report (PER): USAID's Pesticide Procedures

3.1 Factor a. US EPA registration status of the proposed pesticides

Table 1 in PER-Attachment A lists the pesticides (active ingredients) requested by FTF country programs, and shows US EPA registration status of each active ingredient. Table 2 in PER-Attachment B includes active ingredients that are not registered by EPA. These may not be used or recommended (for use or procurement) by FTF volunteers. The FTF Program requests approval to provide assistance for the use or procurement of pesticide active ingredients, as shown in SUAP-Attachment A.

In addition to US EPA registration status, the table in PER-Attachment B shows WHO toxicity class. Any active ingredient that is WHO toxicity class 1 (1a and 1b) is rejected due to its high toxicity (listed

in Table 2). Other active ingredients were rejected (Table 2) based on their toxicity as determined by US EPA or other regulatory bodies or treaties. Reasons for rejection are noted in the table.

The soil and post-harvest fumigants that FTF country programs submitted are all considered highly toxic (although WHO does not assign toxicity levels to fumigants), and are tightly regulated by the US EPA. The US EPA requires protections for workers, bystanders, and people who live and work nearby to areas that are fumigated. Applicators must be certified, and US EPA requires certain fumigation equipment that must be regularly maintained. These standards should also be upheld by any USAID supported activities where fumigants will be recommended or used, yet in FTF country programs, it is impossible to ensure these high standards. Therefore, the fumigants submitted by FTF country programs have been rejected.

Endosulfan is expected to be added to the Stockholm Convention on POPs, and a global ban on the chemical may be imminent. Regardless of the status of the ban, Endosulfan is rejected by this PERSUAP due to its high toxicity to humans and the environment, and its persistence in the environment. Atrazine is a groundwater contaminant, considered highly toxic to humans and amphibians, and the EU has withdrawn regulatory approval for it. Although atrazine is registered by the US EPA, it is highly toxic to humans and the environment, and is rejected by this PERSUAP.

As discussed in the SUAP, FTF volunteers will be required to verify that active ingredients and any products recommended are approved/registered by the host country before a FTF volunteer recommends a specific pesticide (active ingredient or product). FTF volunteers will also be required to ensure that prior to recommending a specific pesticide product, it is considered a GUP or the equivalent, and that it is EPA toxicity level II or above or the equivalent (if the product is not US EPA registered).

FTF volunteers should be aware of the often low level of understanding of the toxic effects of pesticides in many of the FTF countries. While based on EPA registration and WHO toxicity class, the table in PER-Annex B provides a range of active ingredients that can be recommended by FTF 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). For example, copper products are often used as fungicides, and there is a common misunderstanding by many in FTF countries that they 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 with 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 to many FTF country program farmers, and some even perceive it to be a “natural” product.

Several FTF offices requested approval to provide assistance for the use of oral or injectable veterinary treatments, such as de-wormers and other anti-parasitics, and antibiotics. While definitions of pesticides are typically quite broad, they usually exclude drugs used to control diseases of humans or animals, including livestock and pets. In the U.S. such drugs are regulated by the Food and Drug Administration and are not considered pesticides. In addition, fertilizers, nutrients, and other substances used to promote plant survival and health are not considered plant growth regulators and thus are not considered pesticides. Therefore, approval in a PERSUAP is not needed for FTF programs to provide support for the use or procurement of oral and injectable veterinary drugs. PERSUAP approval is required for all veterinary drugs administered as dips or sprays.

3.2 Factor b. Basis for selection of requested pesticides

FTF 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.

Additional comments from country programs included:
The Georgia program prioritized the reasons for selection as: 1) quality-effectiveness, 2) good example (demonstrated locally), and 3) price.

Ghana gave the reasons for making the pesticide selections as follows: regulatory status of the active substance in Ghana; regulatory status of active substance in the EU; economic importance of crops on which pesticides are to be applied; efficacy of the active substance against target crop pests and diseases; possibility of use on several crops; availability in Ghana of products containing the active substance and available technical assistance in handling of products; and economic impact on producers in terms of affordability.

Haiti stated that some of the pesticides were chosen because they were less dangerous than other options, and noted that ivermectin was a very toxic choice, but to make it less dangerous and more effective, they recommend mixing it with mineral oil.

Lebanon noted that some of the pesticides were chosen because of low mammalian toxicity and some because of their selectivity.

Many of the pesticides requested by the Mozambique country program were chosen, in part, because of their low toxicity.

The one pesticide requested by the Nicaragua dairy VC, Picloran, is requested because it is available, it does not remain in soil, and it does not damage the soil structure.

Nigeria noted that some of the pesticides were chosen because they disintegrate very quickly.

Notably, only Haiti, Lebanon, Mozambique, Nicaragua, and Nigeria gave a basis for selection related to environmental or health reasons. While the most common reasons for choosing the pesticides requested are valid—availability, efficacious, cost-effective—the replies from the country programs indicate that there is still major work that needs to be done before farmers, applicators, and extension officers consider human health and environment issues along with other reasons for selecting a specific pesticde.

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

3.3 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 and livestock). 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.

However, as described in 3.2 above, most FTF country programs do not currently make their pesticide

choices based on least toxic alternatives. This may be due to limited availability of less toxic products, high cost of less toxic products, or lack of awareness of these products, and in some cases, limited efficacy as compared with the more highly toxic chemicals. Also as noted above, in many of the FTF core countries, safe use practices are not widely known. FTF volunteers, whose assignments directly or indirectly involve pesticide considerations, will surely have the opportunity to raise awareness of the IPM approach, to encourage IPM, and to discourage poor practices.

As part of this Programmatic PERSUAP, each FTF country program was requested to provide IPM measures recommended as part of disease and insect control strategies. Among FTF host countries there is a wide range of understanding and implementation of an IPM approach. Clearly, there is room for capacity building in IPM in all FTF core countries.

FTF country programs mentioned a wide range of practices as part of IPM, such as: companion cropping, quick removal of affected plants, good rotation practices, regular monitoring, apply pesticides with irrigation system, apply pesticides in early morning or late afternoon [presumably to avoid active time for pollinators], apply lowest acceptable dose, only apply pesticides when monitoring/scouting indicates an insect or disease present, use only in emergency situation, use host crops as barriers, rotate insecticides, manual weeding, apply in a timely manner, use pesticide judiciously, only use pesticide if necessary, good agronomic practices, biological control, good post-harvest handling of grains, good animal husbandry, early warning system, use clean, certified seed, use pesticides that are recommended for use within an IPM program, bury infected debris, good water management, attention to time of planting, delayed rainfed planting, good nursery management, avoid physical damage to plants, pruning, regulate shade trees, early planting, and use improved varieties. Some FTF country programs mentioned a few of these as well as other practices, some mentioned several of these practices, and some programs provided no information on IPM tactics (Angola, South Africa and Moldova).

The Guyana FTF program gave the following practices for a host of insects and diseases: preserve natural enemies, control weeds in and around fields, maintain crop and field sanitation, remove egg clusters, avoid fields with a history of cutworm problems, wait 10-14 days after field is disked (to starve larvae) before planting, use insecticidal soap and neem, plant resistant varieties, avoid poorly drained fields, plant on raised beds, clean equipment and boots after working in an affected field, use optimum spacing, remove fruits and vegetables that have fallen from the plant and burn, mulch for weed control.

Mali and Nigeria FTF programs also provided fairly strategic approaches to IPM. Kenya provided an IPM package that could be used as a model for many country programs.

Mozambique and Tanzania provided detailed IPM tactics. These are included in SUAP-Attachment F.

IPM practices submitted as part of this PERSUAP should be retained in FTF program files for future reference; and they should be built on and strengthened by knowledgeable FTF program volunteers. This and other IPM recommendations are included in the SUAP.

As stated in the FTF IEE, few volunteer assignments include specific activities relating to pesticide recommendations, but frequently volunteers are able to recommend IPM strategies and safe use of pesticides, as a means of reducing production costs, meeting market requirements, and safeguarding producer and consumer safety, and long-term market development. Also as stated in the FTF IEE, training and recommendations for use will be in an IPM context where pesticide use is the last resort. The focus of any recommendations and training will be on IPM and the environmentally responsible and safe use of pesticides when they are needed. Each cooperating NGO will ensure this caveat is included as a standard element in the briefing materials it provides every volunteer prior to their traveling. This

FTF IEE recommendation remains in force through this Programmatic PERSUAP.

Given the range of understanding and implementation of IPM in FTF core countries, volunteers who may be involved with pesticide use/misuse, pesticide recommendations, and pesticide training, should be prepared to provide IPM tactics/best practices as part of all recommendations involving pesticides. These recommendations (included in the SUAP) will ensure that FTF assistance for the use or procurement of pesticides will not have adverse impacts and may have positive environmental and health effects.

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

Each FTF country program was asked to provide the methods of application of the requested pesticides, information on the availability of safety equipment, and measures for maintaining application and safety equipment.

Application methods: Country programs indicated that handheld sprayers and backpack sprayers are the most commonly used application method—backpack sprayers more common than handheld. Motor sprayers, high volume and low volume sprayers are used in some countries, most commonly in Egypt, Mozambique, Nigeria, and Mali. Some FTF countries mentioned that some pesticides are applied through irrigation systems. Seed treatments are also widely used.

The Georgia program mentioned sprinkling pesticides in furrows during planting. Lebanon mentioned a drench, incorporated into the soil, and foliar application. South Africa mentioned that animal-drawn boom sprayers are commonly used. In Tajikistan, farmers use only backpack sprayers and handheld sprayers, but on the one commercial farm in the country, "Favz," industrial fogging and spraying equipment capable of treating large acreages are used. In Uzbekistan, two to three-year old backpack sprayers are most often used and are not well-maintained, while tractor sprayers are used in orchards.

Maintenance of application equipment: Most FTF country programs stated that application and safety equipment is maintained by thorough washing with water immediately after use. Some mentioned that the application equipment and pesticides are stored securely away from the home and in an area where children are unable to enter, but many FTF country programs stated that although that would be the ideal, it rarely happens.

In Belarus, there are strict rules governing maintenance of application equipment. Machinery and equipment must be maintained according to the "hygienic and technological provisions by the respective departments of the Ministry of Health." Before the planting seasons, equipment must be checked and completely repaired. Heads of farms or machinery enterprises are responsible for the maintenance, repair, and testing of machinery and equipment.

In the Dominican Republic (DR), usually pesticide applicators receive training on maintenance from the manufacturer when they buy application equipment. Also, extension officers provide training and supervision to the producers on maintenance of application and protection equipment.
In Guyana, most farmers maintain their application equipment by cleaning it regularly, usually after each use, and with detergent and water. Some farmers refer to their cleaning as a triple rinse process, while others mention pressure rinsing their equipment. Occasionally, some farmers will disassemble their equipment and clean, lubricate, or replace components such as the plunger, cylinder intake valve, and chamber valve. Of the safety equipment available, only respirators undergo any form of maintenance, where their filters are occasionally removed and cleaned or replaced. Most other safety equipment, including gloves, goggles, etc. are usually only cleaned after use.

Maintenance of application equipment in Malawi is the responsibility of the farmer. The Agricultural Extension Services do not conduct training on maintenance. If pesticide/equipment suppliers are funded, they will at times provide training. In terms of repairs, often farmers resort to local artisanal workshops, where workers are not experts in pesticide equipment repair. The Malawi program suggested that training on repair and maintenance of equipment could target these community-based artisanal workshops to provide local back-up services.

Currently, in Mozambique, the most commonly used equipment includes backpack sprayers, masks, gloves, and protective overalls, and most applicators (small scale farmers) take good care of these, by washing them and also changing masks filters.

FTF country responses regarding the **availability of safety equipment** and **measures to increase the use of protective gear** are highlighted below to illustrate the wide range of responses received.

In Belarus, methods of application are regulated by the "Sanitary rules and norms 2.2.3.12-17-2003" approved by the Chief Sanitary Department of the Ministry of Health. Using IPM and equipment not certified by the respective authorities is strictly prohibited. Farmers have access to a wide range of safety equipment.

In Georgia, the ordinary and less expensive protective gear (disposable gloves, masks, safety glasses, clothing, etc.) is available to every farmer in Georgia. However, even though protective wear is available, the level of use is very low mainly due to the general lack knowledge of pesticide dangers. The more advanced equipment, which is more expensive, but has greater protective features, such as cartridge and canister respirators, air supplied equipment, full face protective goggles, etc. are also available, but used only in very rare cases. To improve the incidence of use, the Georgia program suggested that a wide ranging information campaign on IPM is needed, including trainings, leaflets, and technical assistance.

In Uzbekistan in many cases, toxic chemicals are sold without the associated protective equipment (e.g., respirators, safety goggles, gloves, and protective clothing). Spraying is usually done in street clothes (long-sleeve shirts and pants) and boots, usually without gloves, goggles, or masks.

In the Republic of Moldova use of safety equipment for pesticide application is specified in the Labor Safety Instructions, and also by the Technological Standards and Instructions of the Phyto-Sanitary Department. There are several suppliers of safety equipment and farmers have access to a wide range of safety gear. Before safety equipment is sold, it must go through certification procedures.

In the DR, safety equipment representatives and distributors are located mainly in the urban areas, and there are small distributors and technicians from these companies to promote their products and to assist farmers in rural areas.

In Haiti, farmers that FTF volunteers work with use few, if any, chemicals. Safety equipment is not readily available. Backpack sprayers are available, but they are often too expensive. A constraint to Haitian farmers using proper application and safety equipment has been that these products were unavailable at the time they were needed. But FTF volunteers are helping to plan the production cycles with the farmers and are helping them have everything in place when needed, such as seeds or seedlings, chemicals, as well as the skills to monitor for pests and diseases. Even where the safety equipment was available, a lack of knowledge about chemicals and the need for safety precautions constrained their use. Even safety gloves are not widely available in Haiti, and medical gloves are usually used in their place. Storage is also an issue. Most of the producers don't have a place to store chemical products; they often leave them around the home or store them with their livestock. This is one of the biggest challenges;

only 5% of FTF hosts have a place to store chemical products. The only alternative has been to leave the product in the field rather than bringing it into or near their home. FTF volunteers are helping to change some of these behaviors, but greater attention to these issues is needed. As recommended by the Haiti program, a booklet, in Haitian Creole, about the use of chemicals and safeguards that farmers can take would help address misuse and lack of knowledge about pesticides.

In Nicaragua, safety precautions are rare and traditional application practices are common. However, as noted by the Nicaragua FTF program, even application by pump is not guaranteed protection unless safety gear is used. The Nicaragua program recommends trainings and workshops for producers to raise awareness about the risk of poisoning when handling these chemicals; education campaigns that promote the use of masks, gloves, and other protective wear to encourage safe chemical handling; and pesticide container disposal should also be addressed.

Safety equipment is available in Guyana through agro-chemical companies and is generally made available to farmers within their region/areas through outlets or representatives of these companies. Representatives of the agro-chemical companies who visit the farming areas to promote the use of fertilizers and pesticides also promote the use of safety equipment. To increase the use of safety equipment, agricultural agencies/organizations/projects, in collaboration with the government's Pesticide and Toxic Chemicals Control Board, can promote public awareness and educational programs using different media formats. Radio and television programs can target the general population while workshop/demonstration sessions can target schools and residents of farming areas. Also, the Guyana FTF program noted, it is very important to target schools because once armed with the knowledge, the farmers' children will seek to protect themselves and not just practice what they were accustomed to seeing whenever assisting on the farm.

In Malawi, there is a lack of knowledgeable and well-qualified personnel in the field and at professional levels. This coupled with the lack of laboratory facilities for the enforcement of pesticide and environmental regulations, results in widespread misuse of pesticides, which presents a danger to human health and the environment. Training courses at university level and at agricultural training institutions would help build skills; and a laboratory is needed for testing pesticides and pesticide residue.

In Uganda, as in many other FTF countries, safety equipment is available but expensive for the farmers. The Uganda FTF program suggested that the use of safety equipment could be increased if there was a program to loan the equipment to farmers.

Safety equipment is available in Nigeria at medium-sized agro-input shops and major agrochemical dealers located mostly in state capitals and major commercial cities in Nigeria. The use of safety equipment could be increased through training and knowledge sharing on best and appropriate use of agro-chemicals with farmers, contract sprayers, and spray-men. There could also be a deliberate effort to promote contract spraying (through training and financial assistance for commercial loans) as a means of livelihood and employment creation. This would also help instill professional capacity in sprayers and encourage them to apply best practices.

In Mali, safety equipment is available and for sale mainly by the private dealer, "Cigogne," who also provides training and sells pesticides and equipment via local dealers in the major agricultural regions (District of Bamako, Koulikoro, Kayes, Mopti, Ségou and Gao). Also, CMDT (Malian Company for Textile Development) and PALUCP (Fighting Against Grasshopper Project) both make major efforts to train farmers and provide them with equipment such as spraying tools. Even so, the Mali FTF program notes that there is plenty of room to increase the use of safety equipment, and such things as an information program (radio, TV, leaflets, newspaper, sketches), farmer training (demonstrations and

exhibitions by dealers), promoting pesticide supplies by facilitating access to micro-credit, and awarding the best farmer for respecting the environment in agricultural practice would help improve practices.

In Mozambique, most, if not all, agro-input distributors, wholesalers, and retailers also sell safety equipment such as rubber gloves, face masks, overalls, and rubber boots.

The majority of agro input distributors, wholesalers, and retailers in Tanzania sell safety equipment such as rubber gloves, face masks, overalls, and rubber boots. Most of these dealers locate their businesses in towns and this limits the accessibility and availability of input services for smallholder farmers in rural areas (about 85% of the population). To increase the use of safety equipment, regular trainings for smallholder farmers are needed, especially on the use of safety equipment, but there should also be a strategy to bring these services near to them, the Tanzania FTF program recommends.

In Egypt, only large farms which export to EU countries have access to safety equipment; small farmers do not have access. Training on safety measures and use of safety equipment is needed.

In Lebanon, no safety equipment is available or used, and intensive training programs are needed to build awareness of pesticide hazards, and the need for safety precautions.

Almost all FTF countries mentioned the need for training of agricultural producers and of others involved in pesticide application, pesticide sales, and those providing pesticide advice (agro-input dealers/distributors, extension officers, applicators). Many countries mentioned that protective gear is available only in urban areas, indicating there is a need for agro-supply dealers to pay more attention to needs of rural areas. This may require loan programs that encourage dealers to expand to rural areas. Expense of protective equipment is often an issue and a reason that farmers and applicators fail to use protective gear. As the Uganda program mentioned, a program to loan equipment to farmers would increase the use of protective gear.

Notably, no FTF country mentioned regular calibration of spray equipment. None mentioned attention to drift or water contamination issues. For most countries, disposal of pesticide containers was noted as one of the biggest problems.

FTF volunteers are unable to have an influence over many of the issues regarding safety equipment, such as lack of availability in rural areas. But FTF volunteers can strongly encourage the use of protective gear, in line with label requirements. In some cases, if protective gear is unavailable -or in many tropical countries, where protective clothing is uncomfortable, and therefore applicators refuse to use it, FTF volunteers may be able to identify low-cost and comfortable alternatives.

FTF volunteers should always recommend protective gear, as required by the label, when they recommend use of pesticides (see SUAP, Section 4), and they should be aware of the limited accessibility of protective gear in many cases, and prepared to identify measures to access it. FTF volunteers should also be aware of the lack of intact labeling in some FTF countries. The label is used to provide directions on protective gear. Where labels are absent or incomplete, FTF volunteers must be prepared to provide alternative advice on protective gear (see SUAP Section 4 for recommendations). Pesticides should only be recommended in conjunction with the use of appropriate protective gear. *Practical advice* for safety clothing, equipment, and precautions go a long way in FTF countries, and with appropriate recommendations, FTF program assistance for the use or procurement of pesticides is not expected to have adverse impacts on human health.

3.5 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

PER Attachment B notes the acute and chronic human toxicity levels, based on the WHO classification system, of all FTF-requested active ingredients. The table also makes note of active ingredients considered "PAN Bad Actors," a classification system denoting particularly toxic pesticides. Both the WHO classifications and PAN Bad Actors system are described in PER Attachment B.

SUAP Attachment A shows all requested active ingredients *except* those considered too highly toxic for use in FTF countries: WHO toxicity level 1a and 1b, and other active ingredients of concern due to human health or the environment. The table in SUAP-Attachment A includes only those active ingredients that volunteers may use or recommend. Formulated products used or recommended may be comprised of only the approved active ingredients, and no other active ingredients. Based on the analyses conducted for this Programmatic PERSUAP, the more highly toxic pesticides are not allowed to be used or recommended by FTF volunteers.

The US EPA rates the toxicity of formulated products for US EPA registered products only. Many of the products available in FTF countries are not registered by the US EPA, and therefore, the label has no US EPA toxicity rating. The SUAP requires FTF volunteers to ensure that they recommend only *products* that are the equivalent of US EPA toxicity level II and above; or if they use/recommend *active ingredients*, they must ensure that formulated products are actually available in the host country at US EPA toxicity level II and above.

Appropriate safeguards must be taken for pesticide active ingredients noted to have acute and long-term toxicological hazards to humans (SUAP-Attachment B). There are several ways to mitigate exposure to humans. The SUAP requires mitigation measures for active ingredients of special concern, and these best practices are outlined in SUAP-Attachment B. Given the FTF country program responses regarding limited knowledge of the human health hazards of pesticides, and the limited accessibility and use of protective gear, FTF volunteers must be prepared to provide sound, practical information about safeguards. SUAP-Attachment B aims to provide the FTF volunteer with practical 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), SUAP-Attachment A provides groundwater contamination potential of approved active ingredients. For active ingredients that show high potential to contaminate groundwater, appropriate precautions should be taken as discussed in SUAP-Attachment C.

However, given the lack of attention to environmental hazards in most of the FTF country submissions, and the potential environmental hazards presented by pesticide use, appropriate precautions to minimize adverse impacts on the environment should be taken for all pesticides. Best practices in mixing, storing, applying, disposing, and transporting of pesticides should be instilled in farmers and applicators when using *any* pesticide. In training, best practices should be encouraged for all pesticides (including for storage, application, etc). FTF volunteers are usually well-placed to provide these mitigation recommendations, and SUAP-Attachment C includes guidance and specific measures to minimize impacts of pesticide use on the environment.

FTF volunteers should be cognizant of the often low level of understanding of the environmental hazards of pesticides, and the widespread misuse of pesticides that can contaminate the environment. Volunteers should also be aware that many farmers and applicators may have a low level of education—as noted in several FTF country submissions, and may either be illiterate or unable to read and understand English. Alternatives to English training materials may be needed.

With well-informed and prepared FTF volunteers, equipped to provide guidance to FTF recipients on

mitigating impacts of pesticides to human health and the environment, FTF assistance for the use or procurement of pesticides is unlikely to have adverse effects; and FTF input will likely result in improved practices, with positive human health and environmental effects. The measures in SUAP-Attachments B and C provide the necessary guidance, and this guidance should be provided in conjunction with FTF assistance for the use or procurement of pesticides.

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

For most of the pesticides requested by FTF country programs, *effectiveness* was one of the primary reasons for selecting the pesticide. The best way to determine efficacy is to conduct field trials testing the top five to six products for each pest on each crop. However, this takes a large applied research effort, beyond the scope of the FTF program. FTF volunteers can help farmers and applicators monitor efficacy of a pesticide product, and guidance for this is included in SUAP-Attachment G.

The problem of product adulteration is a concern for most FTF country programs. Adulterated products minimize the efficacy of a product. Obsolete products are also a concern. Governments of many FTF countries are unable to adequately control adulteration or the continued sale and use of obsolete products.

SUAP-Attachment G provides guidance on monitoring efficacy and adulteration, and measures to protect against adulteration and use of obsolete products. In addition, FTF 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 SUAP-Attachment G, FTF volunteers will be able to help protect against the use of adulterated and obsolete products, and will be able to help farmers monitor efficacy of pesticides used.

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

All pesticides can be hazardous to non-target ecosystems, fish, wildlife, and beneficial insects. As indicated on FTF country submissions, there is a low level of knowledge about the effects of pesticides on non-targets. Practices that could impact non-target ecosystems are common in FTF 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 are active, etc. These poor practices can affect non-target ecosystems and organisms.

In addition, in FTF countries, broad spectrum pesticides are common—pesticides that kill a wide range of organisms, and selective pesticides are less commonly used. Intact pesticide labels should include information on a pesticide product's effects on non-target organisms. However, as mentioned, in several FTF countries, pesticides are often found re-packaged and without intact labels.

FTF volunteers should be aware of the low level of knowledge in many FTF 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).

SUAP-Attachment C provides guidance for volunteers to help ensure their recommendations for specific pesticides will be the least hazardous for non-target ecosystems, fish, wildlife, and beneficial insects. SUAP-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. FTF volunteers should be prepared to provide this information to FTF recipients in conjunction with providing recommendations for the use or procurement of pesticides.

Some FTF submissions indicate a misunderstanding that botanicals may be less toxic to non-target species than synthetically derived 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 cause cancer. 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 indicated in FTF country submissions, farmers and applicators in many FTF countries may be illiterate or unable to read English. Their main concern will be managing the pest or disease that is affecting their crop. They may be unconcerned about non-target organisms and ecosystems or have little or no knowledge of pesticides' effects on non-targets. They will likely be unaware of mitigation measures to protect non-targets. FTF volunteers may have the opportunity to provide guidance and practical safeguards.

SUAP Attachment C provides a range of best practices that FTF volunteers can use and encourage others to use. They should be recommended in conjunction with any assistance provided for the use or procurement of pesticides; thereby, FTF assistance for the use or procurement of pesticides should have no adverse effects on non-target ecosystems.

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

FTF volunteers will be working in over 21 countries, and within FTF countries, volunteers may work in any region. At this stage, it is impossible to provide information on the climate, flora, fauna, geography, hydrology, and soils in areas where FTF volunteers will be working, and where they will be providing assistance for the use or procurement of pesticides. However, guidance is provided in the SUAP to help ensure there will be no adverse impacts to the environment – whatever the conditions under which pesticides will be used or recommended.

Of particular note are aquatic features. 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 also be contaminated when farmers or applicators wash pesticide sprayers in or near waterways. Indiscriminate pesticide and pesticide container disposal can also contaminate waterways and aquatic organisms. Contamination could also occur directly from pesticide use in agricultural fields. This 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 FTF requested 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 (this is also indicated in SUAP-Attachment A). 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 the tables in SUAP-Attachment A, some of the proposed pesticides are potential ground water contaminants. These pesticides in particular, but in general no pesticides, should be mixed, applied, stored, or disposed of adjacent to or upslope from waterways, wetlands or drinking water sources without appropriate safeguards described in the SUAP-Attachment C.

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

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

Non-chemical methods used by farmers in FTF 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 FTF countries non-chemical methods are the most common pest control methods used because they are the least expensive.

Notably, IPM is not well known in many FTF countries, and almost all FTF countries mentioned the need for training in non-chemical methods of control. In addition, less toxic pesticides are not widely known, and often are more expensive in FTF countries than the more highly toxic pesticides.

This PERSUAP provides for a wide range of active ingredients to be recommended (SUAP-Attachment A). They cover a range of pesticide families. If a pesticide in SUAP-Attachment A is registered by the host country, and if it is available in-country, volunteers have a range of active ingredients 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 the SUAP-Attachment F.

3.10 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 of proposed pesticides. If the host country's ability to regulate pesticides is inadequate, assistance for the use or procurement of pesticides could result in greater harm to the environment.

FTF country programs were asked to provide the list of government approved/registered pesticides for their country. All FTF country programs except Angola, Mali, Nigeria, Ghana, Egypt, and Lebanon submitted government lists. As described above (Section 2.2), some country lists were more thorough, and included more chemicals and products than others. FTF volunteers shall only recommend pesticides included in SUAP-Attachment A **and** that are on the host government approved list.

Unregistered pesticides may still be entering FTF countries. In many of these countries, regulations

covering pesticide import exist, but enforcement may be weak. Obsolete and illegal pesticides may cross into FTF countries through relatively porous borders. Constraints to enforcement may include limited human and financial resources and limited technical capacity.

Government regulations covering transportation and labeling/packaging vary among FTF countries, and their ability to enforce these regulations also varies. FTF 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 FTF volunteers will be able to rely on intact labeling, and should be prepared to provide advice in place of label directions.

FTF country programs were asked to list the most serious pesticide-related issues in their country. Some mentioned that government fails to control import and disposal of pesticides. Obsolete pesticides—use of them and lack of disposal measures for them—are a problem in many FTF countries. Most FTF host countries have no program to certify applicators and have no continuing education available for applicators. Training of farmers and applicators is often implemented through an agriculture Ministry, and often supported by a donor project.

FTF volunteers should especially be aware that few, if any FTF host countries have a program 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, FTF volunteers can encourage, from bottom-up, good practices in storage, disposal and use. "Best practices" are included in SUAP-Attachments.

3.11 Factor k. Provision for training of users and applicators

FTF 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 FTF country partner to request a volunteer and to specify the tasks. FTF country programs may 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 FTF country responses, FTF country programs should market their volunteer experts in IPM and safe use. This would fill a gap noted by all FTF country programs, and a constraint to improved pesticide practices.

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

FTF 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, input dealers, and others is targeted. Volunteers generally have no opportunity to revisit sites to monitor activities and implementation of their recommendations. However, evaluating the risks and benefits of pesticide use should be an ongoing, dynamic process. Therefore, volunteers who provide assistance for the use or procurement of pesticides must provide this in conjunction with recommendations and training on how to monitor the use and effectiveness of pesticides.

To help farmers monitor efficacy once the volunteer is gone, they could draw up simple monitoring plans, and could train recipients to collect data on reduction in efficacy and any other known environmental impacts which should trigger a change to a different pesticide or a different method of control. Simple forms that farmers can easily use are best. Volunteers who prepare such plans should submit them to the FTF country office so that subsequent volunteers can build upon these plans. In this way, the monitoring plan will be a dynamic and up to date resource and available for other volunteers. See SUAP-Attachment G for recommendations for monitoring plans.

PER Annex A: Farmer-to-Farmer Programmatic PERSUAP Scope of Work

Terms of Reference: FTF PERSUAP

This Scope of Work (SOW) describes the services required for the John Ogonowski and Doug Bereuter Farmer-to-Farmer Program for preparation of a Programmatic Pesticide Evaluation Report and Safe Use Action Plan (PERSUAP) to guide activities of the FTF volunteer program activities. The services described herein will enable the above-mentioned program to respond to and comply with the requirements of USAID Regulation 22CFR 216.3(b), USAID's pesticide procedures and will make it possible for the program to comprehensively contribute to environmental and human health safety on this project, while achieving project goals. Weidemann Associates, Inc. under the FTF Special Program Support Project (SPSP) will provide qualified professionals to guide preparation of a *Pesticide Evaluation Report and Safe Use Action Plan* **(PERSUAP)**. The PERSUAP provides the technical data and analyses that will be used in preparing a Programmatic Environmental Assessment for the FTF Program, revising the existing Program IEE to reflect the information and requirements laid out in the program-wide PERSUAP.

Background

All USAID activities are subject to evaluation via, at minimum, an Initial Environmental Examination (IEE) and at maximum an Environmental Assessment (EA). And because of high risk concerns presented by pesticides, the USAID environmental regulations require that at least the 12 factors outlined in the Pesticide Procedures described in 22 CFR 216.3 (b)(1)(i) (a through l) be addressed in the PERSUAP for any program that includes assistance for the procurement or use of pesticides. The PERSUAP focuses on the particular circumstances of the program in question, the risk management choices available, and how a risk management action plan would be implemented in the field. Further details about what to include in a PERSUAP are given below.

Why is a local-level assessment such as a PERSUAP needed for USAID pesticide programs? To help in understanding the utility, consider the U.S. system for promoting pesticide safety. When the USEPA registers pesticides for use in the United States, it specifies the manner in which the product can be "safely" used (i.e., with an acceptably small risk), including safety equipment needed when applying the pesticide, how to apply it, the allowed uses, etc. But the context in which EPA makes these registration decisions is important to note. An extensive system of capabilities and resources exist in this country that help give EPA confidence these specifications will be followed and the product will be used appropriately. These include a 97% literacy rate meaning most of the population can read pesticide labels; close control by EPA over the content of the label; training requirements and programs for those pesticide products that require applicator certification; worker protection requirements; occupational safety regulations; and relatively effective federal, state and local enforcement mechanisms.

In allowing the use of certain pesticides in its overseas programs, USAID cannot rely on the same societal capabilities and resources that the USEPA does to assure appropriate use of the product. The preparation of a PERSUAP gives a program manager the opportunity to consider practical actions by which to reduce the risks of using pesticide products in a program, taking into consideration the context in which the products will be used, the particular elements of the program, and the different capacities of the partners involved.

The FTF Program presents unique challenges in complying with the requirements for development of a programmatic PERSUAP. The FTF Program provides voluntary technical assistance to farmers, farm groups, and agribusinesses in countries to promote sustainable improvements in food processing, production, and marketing. The program relies on the expertise of U.S. volunteers from diverse backgrounds—farms, land grant universities, cooperatives, private agribusinesses, nonprofit farm organizations and others to respond to the needs of host country farmers and organizations. Typically, volunteers spend about 20 to 30 days in the host country. Volunteers have completed over 12,000 assignments in 103 countries, since the program began in 1985. Volunteers work on a wide range of activities, providing assistance to host organizations—private farmers, cooperatives and community groups, rural credit institutions, extension services, input supply firms, agribusinesses, and others. Assignments may involve technology transfer, business planning, organizational strengthening, marketing, or environmental conservation.

US NGOs implement the FTF Program. These organizations work closely with overseas USAID missions and local partner organizations, supporting a variety of development programs aimed at reducing poverty and promoting sustainable food security. Local offices of the volunteer program implementers identify hosts and plan assignments, recruit and field volunteers, provide logistics and translation services, as needed, and follow up with host organizations on implementation of volunteer recommendations. Often the volunteer assistance is related to a larger on-going development program.

Most volunteer assignments provide technical assistance services to host organizations under Country FTF Projects in about

20 core countries. (See list of countries and country projects in Attachment A.) Country FTF Projects may involve support service development (extension services, financial services, marketing, input supply, processing), but most focus on development of specific value chains, such as dairy development, horticulture, staple food production, grain and oilseeds, aquaculture, apiculture, agro-forestry and small ruminants.

PERSUAP—Scope and Purpose

Pesticides, if not used properly, can kill and injure humans, as well as environmental resources. Pesticides are defined as synthetic *or natural product-derived* chemical products intended to kill, control, and repel insects, plant diseases, weeds, and other pest organisms. The FTF PERSUAP analysis will cover those pesticides proposed for use in relation to Country FTF Projects. Such pesticides must be, at a minimum: a) registered by USEPA for the same *or similar* uses without restrictions; b) registered by the local government; and c) available in the country or region. The PERSUAP will also specifically list pesticides that are *rejected for use* and for which use should be discouraged by the FTF Program, with reason(s) for rejection.

The FTF Program typically provides only voluntary technical assistance to host organizations and this in the form of short term voluntary services. Volunteers and the FTF Program implementers have little control over activities carried out by hosts and FTF Programs are not intended to involve any procurement or direct use of pesticides. However, pesticides are used in most agricultural production systems and, even when volunteers are not working directly with pesticides or pest control, attention to pesticide use systems is important to marketing, crop and livestock management, business plan development and other activities with which the volunteer may be involved. Frequently, pesticides are misused or mishandled and volunteers have a need or an opportunity promote safer use through training or advisory services.

USAID Environmental Procedures for pesticide "use" (as provided by USAID Environmental Procedures: Title 22, Code of Federal Regulations Part 216, 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-l). Even though the FTF Program and FTF volunteers rarely, if ever, are involved in procurement or direct application of pesticides, "use" is interpreted broadly to include the handling, transport, storage, mixing, loading, application, clean up of spray equipment, and disposal of pesticides, as well as the provision of fuel for transport of pesticides, and providing technical assistance in pesticide management. "Use" is said to occur if training curricula include information on safer pesticide use even if it does not involve actual application of pesticide. It also applies if pesticide procurement is facilitated by credit or loans. USAID also strongly encourages including instruction in IPM and alternatives to pesticides in any training on pesticide use as defined above. Under this approach, pesticides are considered a tool of 'last resort' and pesticide choice should as far as feasible be the 'least toxic' choices. ***This definition of "use" applies throughout this SOW and the resulting PERSUAP.***

The FTF PERSUAP is intended to address crop and livestock protection activities in production as well as in storage and processing. It will cover use of all pesticides--herbicides, insecticides, fungicides, nematicides, rodenticides, miticides, and other pesticides and related chemicals. Specifically, the PERSUAP includes:

> 1. Documentation on the specific uses of pesticides that comply with 22 CFR 216.3(b)(1)(i)(a through l) for each project activity that "uses" pesticides, including promoting the adoption of particular pesticides and pesticide use technologies supported by USAID; and
>
> 2. Mitigative actions as identified in safe use action plans with implementing partner commitments to recommended actions, including capacity building by training, production of simple safety materials like fact sheets and posters, and other means, with defined timelines and assignment of specific responsibilities for actions.

The PERSUAP is typically based on an assessment of the pesticide system from import/production to distribution and use to disposal using a systems analysis approach. This pesticide system analysis provides the backdrop for accurately addressing the 12 parts of Regulation 216's Pesticide Procedures. The PERSUAP will help FTF volunteers:

1. Ensure compliance with the Agency's pesticide procedures;
2. Ensure compliance with the host government pesticide importation, testing, storage, use, disposal and registration regulations, laws, policies and procedures;
3. Identify and recommend appropriate mitigative actions for incorporation into the projects' activities;
4. Identify and recommend alternative actions and/or pesticides, as appropriate;
5. Facilitate use of Integrated Pest Management (IPM) with a view of avoiding or reducing unnecessary pesticide risk; and
6. Identify and address key pesticide use issues, particularly those that impact on pesticide utilization by small-scale producers, laborers, and agribusinesses.

Scope of Work

The Weidemann Associates, Inc. FTF Special Program Support Project (Weidemann) will prepare a draft programmatic PERSUAP for the FTF Program. This will be undertaken in collaboration with the FTF Program implementers that will have to provide the country-specific details on activities in which volunteers will be involved. The FTF implementing organizations' country staff provide a pragmatic and efficient means of developing the necessary detail required for completion of the FTF PERSUAP. While country and project details vary, there are many similarities in activities and production systems, such that a single programmatic PERSUAP is the preferred approach to meeting regulatory requirements and ensuring a sound approach to implementing the FTF Program.

A PERSUAP basically consists of two parts, a "PER" and a "SUAP." The Pesticide Evaluation Report (PER) section performs the systems analysis of the country's pesticide system from import to ultimate disposal and addresses the 12 informational elements required in the Agency's Pesticide Procedures. The Safe Use Action Plan (SUAP) puts the conclusions and recommendations reached in the PER into a plan of action, including assignment of responsibility to appropriate parties connected with the pesticide program.

The FTF Programmatic PERSUAP shall include:

A. PERSUAPs for each Country FTF Project (See Attachment C guidelines) including:

1. Documentation on the specific uses of pesticides that will comply with 22 CFR 216.3(b)(1)(i) for each activity concerned with procurement or use of pesticides, including promoting the adoption of particular pesticides and pesticide use technologies supported by USAID, addressing the 12 Regulation 216 Pesticide Procedure elements:

    a. USEPA registration status of the proposed pesticides.
    b. Basis for Selection of Pesticides.
    c. Extent to which the proposed pesticide use is, or could be, part of an IPM program.
    d. Proposed method or methods of application, including the availability of application and safety equipment.
    e. Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazards.
    f. Effectiveness of the requested pesticide for the proposed use.
    g. Compatibility of the proposed pesticide use with target and non-target ecosystems.
    h. Conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology, and soils.
    i. Availability of other pesticides or non-chemical control methods.
    j. Host country's ability to regulate or control the distribution, storage, use, and disposal of the requested pesticide.
    k. Provision for training of users and applicators.
    l. Provision made for monitoring the use and effectiveness of each pesticide.

2. Safe Use Action Plan: Recommendations for mitigative actions to enhance human and environmental safety (compile the recommendations relevant to the above 12 elements according to a timeline, as below, as appropriate)

    a. Immediate Actions (This is expected to include identification of: i) any pesticides with which the FTF Country Projects might usefully and safely work as part of an overall IPM approach and ii) any pesticides or pesticide uses which the FTF Country Projects should actively discourage.)
    b. Date actions to be taken by (for example 3 months hence, 6 months hence, etc)
    c. Continuous Actions
    d. Actions to be taken if resources and time become available (i.e., that are practical) (This may include recommendations for any volunteer or consultant assignments that would be needed in conjunction with FTF Country Projects.)

3. Mechanisms for capacity building of FTF hosts and partners. This should specifically include implementation of the Safe Use Action Plan part of the PERSUAP, including mitigation and training to ensure that procedures required under 22 CFR 216.3 (b)(1) are disseminated and understood by all partners.

B. Description of any Country FTF Project not covered by the Programmatic PERSUAP, including a justification for not including or an explanation for not covering the Country FTF Project (e.g., lack of data, lack of response from country staff, lack of relevance).

C. Description of procedures to be followed for any future Country FTF Projects proposed under the FTF Program.

D. Description of guidelines for any "flexible volunteer assignments" not linked to a defined Country FTF Project.

Roles and Responsibilities

The EGAT FTF Team and EGAT/Bureau Environmental Officer (BEO) will take an active role in working with the Weidemann specialists in the preparation of the FTF Program PERSUAP. The BEO will provide specific technical guidance and direction, review progress and other draft materials produced and perform liaison functions, as needed, with Mission and other Bureau Environmental Officers.

Each of the FTF implementing organizations will collaborate in accessing country data and information and completing the FTF Program PERSUAP. Implementers and country programs are listed in Attachment A. Country. Travel by the pesticide specialist will not be required.

Weidemann will provide services of a consultant(s) with expertise in pesticides. The Specialist will be responsible for working with and through FTF implementing partner Country FTF Program Directors in approximately 20 countries to: 1) acquire information on the current needs for pest control and the usages, practices and conditions under which various pesticides are used (climate, flora, fauna, geography, hydrology, soils, near water bodies etc) relating to production systems with which FTF Country Projects work; 2) acquire information on and determine the extent to which safe pesticide use is and could be part of an integrated pest management program for the Country FTF Projects; 3) acquire and synthesize information on FTF country regulations and controls on acquisition, distribution, usage, storage and disposal of pesticides; 4) acquire and assess implications of USEPA and local country restrictions on use of specific pesticides relevant to Country FTF Projects; and 5) compile: i) a positive list of pesticides and pesticide use practices (if any) for which each FTF Country Project can appropriately provide safe usage recommendations to clients as part of an overall IPM approach to pest control, and ii) a negative list of pesticides and pesticide use practices (if any) which each FTF Country Project should actively discourage. These two pesticide lists for each Country FTF Project may leave pesticides in use in the respective countries that do not fall in either category. For those, the FTF Program will not make any recommendation as to use or non-use.

In sourcing technical expertise to perform the PERSUAP, the Weidemann should consider the following: The most toxic pesticides used are insecticides and the most common pesticides used are insecticides, fungicides and herbicides, and the use of IPM is USAID policy; therefore, degrees and expertise in entomology and plant pathology are most useful, as is coursework in weed science, IPM, pesticide toxicology and soil science are very useful. Several years of experience understanding and working with Regulation 216, Agency BEOs, training on Regulation 216, and actual experience performing PERSUAPs should also be required. Understanding of market-driven Standards and Certification systems such as GlobalGAP, Organic, BRC and others, which drive use of best and safest management practices in agriculture, would be considered highly beneficial.

PER Annex B: List of Pesticide Active Ingredients Requested by FTF Country Programs

PER Annex B - Table 2 below lists the active ingredients of all pesticides requested by FTF country programs for approval in the FTF Programmatic PERSUAP. The table shows EPA registration status of each active ingredient; pesticides with active ingredients not registered by the US EPA are rejected by this PERSUAP. The center column lists WHO acute rankings (see explanatory information below). If a requested pesticide's active ingredient is WHO 1a or 1b, it is rejected by this PERSUAP. For combinations of active ingredients, if one is not EPA registered or is WHO 1a or 1b, the combination is rejected.

WHO Toxicity Class: The WHO bases its ratings – outlined in the table below – on the lowest published rat oral LD_{50}, the lethal dose (in milligrams of substance per kilogram of body weight) that kills 50% of the test animals in a standard assay (see table below). WHO gives a hazard ranking of 1a (Extremely Hazardous) to the most hazardous pesticide active ingredients. While the WHO ratings generally reflect acute toxicity, they also take into account other toxic effects such as reproductive and developmental toxicity. WHO 1 (1a and 1b) are considered extremely toxic, and they are rejected for use by this PERSUAP.

WHO does not rank fumigants, a class of gaseous pesticides that are generally extremely hazardous, they instead have a no listing (NL) rating., The WHO also does not evaluate pesticides believed obsolete or discontinued, even though some of these "obsolete" pesticides are currently registered for use in the U.S. (these also have an NL rating).

WHO Toxicity Classification		**Rat LD_{50}** (mg of chemical per kg of body weight)			
Class	**Description**	**Solids (oral)**	**Liquids (oral)**	**Solids (dermal)**	**Liquids (dermal)**
I*a*	Extremely hazardous	‹ 5	‹ 20	‹ 10	‹ 40
Ib	Highly hazardous	5-50	20-200	10-100	40-400
II	Moderately hazardous	50-500	200-2,000	100-1,000	400-4,000
III	Slightly hazardous	› 500	›2,000	›1000	› 4,000
Table 5	Unlikely to present acute hazard in normal use	› 2,000	› 3,000	---	---
Table 6	Not classified: believed obsolete				
Table 7	Fumigants not classified by WHO				
U	Unlikely to be hazardous				

The US EPA registers active ingredients and formulated pesticide products. The EPA gives only formulated pesticide products (which often include inert ingredients) acute toxicity rankings. These are

reflected in the warning label on the pesticide container. The US EPA gives a warning label of Category 1 to the most acutely toxic pesticide products and Category 4 to the least acutely toxic pesticide products. The different toxicity categories are based on the LC_{50}, the lethal dose (in milligrams of substance per kilogram of body weight) that kills 50% of the test animals in a standard assay. For inhalation exposures, the LC_{50} is used---the concentration in air in mg per liter that kills 50% of the test animals.

PAN Bad Actors are chemicals that are one or more of the following: high acute toxicity, cholinesterase inhibitor, known/probable carcinogen, known groundwater pollutant, or known reproductive or developmental toxicant. NOTE: Because there are no authoritative lists of endocrine disrupting (ED) chemicals, EDs are not yet considered PAN Bad Actor chemicals.

In order to identify a "most toxic" set of pesticides, the Pesticide Action Network (PAN) and the Californians for Pesticide Reform (CPR) created the term PAN Bad Actor pesticides.[1] These pesticides are at least one of the following:

- Known or probable carcinogens, as designated by the International Agency for Research on Cancer (IARC), U.S. EPA, U.S. National Toxicology Program, and the state of California's Proposition 65 list.
- Reproductive or Developmental Toxins, as designated by the state of California's Proposition 65 list.
- Neurotoxic cholinesterase inhibitors, as designated by California Department of Pesticide Regulation, the Materials Safety Data Sheet for the particular chemical, or PAN staff evaluation of chemical structure (for organophosphorus compounds).
- Known groundwater contaminants, as designated by the state of California (for actively registered pesticides) or from historic groundwater monitoring records (for banned pesticides).
- Pesticides with high acute toxicity, as designated by the World Health Organization (WHO), the U.S. EPA, or the U.S. National Toxicology Program.

PAN Parent Chemicals: The following is from the www.pesticideinfo.org site, and explains the inclusion of parent chemicals in the WHO ratings below. **The parent chemical was chosen on the basis of available toxicity information, where chemicals with the maximum amount of toxicity information assigned to parent status.** Where no toxicity information was available for any member of a group, PAN assigned parent status to the least derivatized member of the group for organic compounds (e.g., benzoic acid would be the parent instead of methyl benzoate), the sodium salt (for compounds with a common anion), or the chloride salt (for compounds with a common cation). For some groups with no obvious parent, assignment of parent status was arbitrary.

Table 2 is a compilation of all pesticides that are rejected by this PERSUAP (especially useful for black and white printers where the color shading does not show up).

Note: If a chemical name with alpha, beta, zeta, etc. was submitted, for example, beta cyfluthrin, please check under b for beta and c for cyfluthrin—the chemical may be listed either way.

Color coding:

[1] Definition on www.pesticideinfo.org,

Blue: No PERSUAP approval needed: mainly de-wormers, oral or injectable veterinary treatments.
Red: Not registered by the EPA, WHO 1a or 1b, or otherwise highly toxic and not approved by this PERSUAP (SUAP-Annex E contains lists of highly toxic chemicals and explanations.)

Table 2. Analysis of Active Ingredients Requested by FTF Programs

Chemical/Active ingredient	WHO Toxicity Class	Status of PERSUAP Request & Notes
1-Decanol (or N-Decanol)	WHO NL	Plant growth regulator, alcohol, either PAN Bad Actor: acute toxicity
2,4-D 2,4-Dichlorophenoxyacetic acid	WHO II	Herbicide, plant growth regulator, Chlorophenoxy acid or ester
Dimethylamine salt of 2,4-Dichlorophenyl acetic acid	WHO NL (parent chemical, WHO II)	Parent Chemical-2, 4-D
2, 4-D (amine)		EPA: NR
2, 4-D (ester)		EPA: NR
2, 4-DB	WHO III	Herbicide, Chlorophenoxy acid or ester PAN Bad Actor: dev/reprod toxin
2, 4-D + Dicamba	WHO II (2,4-D) WHO III	2,4-D: as above Di: Herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
2, 4-D + Picloram	WHO II (2,4-D) WHO U (P)	Herbicide, Pyridinecarboxylic acid PAN Bad Actor: GW contaminant
Abamectin	WHO NL	Insecticide, botanical PAN Bad Actor: Acute toxicity, dev/reprod Toxin
Acephate	WHO III	Insecticide, organophosphate PAN Bad Actor: cholinesterase inhibitor
Acetamiprid	WHO NL	Insecticide, neonicotinoid
Acetamiprid + cypermethrin	WHO NL (A) WHO NL (C) (WHO 1b cyper zeta)	Acet: as above Cyper: insecticide, pyrethrin
Acetochlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: carcinogen
Acetochlor + Flurilazole =fusilazole	WHO III (A) WHO III (fusilazole)	Acetochlor as above Fusilazole: fungicide, azole
Acetochlor + atrazine + simazine	WHO III (Ac) WHO U (At) WHO U (Si)	Ac: as above At: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site Si: Herbicide, triazine PAN Bad Actor: GW, dev/reprod toxin
Acetochlor + atrazine + terbuthylazine	WHO III (Ac) WHO U (At) WHO U (Ter)	Ac: as above At: as above, See PANNA site Ter: Algaecide, herbicide, microbiocide
Acrinathrin		Insecticide, pyrethroid EPA: NR
Actellic = pirimiphos methyl	WHO III	Insecticide, organophosporous PAN Bad Actor: cholinesterase inhibitor

Alachlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: Carcinogen, dev/reprod toxin, GW Cont.
Alachlor + Atrazine	WHO III (Al) WHO U (At)	Alachlor, as above Atrazine, Herbicide, triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Alachlor + Atrazine	WHO III (Al) WHO U (At)	Al: as above At: Herbicide, triazine PAN Bad Actor: carcinogen, GW cont.
Albendazole		Oral veterinary drug for worms, no PERSUAP approval needed
Aldicarb	WHO 1a	Insecticide, nematacide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, GW contaminant
Allethrin	WHO II	Insecticide, pyrethroid
Aluminum phosphide (fumigant)	Not classified by WHO, but highly toxic	Fumigant, fungicide, inorganic PAN Bad Actor: acute toxicity
Aluminum tris (0-ethyl phosphonate)		Same as Fosetyl-Al, see below
Ametryn	WHO III	Herbicide, triazine
Ametryn + Atrazine	WHO III (Am) WHO U (At)	Am, as above At: Herbicide, triazine PAN Bad Actor: carcinogen, GW cont. See PANNA site
Amicarbazone	WHO NL	Herbicide, triazolone
Amidosulfuron + iodosulfuron methyl of NA + antidote		Am: EPA: NR
Amitraz	WHO III	Insecticide, formamidine PAN Bad Actor: dev/reprod toxin
Amoxicillin		Antibiotic, no need for approval in the PERSUAP
Anilazine		EPA: NR
Aphidius transcaspicus (parasitic wasp) Min. 500 Aphidius Mummies/400ml		EPA: NR
Asbiothrin (=esbiothrin) + Deltamethrin	WHO NL (Es) (parent chemical, WHO II) WHO II (D)	Es: Insecticide, pyrethroid D: Insecticide, pyrethroid
Asulam – Sodium	WHO NL	Herbicide, Other carbamate
Atrazine	WHO U	Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Atrazine + Ametryne	WHO U (At) WHO III (Am)	Atrazine, as above Ametryne, herbicide, triazine See PANNA site
Atrazine + S-metolachlor	WHO U (At) WHO NL (S-m) (parent chemical, WHO III)	AT: herbicide, triazine PAN Bad Actor: carcinogen, GW cont. See PANNA site S-m: Herbicide, chloroacetanilide PAN Bad Actor: GW cont.
Azadirachtin	WHO NL	Insecticide, nematicide
Azinox (anti-parasitic, oral)		No PERSUAP approval needed

Azocyclotin		Insecticide EPA: NR
Azoxystrobin	WHO U	Strobin, fungicide
Azoxystrobin + Cyproconazole	WHO U (Az) WHO III (Cypro)	Azoxy as above Cypro, Azole, fungicide PAN Bad Actor: Carcinogen
Bacillus megaterium	WHO NL	EPA: NR
Bacillus sphaericus	WHO NL	Insecticide, microbial
Bacillus thuringiensis	WHO NL	Depends on the strain re EPA registration Insecticide, microbial
Bacillus thuringiensis (Subsp. Kurstaki)	WHO NL	Depends on more details of the strain of kurstaki re EPA registration Insecticide, microbial
Bt, Aizawai strain	WHO NL	Depends on more details of the strain of Aizawa re EPA registration Insecticide, microbial
Bt, subsp kurstaki HD-1 ABT S-351, sporic-crystalic complex	WHO NL	Insecticide, microbial
Beauveria bassiana	WHO NL	Depends on the strain of bassiana re EPA registration Insecticide, microbial
Benalaxyl + Mancozeb		B, EPA: NR
Bendiocarb + Permethrin		B, EPA: NR
Bendioxide = Bentazon		EPA: NR
Benfuracarb		EPA: NR
Benomyl	WHO U	Fungicide, Benzimidazole, EPA: NR
Benomyl + carbendazim + thiophanate methyl	WHO U (all)	B: as above, EPA: NR C: Fungicide, Breakdown product, Benzimidazole Fungicide, benzimidazole precursor PAN Bad Actor: carcinogen, dev/reprod toxin
Benomyl + thiram	WHO U (B) WHO III (Th)	B: as above, EPA: NR Th: Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Bensulfuron + Metasulfuron methyl		B, EPA: NR
Bensultap	WHO III	Fungicide, Nereistoxin, EPA: NR
Bentazone	WHO III	EPA: NR
Bentazone + MCPA		B, EPA: NR
Bentazone + Mecoprop-P		B, EPA: NR
Bentazone + Propanil	WHO III (B) WHO III (P)	B, EPA: NR P: Herbicide, anilide
Benthiocarb	WHO II	Herbicide, thiocarbamate PAN Bad Actor
Benthiocarb + Propanil	WHO II (B) WHO III (P)	B: As above P: Herbicide, anilide
Benzalkonium	WHO NL	Microbiocide, algaecide, herbicide, Quarternary ammonium compound PAN Bad Actor: acute toxicity
Beta-Cyfluthrin	WHO II	Insecticide, pyrethroid

Beta-Cyfluthrin + Chlorpyrifos	WHO II (BC) WHO II (C)	BC: as above Chlor: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Beta-cyfluthrin + imidacloprid	WHO II (BC) WHO II (Im)	BC: as above Im: insecticide, neonicotinoid
Bifenazate	WHO NL	Insecticide, unclassified
Bifenthrin	WHO II	Insecticide, pyrethroid PAN Bad Actor: Dev/Reprod. Toxin
Bioallethrin + Pyriproxyfen	WHO II WHO U	B: Insecticide, pyrethroid P: Insecticide, unclassified
Bispyribac Sodium	WHO NL	Herbicide, unclassified
Bitertanol	WHO U	EPA: NR
Boldenona		EPA: NR Is this a steroid? If yes, no need for approval in PERSUAP
Boscalid	WHO NL	Fungicide, anilide
Boscalid + Kresoxim-methyl	WHO NL (B) WHO NL (K-m)	Boscalid, as above K-m, fungicide, strobin PAN Bad Actor: carcinogen
Boscalid + Pyraclostrobin	WHO NL	Boscalid, as above Pyraclostrobin, fungicide, strobin
Brodifacoum	WHO 1a	Rodenticide, coumarin PAN Bad Actor: Acute Toxicity
Bromacil	WHO U	Herbicide, uracil PAN Bad Actor: GW cont.
Bromadiolone	WHO 1a	Rodenticide, coumarin PAN Bad Actor: acute toxicity
Bromhexine		Oral veterinary drug for respiratory disorders?: PERSUAP approval not needed
Bromopropylate		Insecticide EPA: NR
Bromoxynil + Ioxynil+ Mecoprop Esters (bromoxynil heptanoate)	WHO NL (parent chemical: WHO II)	B: Herbicide, Hydroxybenzonitrile Iox: EPA: NR Mecoprop: herbicide, chlorophenoxy ethyl or ester
Bromoxynil Octanoate + MCPA-2-ethyl Hexyl ester	WHO NL (parent chemical: WHO II) WHO NL (parent chemical: WHO III)	B: herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin MCPA,2: herbicide, Chlorophenoxy acid or ester
Bromoxynil phenol	WHO II	Herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin
Bromoxynil phenol + MCPA	WHO (NL (B: parent chemical: WHO II) WHO III (MCPA)	B: Herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin MCPA: herbicide, chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
Brompropilat=Bromopropylate	WHO U	Insecticide
Bromuconazole	WHO II	Fungicide, azole
Bronopol (Brontak, seed treatment)	WHO II	Microbiocide, fungicide PAN Bad Actor: acute toxicity

Bupirimate		EPA: NR
Buprofezin	WHO U	Insect growth regulator, unclassified
Butoxide + D-Allethrin	WHO U (PB) WHO NL (parent chemical, WHO II)	PB: as above DA: Insecticide, pyrethroid
Butoxide = Piperonyl butoxide	WHO U (Piperonyl butoxide)	Synergist, unclassified
Butralin	WHO III	Herbicide, 2, 6-Dinitroaniline
Calcium carbonate (lime): Stabilize soil acidity in aquaculture ponds	WHO NL	pH adjustment, fungicide, microbiocide, herbicide, inorganic
Calcium polysulfide (Lime-sulfur)	WHO NL	Insecticide, fungicide, inorganic
Captafol 80 WP (product)		Product was cancelled by US EPA, PIC
Captan	WHO U	Fu ngicide, Thiophthalimide PAN Bad Actor: Acute toxicity, carcinogen
Carbamato=Propamacarb hydrochloride	WHO NL	Fungicide, Other carbamate
Carbaryl	WHO II	Insecticide, Plant Growth Regulator, Nematicide; N-methyl carbamate PAN Bad Actor: Cholinesterase inhibitor
Carbaryl + Cyhalothrin	WHO II (Ca) WHO (Cy)	Ca, as above Cy, EPA: NR
Carbendazim	WHO U	Fungicide, Breakdown product, Benzimidazole
Carbendazim + Epoxiconazole	WHO U (C)	C, as above E, EPA: NR
Carbendazim + Propiconazole	WHO U (car) WHO II (propi)	Carbendazim: as above Propi: fungicide, azole Propi: PAN Bad Actor: Dev/Reprod Toxin
Carbofuran= Furadan	WHO 1b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, POP
Carbosulfan	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: cholinesterase inhibitor EPA: NR
Carboxin (seed treatment)	WHO U	Fungicide, carboxamide PAN Bad Actor: dev/reprod toxin
Carboxin + Thiram	WHO U (C) WHO III (T)	C, as above T: Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
CCA=copper-chrome-arsenic		EPA: NR
Chlorfenapyr	WHO II	Insecticide, pyrazole
Chlorfenvinphos		EPA: NR
Chlorfenvinphos (or Chlorfenfiphos)+ dichlorvos + gentian violet		C, EPA: NR
Chlorimuron ethyl + Metribuzin	WHO NL (CE) WHO II (M)	CE: Herbicide, sulfonylurea M: Herbicide, triazinone PAN Bad Actor: dev/reprod toxin
Chlorothalonil	WHO U	Fungicide, substituted benzene PAN Bad Actor: acute toxicity, carcinogen

Chlorpyrifos	WHO II	Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor OP of primary concern
Chlorpyrifos + cypermethrin	WHO II (Ch) WHO NL (Cy) WHO 1b (cyper zeta)	Ch: as above, OP of primary concern Cy: Insecticide, pyrethroid
Chlorpyrifos + Dimethoate	WHO II (Ch) WHO II (D)	Ch: as above, OP of primary concern D: Insecticide, organophosporous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Chlorpyrifos methyl	WHO U (C-m)	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Chlorsulfuron	WHO U	Herbicide, sulfonylurea PAN Bad Actor: dev/reprod toxin
Chlorsulfuron + clorsulfoxim		Ch: as above Cl: EPA: NR
Chlorsulfuron + dicamba	WHO U (Ch) WHO III (D)	Ch: as above D: herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
Chlorsulfuron + tribenuron-methyl	WHO U (Ch) WHO NL (T)	Ch: as above T: Herbicide, sulfonylurea
Chlorthal-dimethyl (DCPA)	WHO U	Herbicide, alkyl phthalate PAN Bad Actor: GW cont
Chlorthalonil + mefenoxam	WHO U (C) WHO NL (M), parent chemical, WHO III	C, as above M: Fungicide, Xylylalanine PAN Bad Actor: acute toxicity
Chromafenozide	WHO NL	EPA: NR
Cinmethylin		EPA: NR
Clethodim	WHO NL	Herbicide, cyclohexenone derivative
Clethodim	WHO NL	He rbicide, Cyclohexenone derivative
Clodinafop Propargyl	WHO NL	Plant growth regulator, Aryloxyphenoxy propionic acid
Clofentezine	WHO U	Insecticide, tetrazine
Clomazone	WHO II	Herbicide, unclassified
Clopiralid	WHO NL	Herbicide, pyridinecarboxylic acid PAN Bad Actor: acute toxicity
Clorantraniliprol		EPA: NR
Cloridazon	WHO U	Herbicide, pyridazinone
Cloxacillin		Antibiotic for anti-mastitis; approval not required in a PERSUAP
Copper	WHO NL	Fungicide, inorganic-copper
Copper ammonium acetate	WHO NL	Fungicide, inorganic-copper EPA: NR
Copper ammonium carbonate	WHO NL	Fungicide, inorganic copper
Copper hydroxide/ Cupric hydroxide	WHO III	Fungicide, microbiocide, nematacide, inorganic-copper
Copper octanoate=copper spray	WHO NL	Fungicide, inorganic copper

Copper oxide + chromium trioxide + Arsenic pentoxide	WHO II (CO)	CO, as above CT: wood preservative, inorganic chromium PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin See PANNA for info, known carcinogen: not allowed in FTF AP: fungicide, insecticide, rodenticide, herbicide PAN Bad Actor: acutre toxicity, carcinogen, dev/reprod toxin AP, See PANNA, known carcinogen: not allowed in FTF
Copper oxide/Cuprous oxide	WHO II	Fungicide, insecticide, inorganic-copper
Copper oxychloride	WHO III	Fungicide, inorganic-copper
Copper oxychloride + Kasugamycin	WHO III (CO) WHO U (K)	Copper oxychloride: as above Kasu: fungicide, microbiocide; antibiotic Kasugamycin, EPA: NR
Copper oxychloride+Metalaxyl	WHO III (both)	Copper oxy: as above Meta: fungicide, Xylylalanine
Copper sulfate (anhydrous)		EPA: NR
Copper sulfate (basic)	WHO NL; parent chemical WHO II	Fungicide, algaecide, molluscicide, inorganic-copper
Copper sulfate (basic or pentahydrate) + lime	WHO NL; parent chemical WHO II WHO NL (L)	CS: as above L: pH adjustment, fungicide, microbiocide, inorganic
Copper sulfate + Arsenic pentoxide		Arsenic pentoxide: see PANNA site, known carcinogen, not allowed in FTF
Copper sulfate basic: Cooperamino Acid Sulphate	WHO NL (basic) WHO II (parent chemical)	Fungicide, Algaecide, Molluscicide, Inorganic-copper
Cotoran=Fluometuron	WHO U	Herbicide, urea
Cotton seed oi1+ Garlic extract	WHO NL (garlic)	Insecticide, botanical Cotton seed oil, EPA: NR
Coumatetralyl		Rodenticide, coumarin EPA: NR
Cyanazine + Atrazine	WHO II (Cya) WHO U (At)	Cya: Herbicide, Triazine, EPA: NR PAN Bad Actor: GW contam, Dev/Reprod toxin Atrazine: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Cyanophos		Insecticide, avicide EPA: NR
Cycloxydim		Herbicide EPA: NR
Cyfluthrin	WHO II	Insecticide, pyrethroid
Cyfluthrin + Propoxur	WHO II (C) WHO II	C: as above P: insecticide, N-methyl carbamate PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Cyfluthrin + Tetramethrin	WHO II (C) WHO U	C: as above T: Insecticide, pyrethroid

Cygon (dimethoate)	WHO II	Insecticide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Cymiazole + Cypermethrin		Cymi: EPA: NR
Cymoxanil + Mancozeb	WHO III (Cy) WHO U (Manco)	Cymox: Fungicide, unclassified Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc
Cymoxanil + copper oxychloride	WHO III (Cy) WHO III (CO)	Cy: Fungicide, unclassified CO: Fungicide, inorganic-copper
Cymoxanil + famoxadone	WHO III (Cy) WHO U (F)	Cy: Fungicide, unclassified F: fungicide
Cypermethrin	WHO NL (Cy) WHO 1b (cyper zeta)	Insecticide, pyrethroid
Cypermethrin + chlorpyrifos (also listed above as chlor + cyper)	WHO NL (cyper; parent chemical, WHO 1b) WHO II (chlor)	Cyper: Insecticide, pyrethroid Chlor: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Cypermethrin + dimethoate	WHO NL (cyper) (parent chemical WHO 1b)	Parent chemical, WHO 1b: not allowed in FTF D: OP of primary concern
Cypermethrin + d-tetramethrin		As above
Cypermethrin + imidacloprid		Cypermethrin: As above
Cypermethrin + imiprothrin		As above
Cypermethrin + imiprothrin + d-allethrin		As above
Cypermethrin cis	WHO NL (BC) (parent chemical, zeta, WHO 1b)	Insecticide, pyrethroid
Cypermethrin high cis	WHO 1b, parent chemical	
Cypermethrin+profenofos		Cypermethrin: As above
Cypermethrin-alpha	WHO II	Insecticide, pyrethroid EPA: NR
Cypermethrin-alpha + dimethoate		Cypermethrin-alpha: EPA: NR D: OP of primary concern
Cypermethrin-alpha + Flumethrin		As above
Cypermethrin-alpha + tetrachlovinphos		As above
Cypermethrin-beta	WHO 1b	
Cypermethrin-zeta + profenofos	WHO I b WHO II (P)	Zeta: Insecticide, pyrethroid PAN Bad Actor: acute toxicity Profen: as above
Cyphenothrin + Prallethrin	WHO II (Cy) WHO II (P)	Cy: Insecticide, pyrethroid P: Insecticide, pyrethroid
Cyproconazole	WHO III	Fungicide, azole
Cyproconazole + Propiconazole	WHO III (cypro) WHO II (propi)	Cypro, as above Propi, Fungicide, azole PAN bad Actor: dev/reprod toxin
Cyprodinil/Ciprodinil	WHO NL	C: Fungicide, pyrimidine
Cyromazine	WHO U	Insecticide, triazine PAN Bad Actor: GW contam
Dalapon		Herbicide, unclassified EPA: NR

D-Allethrin	WHO NL (parent chemical, allethrin WHO II)	Insecticide, pyrethroid
D-Allethrin + permethrin	WHO NL (D-A) WHO II (P)	D-A: as above P: insecticide, pyrethroid
D-Allethrin + piperonyl	WHO NL (D-A) WHO U (PB)	D-A: as above PB: synergist, unclassified (piperonyl butoxide)
Dazomet	WHO III	Fumigant, fungicide, nematacide
DDVP	WHO 1b	Insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Deltamethrin	WHO II	Insecticide, pyrethroid
Deltamethrin + chlorpyrifos	WHO II (D) WHO II (C)	D: as above C: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Deltamethrin + chlorpyriphos-methyl	WHO II (D) WHO NL (C-M) (parent chemical, WHO II)	D: as above C-M: insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Deltamethrin + fenitrothion	WHO II (D) WHO II (F)	D: as above F: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Deltamethrin + triazophos		D: as above T: EPA: NR
Desmedifam + fenmedifam + ethofumesate	WHO U (D) WHO U (F) WHO U (E)	D: Herbicide, bis-carbamate F: Herbicide, bis-carbamate E: Herbicide, unclassified
Dexamethasone		Injectable or oral veterinary drug, steroid: PERSUAP approval not needed
Diafenthiuron	WHO U	EPA: NR
Diafethilone	WHO 1a	Rodenticide PAN Bad Actor: acute toxicity
Diazinon	WHO II	Insecticide, organphosporous PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Diazinon + mineral oil	WHO II (D) WHO NL (MO)	D: as above, OP of primary concern MO: Insecticide, adjuvant, petroleum derivative PAN Bad Actor: carcinogen
Dibrom=Naled	WHO II (parent chemical, WHO 1b)	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Dicamba	WHO III	Herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
Dicamba + triasulfuron	WHO III (D) WHO U (T)	D: as above T: Herbicide, sulfonylurea
Dichlorvos	WHO 1b	Insecticide, breakdown product, impurity PAN Bad Actor: acute toxicity, cholinesterase inhibitor, carcinogen, OP of primary concern
Dichlorovos + dimithenety	WHO 1b (Di)	D: OP of primary concern Dich: as above

Dichlorvos + lambda cyhalothrin	WHO 1b (Di) WHO II	Dich: as above, OP of primary concern LC: Insecticide, pyrethroid
Dichlorvos + Tetramethrin	WHO 1b (Di) WHO U (T)	Dich: as above, OP of primary concern Tetra: insecticide, pyrethroid
Diclofluanid		EPA: NR
Diclofop-Methyl	WHO NL	Herbicide, Chlorophenoxy acid or ester, Aryloxyphenoxy propionic acid PAN Bad Actor: carcinogen, dev/reprod toxin
Dicofol	WHO III	Insecticide, organochlorine PAN Bad Actor: acute toxicity
Dicofol + Tetradifon	WHO III (di) WHO U (tetra)	Dicofol, as above Tetra: Insecticide, unclassified EPA: NR
Diethyl toluamide + DEET	WHO III (both)	Insecticide repellant, unclassified (both)
Diethyl toluamide + Dimethyl phthalate		DT: as above DP: EPA: NR
Difenconazole	WHO III	Fungicide, azole
Difenconazole + propiconazol	WHO III (D) WHO II (P)	D: as above P: Fungicide, azole PAN Bad Actor: dev/reprod toxin
Diflubenzuron	WHO U	Insecticide, benzoylurea
Diflufenican + isoproturon	WHO U	D: herbicide, anilide I: EPA: NR
Diglyphus isaea (parasitic wasp)		EPA: NR
Dimethenamide-P	WHO NL	Herbicide, amide
Dimethipin		EPA: NR
Dimethoate	WHO II	Insecticide, organophosporous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Dimethoate + alpha-cypermethrin	WHO II (both)	Dimeth, as above Insecticide, pyrethroid, OP of primary concern A-C: EPA: NR
Dimethomorph + dithianon	WHO U (D)	Dimetho: as above, OP of primary concern Dith: EPA: NR
Dimethomorph + folpet	WHO U (both)	Dimetho: as above F: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Dimethomorph + mancozeb	WHO U (both)	Dimetho: Fungicide, morphaline Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc PAN Bad Actor: carcinogen, dev/reprod toxin
Diniconazole		EPA: NR
Dinitro ortho cresol (DNOC)		EPA: NR, PIC
Dinocap		EPA: NR
Dioctyl Sodium Sulfosuccinate	WHO NL	Insecticide, unclassified
Diphacinone	WHO 1a	Rodenticide, 1,3 indandione PAN Bad Actor: acute toxicity
Diquat dibromide	WHO NL	Herbicide, dessicant, Bipyridylium
Disulfuton- Fenamifos= fenamiphos sulfone + Triadimenol	WHO NL (fena sulfone) WHO 1b (parent chemical, fenamiphos) WHO III (tria)	Fenammiphos sulfone: EPA: NR Organophosporous, insecticide, nematicide PAN Bad Actor: cholinesterase inhibitor Tria: Fungicide, breakdown product
Dithianon		EPA: NR

Diuron	WHO U	Herbicide, urea PAN Bad Actor: carcinogen, GW contam, dev/reprod toxin
Dodemorph-Acetate	WHO NL	Fungicide, morpholine EPA: NR
Doramectina	WHO NL	EPA: NR
Doxiciclina		Antibiotic: no need for PERSUAP approval
D-tetramethrin (tetramethrin) + Permethrin + Deltamethrin	WHO U (tetra) WHO II (P) WHO II (D)	Tetra: insecticide, pyrethroid P: insecticide, pyrethroid D: insecticide, pyrethroid
Ebufos=Cadusafos		EPA: NR
Emamectin Benzoate	WHO NL	Insecticide, botanical PAN Bad Actor: acute toxicity
Encarsiajormosa (parasitic wasp)		EPA: NR
Endosulfan	WHO II	Insecticide, organochlorine PAN Bad Actor: acute toxicity; see PANNA site: not approved for FTF program
Enrofloxacin		Antibiotic: no need for PERSUAP approval
Epoxiconazole		EPA: NR
Epoxiconazole + carbendazim		E: EPA: NR
Epoxiconazole + pyraclostrobin		E: as above
Epoxiconazole + tiofanat-meti 1		E: as above
EPTC (+Safener for maize)	WHO II	Herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin
Esbiothrin	WHO NL (parent chemical, WHO II)	Insecticide, pyrethroid
Esfenvalerate	WHO II	Insecticide, pyrethroid
Essential Oils		EPA: NR
Ethaboxam		EPA: NR
Ethephon	WHO U	Plant growth regulator, organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Ethion		EPA: NR
Ethion + cypermethrin		E: EPA: NR
Ethoprop= Ethioprophos	WHO 1a	Insecticide, nematicide, organophosporous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Ethylene dibromide (EDB)		Fumigant, nematicide EPA: NR, PIC, PAN dirty dozen
Etofenprox	WHO U	Insecticide PAN Bad Actor: carcinogen
Etoxazole	WHO NL	Insecticide, unclassified
Famoxadime + cymoxanil	WHO U (F) WHO III (cymox)	Famoxadone: Fungicide, unclassified Cymox: Fungicide, unclassified
Fatty Alcohols		EPA: NR
Febantel + Pyrantel emboate + Praziquantel-de wormer (drontal)		Febantel=drontal, etc. de-wormer; no PERSUAP approval needed
Febantel + Pyrantel Pamoate (Para Tak: endoparasites)		Same as above

Fenamidon + fosetyl-Al	WHO NL WHO NL (parent chemical, WHO U)	Fe: Fungicide F-A: Fungicide, unclassified PAN Bad Actor: acute toxicity
Fenamiphos	WHO 1b	Organophosporous, insecticide, nematicide PAN Bad Actor: cholinesterase inhibitor
Fenarimol	WHO U	Fungicide, pyrimidine
Fenazaquin		EPA: NR
Fenbutatin oxide	WHO U	Insecticide, organotin, heavy metal PAN Bad Actor: acute toxicity, dev/reprod toxin
Fenetrazole =tebuconazole+ Terbutrazole=tebuconazole + triadimenol	WHO III (All)	All: fungicide, azole
Fenhexamid	WHO U	Fungicide, anilide
Fenitrothion	WHO II	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Fenitrothion + deltamethrin	WHO II (both)	F: as above D: Insecticide, pyrethroid
Fenitrothion + permethrin	WHO II (both)	F and P: Insecticide, pyrethroid
Fenitrothion + permethrin + tetramethrin	WHO II (F, P) WHO U (T)	All: insecticide, pyrethroid
Fenoxaprop-P-ethyl	WHO NL	Herbicide, Aryloxyphenoxy propionic acid
Fenoxaprop-P-ethyl + antidote mefenpir-diethyl		F: as above M: EPA: NR
Fenoxapropyl-p-ethyl + Iodosulfuron-methyl		F: as above I-M: EPA: NR
Fenoxicarb	WHO U	Insecticide, insect growth regulator, other carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor, dev/reprod toxin
Fenpropathrin	WHO II	Insecticide, pyrethroid PAN Bad Actor: acute toxicity
Fenpyroximate	WHO NL	Insecticide, unclassified
Fenthion	WHO II	Insecticide, avicide, organophosphorous EPA: NR PAN Bad Actor: cholinesterase inhibitor
Fenthion-methyl		EPA: NR
Fenvalerate	WHO II	Insecticide, pyrethroid
Fenvalerate + fenfuracarb	WHO II (F)	F: as above B: EPA: NR
Fenvelerate + fenitrothion	Both are WHO II	Fen: as above Fenitroth: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Fipronil	WHO II	Insecticide, pyrazole
Fipronil Methoprene	WHO II (F) WHO U	F: as above M: insect growth regulator
Flocumaphen = Flocoumafen		EPA: NR
Florfenicol		Antibiotic: PERSUAP approval not needed
Fluazifop-P-butyl	WHO III	Herbicide, Aryloxyphenoxy propionic acid
Fluazifop-R-methyl (see above; only registered as fluazifop-p-butyl)		
Flubendiamide	WHO NL	Insecticide, unclassified
Flubendiamide + spirotetramat	WHO NL (Fl) WHO NL (S)	FL: as above Sp: Insecticide, keto-enol

Fludioxonil + Metalaxyl M	WHO NL (F) WHO NL; parent chemical, WHO III (M)	Flud: fungicide, unclassified Meta M: fungicide, Xylylalanine PAN Bad Actor: acute toxicity
Flufenacet	WHO III	Herbicide, anilide
Flufenoxuron	WHO U	Insecticide, benzoylurea EPA: NR
Flumethrin	WHO NL	EPA: NR
Flumethrin + piperonyl		F: EPA: NR
Flumetralin	WHO U	Plant growth regulator, 2, 6-dinotroaniline
Flumetralin + butralin	WHO U (F) WHO III (B)	F: as above B: herbicide, 2, 6-dinotroaniline
Flunixin		NSAID: PERSUAP approval not needed
Fluomethuron	WHO U	Herbicide, urea
Fluomethuron + prometryn (also below as P + F)	WHO U (F) WHO U (P)	Fl: as above P: herbicide, triazine PAN Bad Actor: dev/reprod toxin
Fluometuron	WHO U	Herbicide, urea
Fluopicolid + propamocarb	WHO NL	F: fungicide P: EPA: NR
Fluorocloridon		EPA: NR
Flurasulam + flumetsulam	WHO U (both)	Flur: Herbicide, triazolopyrimidine Flum: Herbicide, triazolopyrimidine
Fluroxypyr + Clopyralid + MCPA	WHO U (F) WHO NL (C) WHO III (MCPA)	Fl: Herbicide, Pyridinecarboxylic acid Cl: Herbicide, Pyridinecarboxylic acid PAN Bad Actor: acute toxicity MCPA: Herbicide, Chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
Flusilazole	WHO III	EPA: NR
Flusulfamide	WHO NL	EPA: NR
Flutriafol		Fungicide, azole EPA: NR
Flutriafol + thiabendazole	WHO III (Fl) WHO U (T)	F: EPA: NR
Folpet	WHO U	Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Folpet + triadimenol	WHO U WHO III (T)	Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen T: fungicide breakdown product, Azole
Foramsulfuron + iodsulfuron-methyl + antidot isoxadifen-ethyl	WHO NL (F)	F: herbicide, sulfonylurea I-M: EPA: NR
Formetanate	WHO 1b	EPA: NR
Fosalon		EPA: NR
Fosetyl-aluminum	WHO NL (parent chemical, WHO U)	Fungicide, unclassified PAN Bad Actor: acute toxicity
Fosetyl-aluminum + fluopicolid	WHO NL (F-A) (parent chemical, WHO U) WHO NL	F-A: as above F: fungicide

Fosetyl-aluminum + folpet	WHO NL (F-A) (parent chemical, WHO U) WHO U (F)	F-A: as above Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Fosfomicina (fosfomicyn)		Antibiotic, injectable, oral veterinary drug: PERSUAP approval not needed
Fosthiazate	WHO NL	Nematicide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Furadan=carbofuran	WHO 1b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, POP
Furadan + Disyston (=disulfoton)	WHO 1b (F) WHO 1a (D)	F: as above D: insecticide, nematicide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Furfural	WHO NL	Fumigant
Galoxiphopetox (see Haloxyfop R Methyl)		
Gamma cyhalothrin	WHO NL (parent chemical, WHO II)	Insecticide, pyrethroid
Garlic extracts	WHO NL	Insecticide, botanical
Geksitiazoks (Niccoran 10%)		EPA: NR (Niccoran/Nissoran product not found)
Gibberellic acid	WHO U	Plant growth regulator, botanical
Gibberellin	WHO U	Plant growth regulator, botanical
Glufosinate Ammonium	WHO NL	Herbicide, unclassified
Glyphosate	WHO U	Herbicide, phosphonoglycine
Glyphosate Trimesium	WHO NL	EPA: NR
Haloxyfop- RR- Methyl Ester, haolxyfop R Methyl		Herbicide, Aryloxyphenoxy propionic acid EPA: NR
Heptenofos		Insecticide, organophosphorous EPA: NR
Hexaconazole		Fungicide, azole EPA: NR
Hexaflumuron	WHO U	Insecticide, benzoylurea
Hexazinone	WHO III	Herbicide, triazinone PAN Bad Actor: acute toxicity, GW contam
Hexazinone + Dichlorvos (DDVP)	WHO III (H) WHO 1b (D)	H: as above D: insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor, OP of primary concern
Hexythiazox =Hexitiazox	WHO U	Insect growth regulator, unclassified
Hydramethylnon	WHO III	Insecticide PAN Bad Actor: dev/reprod toxin
Hymexazol	WHO U	Fiungicide, unclassified PAN Bad Actor: acute toxicity
Imamectin benzoate=emamectin benzoate	WHO NL	Insecticide, botanical PAN Bad Actor: acute toxicity
Imazamox	WHO NL	Herbicide, imidaaolinone
Imazapic: ammonium salt	WHO NL	Herbicide, imadazolinone
Imazapyr	WHO U	Herbicide, imadazolinone PAN Bad Actor: acute toxicity

Imazapyr + imazamox	WHO U (imazapyr) WHO NL (imazamox)	I and I: as above
Imazetapir= Imazethapyr	WHO U	Herbicide, plant growth regulator, imadazoline
Imidacloprid	WHO II	Insecticide, neonicotinoid
Imidacloprid + metalaxyl + carbendazim	WHO II (I) WHO III (M) WHO U (C)	Im: as above M: fungicide, xylylalanine C: fungicide, breakdown product, benzimidamole
Imidacloprid + pencycuron	WHO II (Imi)	Im: as above Pen: Fungicide, urea, EPA: NR
Imidacloprid + pencycuron + thiram	WHO II (I) WHO III (Th)	Im: as above Pen: fungicide, urea, EPA: NR Th: Fungicide, dithiocarbarmate PAN Bad Actor: dev/reprod toxin
Imidacloprid + thiram	WHO II (Imi) WHO III (Th)	Im: as above Th: fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Imidacloprid + triadimenol	WHO II (imida) WHO III (tria)	Im: as above Tria: fungicide breakdown product, Azole
Imidazolinone=imazapic, ammonium salt	WHO NL	Herbicide, imadazolinone
Imidocarb (Disodium cyanodithioimido carbonate)	WHO NL	Microcode, unclassified PAN Bad Actor: dev/reprod toxin
Iminoctadine Tris (Albesilate)		Fungicide, guanidine EPA: NR
Imiprothrin + cyfluthrin	WHO NL (I) WHO II (C)	I: Insecticide, pyrethroid C: Insecticide, pyrethroid
Imiprothrin + cypermethrin	WHO NL (I) WHO NL (Cy) WHO 1b (cyper zeta)	I: as above C:Insecticide, pyrethroid
Imiprothrin + d-phenothrin	WHO NL (I)	I: as above
Imiprothrin + Esbiothrin + Permethrin	WHO NL (I)	I: as above E: cancelled, EPA: NR
Imiprothrin + phenothrin	WHO (I)	I: as above
Indoxacarb	WHO NL	Insecticide, unclassified
Iodosulfuron - methyl sodium		Herbicide, sulfonylurea EPA: NR
Ioxynil		EPA: NR
Ioxynil Octanoate + 2,4-D Esters		IO: Herbicide, EPA: NR
Iprodione	WHO U	Fungicide, dicraboximide PAN Bad Actor: carcinogen
Iprodione + propineb	WHO U (I)	I: as above P: EPA: NR
Iprovalicarb + propineb	WHO U (both)	EPA: NR for both
Isofluote		EPA: NR
Isopropyl amine glyphosate	WHO NL (WHO U, parent chemical)	Herbicide, phosphonoglycine
Isoxaflutole	WHO NL	Herbicide PAN Bad Actor: carcinogen

Isoxaflutole + aclonifen	WHO NL (I) WHO U (A)	Iso: Herbicide, unclassified PAN Bad Actor: carcinogen Ac: Herbicide, diphenyl ether
Ivermectin		Injectable or tablet anti-parasite: approval in PERSUAP not needed
Ivomectin		Same as above
Ketoprofeno		Anti-inflammatory drug: approval in PERSUAP not needed
Kresoxim-methyl	WHO NL	Fungicide, strobin PAN Bad Actor: carcinogen
Kresoxim-methyl + boscalid	WHO NL (K-M) WHO NL (B)	K-M: as above B: fungicide, anilide
Lambda cyhalothrin	WHO II	LC: insecticide, pyrethroid
Lambda cyhalothrin + acetamiprid	WHO II (LC) WHO NL (A)	LC: as above A: Insecticide, neonicotinoid
Lambda cyhalothrin + Imidacloprid	WHO II (LC) WHO II (I)	LC: as above I: Insecticide, neonicotinoid
Lambda cyhalothrin + profenofos	WHO II (LC) WHO II (P)	LC: as above Prof: Insecticide, oganophosphorous PAN Bad Actor: cholinesterase inhibitor
Lambda cyhalothrin + Thiamethoxam	WHO II (LC) WHO NL (Th)	LC: as above Th: fungicide, insecticide
Lambda cyhalothrin + chlorpyriphos-methyl	WHO II (LC) WHO U (C-M) parent chemical, WHO II	LC: as above C-M: insecticide, organophosporous PAN Bad Actor:
Lamda cyhalothrin + chlorpyriphos	WHO II (LC) WHO II (Ch)	LC: as above Ch: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor
Lebaycid=Fenthion		EPA: NR
Lenacil		EPA: NR
Lindane		Insecticide, rodenticide, organochlorie EPA: NR
Lindane + thiram (seed dressing)		L: EPA: NR
Linuron	WHO U	Herbicide, urea PAN Bad Actor: deve/reprod toxin
Lufenuron	WHO NL	Insecticide, benzoylurea
Magnesium chlorate (chlorate of magnesium)		EPA: NR
Magnesium phosphide	WHO not classified,	Fumigant, rodenticide, inorganic see PANNA: not allowed in FTF program
Malathion	WHO III	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor OP of primary concern
Malathion + permethrin	WHO III (M) WHO II (P)	M: as above, OP of primary concern P: insecticide, pyrethroid
Malathion + pyrethrins	WHO III (M) WHO NL	M: as above, OP of primary concern P: insecticide, botanical
Mancozeb	WHO U	Fungicide, Dithiocarbamate, Inorganic-Zinc
Mancozeb + Cymoxanil (also listed above as cymoxanil + mancozeb)	WHO U (Manco) WHO III (Cymox)	Mancozeb: as above Cymox: Fungicide, unclassified
Mancozeb + Dimethomorph	WHO U (both)	Mancozeb: as above Di: Dimetho: Fungicide, morphaline

Mancozeb + copper hydroxide	WHO U (M) WHO III (CH)	Mancozeb: as above CH: Fungicide, microbiocide, nematacide, inorganic-copper
Mancozeb + mefenoxam	WHO U (Ma) WHO NL (Me)	Mancozeb: as above Mef: fungicide, xylylalanine PAN Bad Actor: acute toxicity
Mancozeb + zoxium=zoxamide	WHO U (Ma) WHO NL	Ma: as above Z: fungicide
Mancozeb+Metalaxyl	WHO U (Ma) WHO U (Me)	Mancozeb: as above Met: fungicide, xylylalanine
Maneb	WHO U	Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin, carcinogen
MCPA	WHO III	Herbicide, chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
MCPA + Bromoxynil octanoate	WHO III (MCPA) WHO NL (parent chemical, WHO II)	MCPA: as above BO: herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin
Mefenoxam + chlorothalonil	WHO NL (M) WHO U (C)	Me: fungicide, xylylalanine PAN Bad Actor Ch: Fungicide, substituted benzene PAN Bad Actor: Acute toxicity, carcinogen
Metalaxyl	WHO III	Fungicide, xylylalanine
Metalaxyl + Mono & Di-Potassium salts of phosphonic acid=fosetyl-al?	WHO II (Met) WHO NL (F-A) (parent chemical, WHO U)	Met: fungicide, xylylalanine F-A: Fungicide, unclassified PAN Bad Actor: acute toxicity
Metam Sodium	WHO II	Fumigant, Herbicide, Fungicide, Microbiocide, Algaecide, dithiocarbamate PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin
Metamitron		EPA: NR
Metazachlor		EPA: NR
Metconazole	WHO III	Fungicide, azole
Metham sodium	WHO II	Fumigant, fungicide, herbicide, microbiocide, algaecide; dithiocarbamate PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin
Methamidophos	WHO I b	Insecticide, breakdown product, organophosphorous, OP of primary concern, PIC
Methiocarb	WHO I b	Insecticide, molluscicide, N-methyl carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Methomyl	WHO 1b	Insecticide, breakdown product, N-methyl carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Methyl bromide + chloropicrin (fumigant)		MB: Fumigant, insecticide, herbicide, nematicide; halogenated organic PAN Bad Actor: acute toxicity, dev/reprod toxin (see USEPA and USAID guidance on this: not allowed in FTF program) C: fumigant, nematicide, inorganic PAN Bad Actor: acute toxicity

Methylaldehide + Methomyl + Methiocarb Methyl aldehyde=formaldehyde	WHO: fumigant, WHO doesn't rank, but highly toxic WHO I b (Metho, Methio)	Formaldehyde: microbiocide, unclassified PAN Bad Actor: acute toxicity, carcinogen Metho: as above Methio: as above
Metiram	WHO U	Fungicide, dithiocarbamate, inorganic zinc PAN Bad Actor: carcinogen, dev/reprod toxin
Metiram + copper hydroxide	WHO U (M) WHO III (CH)	M: as above CH: Fungicide, microbiocide, nematacide, inorganic-copper
Metiram + pyraclostrobin	WHO U (M) WHO NL (P)	M: as above P: fungicide, strobin
Metofluthrin	WHO NL	Insecticide, pyrethroid PAN Bad Actor: carcinogen
Metolachlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: GW cont
Metribuzin	WHO II	Herbicide, triazinone PAN Bad Actor: dev/reprod toxin
Metribuzin + chlorimuron ethyl	WHO II (M) WHO NL (C)	M: as above C: herbicide, sulfonylurea
Metribuzon + Paraquat	WHO II (both)	M: Herbicide, triazinone PAN Bad Actor: dev/reprod toxin P: Herbicide, bypiridylium PAN Bad Actor: acute toxicity
Metsulfuron methyl	WHO U	Herbicide, sulfonylurea
Mevinphos		EPA: NR
Miclobutanil	WHO III	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Miclobutanil + quinoxifen	WHO III (M) WHO U (Q)	M: as above Q: fungicide, quinoline
Milbemectin	WHO NL	Insecticide, antibiotic
Mineral oil	WHO NL	Insecticide, adjuvant, petroleum derivative PAN Bad Actor: carcinogen
Molinate	WHO II	Herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin
Monocrotophos + Cypermethrin	WHO NL (C)WHO 1b (cyper zeta)	Mono: PIC C: Insecticide, pyrethroid
Mono-potassium and dipotassium phosphonates phosphonic acid		See Fosetyl-al
MSMA	WHO NL (parent chemical, WHO III)	Herbicide, defoliant, organoarsenic, heavy metal PAN Bad Actor: carcinogen
N,N-diethyl-m-toluamide=DEET	WHO III	Insecticide repellant, unclassified
Neem Oil, Neem extract	WHO NL	Insecticide, botanical
Neo-pynamin=tetramethrin		Insecticide, botanical
Niclosamide + Levamisole		Niclo: EPA: NR
Nicosulfuron	WHO U	Herbicide, sulfonylurea
Nicosulfuron + rimsulfuron	WHO U (N) WHO U (R)	N: as above R: herbicide, sulfonylurea
Nicosulfuron + thifensulfuron-methyl	WHO U (N) WHO U (T)	N: as above T: herbicide, sulfonylurea

Nitroalkifenolyati= Pyroxychlor		EPA: NR
Nonyl phenol ethoxylate		Adjuvant, soap surfactant EPA: NR
Novaluron	WHO NL	Herbicide, benzoylurea
Omethoate		Breakdown product EPA: NR
Orthene=Acephate	WHO III	Insecticide, organophosphate PAN Bad Actor: cholinesterase inhibitor
Orthodifolotan (captafol 80 WP-product)		Captafol: cancelled by US EPA
Oxadiargyl	WHO NL	Herbicide, unclassified
Oxadiazon	WHO U	Herbicide, unclassified PAN Bad Actor: carcinogen, dev/reprod toxin
Oxadiazon + Propanil	WHO U (O) WHO III (P)	O: as above P: Herbicide, anilide
Oxamyl	WHO I b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Oxydemeton- Methyl	WHO I b	Insecticide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin
Oxyfluorfen	WHO U	Herbicide, diphenyl ether
Paecilomyces lilacinus	WHO NL	Insecticide, microbial
Paraffinic Oils		EPA: NR
Paraquat dichloride	WHO II	Herbicide, bypiridylium PAN Bad Actor: acute toxicity, PAN dirty dozen
Paraquat + diuron	WHO II (P) WHO U (D)	P: see above D: herbicide, urea PAN Bad Actor: carcinogen, gw cont., dev/reprod toxin, PAN dirty dozen
Paraquat=paraquat dichloride, see below		
Penconazol		Fungicide, azole EPA: NR
Pendimethalin (pentimetalin)	WHO III	Herbicide, 2,6-Dinitroaniline
Pendimethalin + Ametryne + Atrazine	WHO III (P, Am) WHO U (At)	P: as above Am: Herbicide, triazine At: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Penoxsulam	WHO U	Herbicide, triazolopyrimidine
Permethrin	WHO II	Insecticide, pyrethroid
Permethrin + Bioallethrin	WHO II (P) WHO II (B)	P: as above B: insecticide, pyrethroid
Permethrin + Pirimiphos methyl	WHO II (P) WHO III (Pi)	P: as above PI: insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Petroleum oil	WHO NL	Insecticide, herbicide, fungicide, adjuvant; petroleum derivative
Phenthoate		EPA: NR
Phosalone		EPA: NR
Phosmet	WHO II	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor

Phosphide 56% w/w equivalent to 33% hydrogen phosphide, each tablet releases 1.0g of hydrogen phosphide gas	EPA I	A restricted use pesticide
Phoxim + Honey		Phoxim: EPA: NR
Phoxim=Foxim	WHO II	EPA: NR
Picloram	WHO U	Herbicide, Pyridinecarboxylic acid PAN Bad Actor: GW cont
Picloram + 2, 4-D	WHO U (P)	P: Herbicide, pyridinecarboxylic acid PAN Bad Actor: GW cont. 2, 4-D: EPA: NR
Picoxystrobin		Fungicide, strobin EPA: NR
PIKS	WHO NL	Herbicide, sulfonylurea
Pinoxaden	WHO NL	Herbicide
Piridaben	WHO III	Insecticide, unclassified
Pirimetanil + trifloxtstrobin	WHO U (P) WHO NL (T)	P: fungicide, pyrimidine T: fungicide, strobin
Pirimicarb	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor
Pirimiphos methyl (actellic-product)=Pirimifosmetil		Breakdown product EPA: NR
Pirimiphos methyl + Permethrin		P-methyl: EPA: NR
Policarbacine (see Metalaxyl)		
Polyaxin = Polymyxin		An antibiotic, oral injectable veterinary drug; No PERSUAP needed
Polyethylene wax=polyethylene glycol	WHO NL	Adjuvant, soap/surfactant, polyalkyloxy compound
Prallethrin	WHO II	Insecticide, pyrethroid
Prallethrin + D-Phenothrin	WHO II (P) WHO U (D-P)	P: as above D-P: insecticide, pyrethroid
Praziquantel		De-wormer, internal: No PERSUAP approval needed
Pretilachlor + Pyribenzoxim	WHO U (Pr)	Pr: herbicide, chloroacetanilide Py: EPA: NR
Procymidone		EPA: NR
Profenfos + cypermethrin	WHO II (P) WHO NL (parent chemical, WHO 1b)	P: as above C: insecticide, pyrethroid
Profenofos	WHO II	Insecticide, oganophosphorous PAN Bad Actor: cholinesterase inhibitor
Profenofos + Lambda cyhalothrin	WHO II (P) WHO II (LC)	P: as above LC: insecticide, pyrethroid
Prometryn	WHO U	Herbicide, triazine PAN Bad Actor: dev/reprod toxin
Prometryn + fluometuron + glyphosate	WHO U (all)	P: as above F: herbicide, urea G: Herbicide, phosphonoglycine
Prometryn + s-metolachlor	WHO U (P) WHO NL (S-M); parent chemical: WHO III	P: as above S-met: herbicide, chloroacetanilide PAN Bad Actor: GW cont.
Propamocarb + Fosetyl		P: EPA: NR
Propamocarb hydrochloride		EPA: NR

Propamocarb hydrochloride + mancozeb		P: EPA: NR
Propanil	WHO III	Herbicide, analide
Propanil + Phenothol=phenoxethol	WHO III (P)	P: as above Ph: EPA: NR
Propanil + thiobencarb	WHO III (P) WHO II (T)	P: as above Thio: herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor
Propaquizafop		EPA: NR
Propargite	WHO III	Insecticide, unclassified
Propargite + Tetradifon	WHO III (P)	Prop: as above PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin Tetra: Insecticide, unclassified EPA: NR
Propargul		Is this propargyl alcohol or bromide? Both are EPA: NR
Propetamphos	WHO I b	Insecticide, organophosphorous PAN Bad Actor: acute toxicity cholinesterase inhibitor
Propiconazole	WHO II	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Propiconazole + procloraz	WHO II (Prop)	Prop: as above Proc: EPA: NR
Propineb		EPA: NR
Propineb + Cymoxanil		Prop: EPA: NR Cymox: Fungicide, unclassified Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc
Propineb + Iprovalicarb		Both: EPA: NR
Propineb + Provalicarb		Prop: EPA: NR
Propoxur	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Propuxur + Cyfluthrin	WHO II (P) WHO II (C)	P: as above C: Insecticide, pyrethroid
Propoxycarbazone-Sodium	WHO NL	Herbicide, unclassified
Propoxycarbazone-sodium	WHO NL	Herbicide, unclassified
Proquinazid		EPA: NR
Prosulfocarb		EPA: NR
Pyraclostrobin + Boscalid	WHO NL (both)	Pyra: fungicide, strobin Bosc: Fungicide, analide
Pyraclostrobin + dithianon		D: EPA: NR
Pyrethrin + cypermethrin + Tetramethrin	WHO NL (cyper) (parent chemical WHO 1b)	
Pyrethrin + DDVP	WHO NL (Py) WHO 1b (DDVP)	Py: Insecticide, botanical Insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Pyrethrin + Permethrin	WHO NL (Py)	Py: as above Per:
Pyrethrins + piperonyl (piperonyl butoxide)	WHO NL (Py) WHO U (Pi)	Py: as above Pi: synergist, unclassified

Pyrethrum + garlic extract, Permethrin		Py:EPA: NR G: Insecticide, botanical
Pyridaben	WHO 1b	Insecticide, unclassified
Pyriproxyfen	WHO U	Insecticide, unclassified
Quinoxifen	WHO U	Fungicide, quinoline
Quizalofop-P-ethyl	WHO NL (parent chemical, WHO II)	Herbicide, aryloxyphenoxypropionic acid
Quizalofop-p-tefuryl		EPA: NR
Rateid (anti-parasitic, spray) 5 % of cypermetrine, 30% of chlorphenvinphos, emulsifiers and organic solvents		Chlorphenvinphos: EPA: NR
Rimsulfuron	WHO U	Herbicide, sulfonylurea
Rimsulfuron + thifensulfuron-methyl	WHO U (R) WHO U (T)	F: as above T: herbicide, sulfonylurea
S-bioallethrin=allethrin + bioresmthrin		S-b: insecticide, pyrethroid Biores: EPA: NR
Sebacilum=Sebatsil (anti-parasitic, spray)		EPA: NR
Sethoxydim	WHO III	Herbicide, cyclohexanone derivative
Sevin=see carbaryl		
Simazine	WHO U	Herbicide, Triazine PAN Bad Actor: GW cont., dev/reprod toxin
S-Metil-N-((metilcarbamoil) oxi) tioacetamidato		See Rateid above
S-Metolachlor	WHO NL (parent chemical, WHO III)	Herbicide, chloroacetanilide PAN Bad Actor: GW cont.
S-Metolachlor + Mesotrione + Triazine = atrazine	WHO NL(S-M) (parent chemical, WHO III) WHO NL (M) WHO U (T)	S-M: as above M: Herbicide T: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Sodium borate	WHO U	Insecticide, herbicide, inorganic
Sodium molybdate		EPA: NR
Spinosad	WHO U	Insecticide, microbial
Spinosyn A and D=spinosad	WHO U	Insecticide, microbial
Spiromesifen	WHO NL	Insecticide, Keto-enol
Spiroxamine	WHO II	Fungicide, unclassified
Sprioxamine + tebuconazole + triadimenol	WHO II (S) WHO III (T) WHO III (Tr)	S: as above T: Fungicide, azole Tr: Fungicide breakdown product, Azole
Steinernema feltiae (1.5million infective juveniles/gram)		EPA: NR
Sulfosulfuron	WHO NL	Herbicide, sulfonylurea PAN Bad Actor: carcinogen
Sulfur	WHO U	Fungicide, insecticide, inorganic
Tabamex EC=Butraline	WHO III	Herbicide, 2, 6-dinitroaniline
Tau-fluvalinate	WHO U	Insecticide, pyrethroid PAN Bad Actor: dev/reprod toxin
Tebuconazole	WHO III	Fungicide, azole

Tebuconazole + Triadimenol	WHO III (both)	Teb: as above Triad: Fungicide, breakdown product
Tebuconazole + trifloxistrobin	WHO III (T) WHO NL (Tr)	Teb: as above Tr: Fungicide, strobin
Tebupenpirat=Tebufenpyrad	WHO III	Insecticide, pyrazole
Tebuthiuron	WHO III	Herbicide, urea PAN Bad Actor: dev/reprod toxin
Teflubenzuron		EPA: NR
Tefluthrin	WHO I b	Tefluthrin: Insecticide, pyrethroid PAN Bad Actor: acute toxicity
Temephos	WHO U	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Tepraloxidim	WHO NL	Herbicide, Cyclohexenone derivative
Terbuthyn=terbutryn		EPA: NR
Terbuthryn + S-Metolachlor		Terb: EPA: NR
Terbuthylazine +Mesotrione + S-Metolachlor	WHO U (T) WHO NL WHO NL (parent chemical, WHO III)	Ter: Algaecide, herbicide, microbicide, Triazine Mes: Herbicide, unclassified S-Meto: Heribicide, Chloroacetanilide PAN Bad Actor: GW cont.
Tetraconazole	WHO II	Fungicide, azole PAN Bad Actor: carcinogen
Tetradifon		EPA: NR
Tetramethrin	WHO U	Insecticide, pyrethroid
Tetramethrin + Cypermethrin	WHO U (T) WHO NL (Cy) WHO 1b (cyper zeta)	T: as above
Tetramethrin + Cypermethrin + Propuxur	WHO U (T) WHO NL (Cy) WHO 1b (cyper zeta)	T: as above
Tetramethrin + D-Phenothrin=Phenathrin + D-Allethrin	WHO U (T, Ph) WHO NL (D-A) (parent chemical, WHO II)	T: as above Ph: insecticide, pyrethroid D-A: insecticide, pyrethroid
Tetramethrin + Fenitrothion	WHO U (T) WHO II (F)	T: as above F: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Tetramethrin + Permethrin + Fenitrothion	WHO U (T) WHO II (P) WHO II (F)	T: as above P: insecticide, pyrethroid F: as above
Thiabendazole	WHO U	fungicide, benzimidazole PAN Bad Actor: dev/reprod toxin
Thiacloprid	WHO II	Insecticide, neonicotinoid PAN Bad Actor: carcinogen
Thiacloprid + betacyfluthrin	WHO II (Th) WHO II (Beta)	Th: as above Beta: insecticide, pyrethroid
Thiacloprid + deltamethrin	WHO II (Th) WHO II (D)	Th: as above D: insecticide, pyrethroid
Thiamethoxam + Metalaxyl –M + Difenoconazole	WHO NL (thia) WHO NL (Meta) (parent chemical, WHO III) WHO III (Di)	Thia: as above Meta-M: Fungicide, xylylaline PAN Bad Actor: acute toxicity Difen: frungicide, azole

Thiamethoxan	WHO NL	Fungicide, insecticide, unclassified
Thifensulfuron-methyl	WHO U	Herbicide, sulfonylurea
Thiobencarb + Prometryn	WHO II (Th) WHO U (P)	Th: herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor P: Herbicide, triazine PAN Bad Actor: dev/reprod toxin
Thiocyclam + Thiocyclam-Hydrogenoxalate		EPA: NR
Thiodicarb	WHO II	Molluscicide, insecticide, N-methyl carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor
Thiophanate		EPA: NR
Thiophanate methyl	WHO U	Fungicide, benzimidazole precursor PAN Bad Actor: carcinogen, dev/reprod toxin
Thiophanate methyl + Maneb	WHO U (Tm) WHO U (M)	Tm: as above Fungicide, dithiocarbamate PAN Bad Actor: carcinogen, dev/reprod toxin
Thiram	WHO III	Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Thiram + Carboxin	WHO III (Th) WHO U (Car)	Th: as abov Car: fungicide, carboximide PAN Bad Actor: dev/reprod toxin
Tidiazuron + diuron (tidiazuron=thidiazuron)	WHO U (Th) WHO U (D)	Th: Defoliant, plant growth regulator; urea D: Herbicide, urea PAN Bad Actor: carcinogen, GW contam, dev/reprod toxin
Tolilfluanid=Tolyfluanid		EPA: NR
Toltrazuril		Oral veterinary drug for parasites: no approval needed in PERSUAP
Topromazon + dicamba		T: EPA: NR
Toxaphene	WHO NL	EPA: NR, POP, PAN dirty dozen
Tralomethrin	WHO II	Insecticide, pyrethroid
Triadimefon	WHO III	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Triadimenol	WHO III	Fungicide breakdown product, Azole
Triazophos		Insecticide, organophosphorous EPA: NR
Tribenuron-methyl	WHO NL	Herbicide, sulfonylurea
Trichlorfon	WHO II	Insecticide, organophosphorous PAN Bad Actor: carcinogen
Trichoderma harzianum	WHO NL	Fungicide, microbial
Triclopyr	WHO III	Herbicide, chloropyridinyl
Triclopyr Paraquat	WHO III (T) WHO II (P)	T: as above P: Herbicide, bypiridylium PAN Bad Actor: acute toxicity
Trifloxystrobin	WHO NL	Fungicide, strobin
Trifloxysulfuron Sodium + Ametryn	WHO NL (T) WHO III (A)	Tri: Herbicide, sulfonylurea Am: Herbicide, triazine
Triflumizole	WHO III	Fungicide, azole
Trifluralin	WHO U	Herbicide, dinitroaniline
Triflusulfuron-methyl	WHO U	Herbicide, sufonylurea
Triforine	WHO U	Fungicide, insecticide, unclassified PAN Bad Actor: dev/reprod toxin
Triphanante-methyl =thiophanate methyl, see above		

Triticonazole	WHO U	Fungicide, azole
Tritosulfuron + dicamba		T: EPA: NR
Vardendrolimus (dendrobacillin) biological		EPA: NR
Varturin genzis (Bitoksibacillin powder)-biological		EPA: NR
Vinclozolin		Fungicide, dicarboximide PAN Bad Actor: carcinogen, dev/reprod toxin
Zinc ethyl bis (ditiocarbamate) + copper oxychloride		Z: EPA: NR
Zinc max (zinc)	WHO NL	Herbicide, inorganic-zinc PAN Bad Actor: dev/reprod toxin
Zinc oxide	WHO NL	Fungicide, adjuvant, inorganic-zinc PAN Bad Actor: dev/reprod toxin
Zinc phosphide	WHO I b	Rodenticide, inorganic zinc PAN Bad Actor: acute toxicity, dev/reprod toxin,

Note:

i. No PERSUAP approval needed for oral or injectible veterinary drugs such as anti-parasitics and antibiotics.
ii. NR: not registered; PANNA: Pesticide Action Network North America

PER Annex C - List of Active Ingredients Rejected for use under the FTF Programmatic PERSUAP

For the ease of those printing in black and white who are unable to see the color coding above, PER Annex C - Table 3 below lists all pesticides (active ingredients) requested for use by FTF country programs that were rejected for use in all FTF country programs covered by this Programmatic PERSUAP.

PER Annex C - Table 3. Active Ingredients Rejected for use under the FTF Programmatic PERSUAP

Chemical/Active ingredient	WHO Toxicity Class	Notes on Rejection of PERSUAP Request
2, 4-D (amine)		EPA: NR
2, 4-D (ester)		EPA: NR
Acetamiprid + cypermethrin	WHO NL (A) WHO NL (C) (WHO 1b cyper zeta)	Cyper: insecticide, pyrethrin
Acetochlor + atrazine + simazine	WHO III (Ac) WHO U (At) WHO U (Si)	At: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site Si: Herbicide, triazine PAN Bad Actor: GW, dev/reprod toxin
Acetochlor + atrazine + terbuthylazine	WHO III (Ac) WHO U (At) WHO U (Ter)	At: as above, See PANNA site Ter: Algaecide, herbicide, microbiocide
Acrinathrin		Insecticide, pyrethroid EPA: NR
Alachlor + Atrazine	WHO III (Al) WHO U (At)	Atrazine, Herbicide, triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Aldicarb	WHO 1a	Insecticide, nematacide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, GW contaminant
Aluminum phosphide (fumigant)	Not classified by WHO, but highly toxic	Fumigant, fungicide, inorganic PAN Bad Actor: acute toxicity
Ametryn + Atrazine	WHO III (Am) WHO U (At)	At: Herbicide, triazine PAN Bad Actor: carcinogen, GW cont. See PANNA site
Amidosulfuron + iodosulfuron methyl of NA + antidote		Am: EPA: NR
Anilazine		EPA: NR
Aphidius transcaspicus (parasitic wasp) Min. 500 Aphidius Mummies/400ml		EPA: NR
Atrazine	WHO U	Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Atrazine + Ametryne	WHO U (At) WHO III (Am)	Atrazine, See PANNA site Ametryne, herbicide, triazine
Atrazine + S-metolachlor	WHO U (At)	AT: herbicide, triazine

	WHO NL (S-m) (parent chemical, WHO III)	PAN Bad Actor: carcinogen, GW cont. See PANNA site S-m: Herbicide, chloroacetanilide PAN Bad Actor: GW cont.
Azocyclotin		Insecticide EPA: NR
Bacillus megaterium	WHO NL	EPA: NR
Benalaxyl + Mancozeb		B, EPA: NR
Bendiocarb + Permethrin		B, EPA: NR
Bendioxide = Bentazon		EPA: NR
Benfuracarb		EPA: NR
Benomyl	WHO U	Fungicide, Benzimidazole, EPA: NR
Benomyl + carbendazim + thiophanate methyl	WHO U (all)	B: EPA: NR C: Fungicide, Breakdown product, Benzimidazole Fungicide, benzimidazole precursor PAN Bad Actor: carcinogen, dev/reprod toxin
Benomyl + thiram	WHO U (B) WHO III (Th)	B: EPA: NR Th: Fungicide, dithiocarbarmate PAN Bad Actor: dev/reprod toxin
Bensulfuron + Metasulfuron methyl		B, EPA: NR
Bensultap	WHO III	Fungicide, Nereistoxin, EPA: NR
Bentazone	WHO III	EPA: NR
Bentazone + MCPA		B, EPA: NR
Bentazone + Mecoprop-P		B, EPA: NR
Bentazone + Propanil	WHO III (B) WHO III (P)	B, EPA: NR P: Herbicide, anilide
Beta-Cyfluthrin + Chlorpyrifos	WHO II (BC) WHO II (C)	Chlor: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Bitertanol	WHO U	EPA: NR
Brodifacoum	WHO 1a	Rodenticide, coumarin PAN Bad Actor: Acute Toxicity
Bromadiolone	WHO 1a	Rodenticide, coumarin PAN Bad Actor: acute toxicity
Bromopropylate		Insecticide EPA: NR
Bromoxynil + Ioxynil+ Mecoprop Esters (bromoxynil heptanoate)	WHO NL (parent chemical: WHO II)	B: Herbicide, Hydroxybenzonitrile Iox: EPA: NR Mecoprop: herbicide, chlorophenoxy ethyl or ester
Bupirimate		EPA: NR
Captafol 80 WP (product)		Product was cancelled by US EPA, PIC
Carbaryl + Cyhalothrin	WHO II (Ca) WHO (Cy)	Cy, EPA: NR
Carbendazim + Epoxiconazole	WHO U (C)	E, EPA: NR
Carbofuran= Furadan	WHO 1b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, POP
Carbosulfan	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: cholinesterase inhibitor EPA: NR

CCA=copper-chrome-arsenic		EPA: NR
Chlorfenvinphos		EPA: NR
Chlorfenvinphos (or Chlorfenfiphos)+ dichlorvos + gentian violet		C, EPA: NR
Chlorpyrifos	WHO II	Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor OP of primary concern
Chlorpyrifos + cypermethrin	WHO II (Ch) WHO NL (Cy) WHO 1b (cyper zeta)	Ch: OP of primary concern Cy: Insecticide, pyrethroid
Chlorpyrifos + Dimethoate	WHO II (Ch) WHO II (D)	Ch: OP of primary concern D: Insecticide, organophosporous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Chlorpyrifos methyl	WHO U (C-m)	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Chlorsulfuron + clorsulfoxim		Cl: EPA: NR
Chromafenozide	WHO NL	EPA: NR
Cinmethylin		EPA: NR
Clorantraniliprol		EPA: NR
Copper ammonium acetate	WHO NL	Fungicide, inorganic-copper EPA: NR
Copper oxide + chromium trioxide + Arsenic pentoxide	WHO II (CO)	CT: wood preservative, inorganic chromium PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin See PANNA for info, known carcinogen: not allowed in FTF AP: fungicide, insecticide, rodenticide, herbicide PAN Bad Actor: acutre toxicity, carcinogen, dev/reprod toxin AP, See PANNA, known carcinogen: not allowed in FTF
Copper oxychloride + Kasugamycin	WHO III (CO) WHO U (K)	Kasu: fungicide, microbiocide; antibiotic Kasugamycin, EPA: NR
Copper sulfate (anhydrous)		EPA: NR
Copper sulfate + Arsenic pentoxide		Arsenic pentoxide: see PANNA site, known carcinogen, not allowed in FTF
Cotton seed oi1+ Garlic extract	WHO NL (garlic)	Insecticide, botanical Cotton seed oil, EPA: NR
Coumatetralyl		Rodenticide, coumarin EPA: NR
Cyanazine + Atrazine	WHO II (Cya) WHO U (At)	Cya: Herbicide, Triazine, EPA: NR PAN Bad Actor: GW contam, Dev/Reprod toxin Atrazine: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Cyanophos		Insecticide, avicide EPA: NR
Cycloxydim		Herbicide EPA: NR
Cygon (dimethoate)	WHO II	Insecticide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase

		inhibitor, dev/reprod toxin, OP of primary concern
Cymiazole + Cypermethrin		Cymi: EPA: NR
Cypermethrin	WHO NL (Cy) WHO 1b (cyper zeta)	Insecticide, pyrethroid
Cypermethrin + chlorpyrifos (also listed above as chlor + cyper)	WHO NL (cyper; parent chemical, WHO 1b) WHO II (chlor)	Cyper: Insecticide, pyrethroid Chlor: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Cypermethrin + dimethoate	WHO NL (cyper) (parent chemical WHO 1b)	Parent chemical, WHO 1b: not allowed in FTF D: OP of primary concern
Cypermethrin + d-tetramethrin		As above
Cypermethrin + imidacloprid		As above
Cypermethrin + imiprothrin		As above
Cypermethrin + imiprothrin + d-allethrin		As above
Cypermethrin cis	WHO NL (BC) (parent chemical, zeta, WHO 1b)	Insecticide, pyrethroid
Cypermethrin high cis	WHO 1b, parent chemical	
Cypermethrin+profenofos		Cypermethrin: As above
Cypermethrin-alpha	WHO II	Insecticide, pyrethroid EPA: NR
Cypermethrin-alpha + dimethoate		Cypermethrin-alpha: EPA: NR D: OP of primary concern
Cypermethrin-alpha + Flumethrin		As above
Cypermethrin-alpha + tetrachlovinphos		As above
Cypermethrin-beta	WHO 1b	
Cypermethrin-zeta + profenofos	WHO I b WHO II (P)	Zeta: Insecticide, pyrethroid PAN Bad Actor: acute toxicity
Dalapon		Herbicide, unclassified EPA: NR
DDVP	WHO 1b	Insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Deltamethrin + chlorpyrifos	WHO II (D) WHO II (C)	C: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Deltamethrin + triazophos		T: EPA: NR
Diafenthiuron	WHO U	EPA: NR
Diazinon	WHO II	Insecticide, organphosporous PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Diazinon + mineral oil	WHO II (D) WHO NL (MO)	D: OP of primary concern MO: Insecticide, adjuvant, petroleum derivative PAN Bad Actor: carcinogen
Dibrom=Naled	WHO II (parent chemical, WHO 1b)	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Dichlorvos	WHO 1b	Insecticide, breakdown product, impurity

		PAN Bad Actor: acute toxicity, cholinesterase inhibitor, carcinogen, OP of primary concern
Dichlorovos + dimithenety	WHO 1b (Di)	D: OP of primary concern Dich: as above
Dichlorvos + lambda cyhalothrin	WHO 1b (Di) WHO II	Dich: as above, OP of primary concern LC: Insecticide, pyrethroid
Dichlorvos + Tetramethrin	WHO 1b (Di) WHO U (T)	Dich: as above, OP of primary concern Tetra: insecticide, pyrethroid
Diclofluanid		EPA: NR
Dicofol + Tetradifon	WHO III (di) WHO U (tetra)	Tetra: Insecticide, unclassified EPA: NR
Diethyl toluamide + DEET	WHO III (both)	Insecticide repellant, unclassified (both)
Diethyl toluamide + Dimethyl phthalate		DP: EPA: NR
Diflufenican + isoproturon	WHO U	D: herbicide, anilide I: EPA: NR
Diglyphus isaea (parasitic wasp)		EPA: NR
Dimethipin		EPA: NR
Dimethoate	WHO II	Insecticide, organophosporous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin, OP of primary concern
Dimethoate + alpha-cypermethrin	WHO II (both)	Dimeth, as above Insecticide, pyrethroid, OP of primary concern A-C: EPA: NR
Dimethomorph + dithianon	WHO U (D)	Dimetho: as above, OP of primary concern Dith: EPA: NR
Diniconazole		EPA: NR
Dinitro ortho cresol (DNOC)		EPA: NR, PIC
Dinocap		EPA: NR
Diphacinone	WHO 1a	Rodenticide, 1,3 indandione PAN Bad Actor: acute toxicity
Disulfuton- Fenamifos= fenamiphos sulfone + Triadimenol	WHO NL (fena sulfone) WHO 1b (parent chemical, fenamiphos) WHO III (tria)	Fenammiphos sulfone: EPA: NR Organophosporous, insecticide, nematicide PAN Bad Actor: cholinesterase inhibitor Tria: Fungicide, breakdown product
Dithianon		EPA: NR
Dodemorph-Acetate	WHO NL	Fungicide, morpholine EPA: NR
Doramectina	WHO NL	EPA: NR
Ebufos=Cadusafos		EPA: NR
Encarsiajormosa (parasitic wasp)		EPA: NR
Endosulfan	WHO II	Insecticide, organochlorine PAN Bad Actor: acute toxicity; see PANNA site: not approved for FTF program
Epoxiconazole		EPA: NR
Epoxiconazole + carbendazim		E: EPA: NR
Epoxiconazole + pyraclostrobin		E: as above
Epoxiconazole + tiofanat-meti 1		E: as above
Essential Oils		EPA: NR
Ethaboxam		EPA: NR
Ethephon	WHO U	Plant growth regulator, organophosphorous

		PAN Bad Actor: cholinesterase inhibitor, OP of primary concern
Ethion		EPA: NR
Ethion + cypermethrin		E: EPA: NR
Ethoprop= Ethioprophos	WHO 1a	Insecticide, nematicide, organophosporous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Ethylene dibromide (EDB)		Fumigant, nematicide EPA: NR, PIC, PAN dirty dozen
Fatty Alcohols		EPA: NR
Fenamiphos	WHO 1b	Organophosporous, insecticide, nematicide PAN Bad Actor: cholinesterase inhibitor
Fenazaquin		EPA: NR
Fenoxaprop-P-ethyl + antidote mefenpir-diethyl		M: EPA: NR
Fenoxapropyl-p-ethyl + Iodosulfuron-methyl		I-M: EPA: NR
Fenthion	WHO II	Insecticide, avicide, organophosphorous EPA: NR PAN Bad Actor: cholinesterase inhibitor
Fenthion-methyl		EPA: NR
Fenvalerate	WHO II	Insecticide, pyrethroid
Fenvalerate + fenfuracarb	WHO II (F)	F: as above B: EPA: NR
Flocumaphen = Flocoumafen		EPA: NR
Flufenoxuron	WHO U	Insecticide, benzoylurea EPA: NR
Flumethrin	WHO NL	EPA: NR
Flumethrin + piperonyl		F: EPA: NR
Fluopicolid + propamocarb	WHO NL	F: fungicide P: EPA: NR
Fluorocloridon		EPA: NR
Flusilazole	WHO III	EPA: NR
Flusulfamide	WHO NL	EPA: NR
Flutriafol		Fungicide, azole EPA: NR
Flutriafol + thiabendazole	WHO III (Fl) WHO U (T)	F: EPA: NR
Foramsulfuron + iodsulfuron-methyl + antidot isoxadifen-ethyl	WHO NL (F)	F: herbicide, sulfonylurea I-M: EPA: NR
Formetanate	WHO 1b	EPA: NR
Fosalon		EPA: NR
Furadan=carbofuran	WHO 1b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: Acute toxicity, cholinesterase inhibitor, POP
Furadan + Disyston (=disulfoton)	WHO 1b (F) WHO 1a (D)	F: as above D: insecticide, nematicide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Galoxiphopetox (see Haloxyfop R Methyl)		
Geksitiazoks (Niccoran 10%)		EPA: NR (Niccoran/Nissoran product not found)

Glyphosate Trimesium	WHO NL	EPA: NR
Haloxyfop- RR- Methyl Ester, haolxyfop R Methyl		Herbicide, Aryloxyphenoxy propionic acid EPA: NR
Heptenofos		Insecticide, organophosphorous EPA: NR
Hexaconazole		Fungicide, azole EPA: NR
Hexazinone + Dichlorvos (DDVP)	WHO III (H) WHO 1b (D)	H: as above D: insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor, OP of primary concern
Imidacloprid + pencycuron	WHO II (Imi)	Pen: Fungicide, urea, EPA: NR
Imidacloprid + pencycuron + thiram	WHO II (I) WHO III (Th)	Pen: fungicide, urea, EPA: NR Th: Fungicide, dithiocarbarmate PAN Bad Actor: dev/reprod toxin
Iminoctadine Tris (Albesilate)		Fungicide, guanidine EPA: NR
Imiprothrin + cypermethrin	WHO NL (I) WHO NL (Cy) WHO 1b (cyper zeta)	C:Insecticide, pyrethroid
Imiprothrin + Esbiothrin + Permethrin	WHO NL (I)	E: cancelled, EPA: NR
Iodosulfuron - methyl sodium		Herbicide, sulfonylurea EPA: NR
Ioxynil		EPA: NR
Ioxynil Octanoate + 2,4-D Esters		IO: Herbicide, EPA: NR
Iprodione + propineb	WHO U (I)	P: EPA: NR
Iprovalicarb + propineb	WHO U (both)	EPA: NR for both
Isofluote		EPA: NR
Lebaycid=Fenthion		EPA: NR
Lenacil		EPA: NR
Lindane		Insecticide, rodenticide, organochlorie EPA: NR
Lindane + thiram (seed dressing)		L: EPA: NR
Magnesium chlorate (chlorate of magnesium)		EPA: NR
Magnesium phosphide	WHO not classified,	Fumigant, rodenticide, inorganic see PANNA: not allowed in FTF program
Malathion	WHO III	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor OP of primary concern
Malathion + permethrin	WHO III (M) WHO II (P)	M: as above, OP of primary concern P: insecticide, pyrethroid
Malathion + pyrethrins	WHO III (M) WHO NL	M: as above, OP of primary concern P: insecticide, botanical
Metamitron		EPA: NR
Metazachlor		EPA: NR
Methamidophos	WHO I b	Insecticide, breakdown product, organophosphorous, OP of primary concern, PIC
Methiocarb	WHO I b	Insecticide, molluscicide, N-methyl carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Methomyl	WHO 1b	Insecticide, breakdown product, N-methyl

		carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Methyl bromide + chloropicrin (fumigant)		MB: Fumigant, insecticide, herbicide, nematicide; halogenated organic PAN Bad Actor: acute toxicity, dev/reprod toxin (see USEPA and USAID guidance on this: not allowed in FTF program) C: fumigant, nematicide, inorganic PAN Bad Actor: acute toxicity
Methylaldehide + Methomyl + Methiocarb Methyl aldehyde=formaldehyde	WHO: fumigant, WHO doesn't rank, but highly toxic WHO I b (Metho, Methio)	Formaldehyde: microbiocide, unclassified PAN Bad Actor: acute toxicity, carcinogen Metho: as above Methio: as above
Mevinphos		EPA: NR
Monocrotophos + Cypermethrin	WHO NL (C)WHO 1b (cyper zeta)	Mono: PIC C: Insecticide, pyrethroid
Niclosamide + Levamisole		Niclo: EPA: NR
Nitroalkifenolyati= Pyroxychlor		EPA: NR
Nonyl phenol ethoxylate		Adjuvant, soap surfactant EPA: NR
Omethoate		Breakdown product EPA: NR
Orthodifolotan (captafol 80 WP-product)		Captafol: cancelled by US EPA
Oxamyl	WHO I b	Insecticide, nematicide, N-methyl carbamate PAN Bad Actor: acute toxicity, cholinesterase inhibitor
Oxydemeton- Methyl	WHO I b	Insecticide, organophosphorous PAN Bad Actor: acute toxicity, cholinesterase inhibitor, dev/reprod toxin
Paraffinic Oils		EPA: NR
Paraquat + diuron	WHO II (P) WHO U (D)	P: see below D: herbicide, urea PAN Bad Actor: carcinogen, gw cont., dev/reprod toxin, PAN dirty dozen
Paraquat dichloride	WHO II	Herbicide, bypiridylium PAN Bad Actor: acute toxicity, PAN dirty dozen
Paraquat=paraquat dichloride, see above		PAN dirty dozen
Penconazol		Fungicide, azole EPA: NR
Pendimethalin + Ametryne + Atrazine	WHO III (P, Am) WHO U (At)	Am: Herbicide, triazine At: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Phenthoate		EPA: NR
Phosalone		EPA: NR
Phosphide 56% w/w equivalent to 33% hydrogen phosphide, each tablet releases 1.0g of hydrogen phosphide gas	EPA I	A restricted use pesticide

Phoxim + Honey		Phoxim: EPA: NR
Phoxim=Foxim	WHO II	EPA: NR
Picloram + 2, 4-D	WHO U (P)	P: Herbicide, pyridinecarboxylic acid PAN Bad Actor: GW cont. 2, 4-D: EPA: NR
Picoxystrobin		Fungicide, strobin EPA: NR
Pirimiphos methyl (actellic-product)=Pirimifosmetil		Breakdown product EPA: NR
Pirimiphos methyl + Permethrin		P-methyl: EPA: NR
Pretilachlor + Pyribenzoxim	WHO U (Pr)	Pr: herbicide, chloroacetanilide Py: EPA: NR
Procymidone		EPA: NR
Profenfos + cypermethrin	WHO II (P) WHO NL (parent chemical, WHO 1b)	C: insecticide, pyrethroid
Propamocarb + Fosetyl		P: EPA: NR
Propamocarb hydrochloride		EPA: NR
Propamocarb hydrochloride + mancozeb		P: EPA: NR
Propanil + Phenothol=phenoxethol	WHO III (P)	Ph: EPA: NR
Propaquizafop		EPA: NR
Propargite + Tetradifon	WHO III (P)	PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin Tetra: Insecticide, unclassified EPA: NR
Propargul		Is this propargyl alcohol or bromide? Both are EPA: NR
Propetamphos	WHO I b	Insecticide, organophosphorous PAN Bad Actor: acute toxicity cholinesterase inhibitor
Propiconazole + procloraz	WHO II (Prop)	Prop: as above Proc: EPA: NR
Propineb		EPA: NR
Propineb + Cymoxanil		Prop: EPA: NR Cymox: Fungicide, unclassified Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc
Propineb + Iprovalicarb		Both: EPA: NR
Propineb + Provalicarb		Prop: EPA: NR
Proquinazid		EPA: NR
Prosulfocarb		EPA: NR
Pyraclostrobin + dithianon		D: EPA: NR
Pyrethrin + cypermethrin + Tetramethrin	WHO NL (cyper) (parent chemical WHO 1b)	
Pyrethrin + DDVP	WHO NL (Py) WHO 1b (DDVP)	Py: Insecticide, botanical Insecticide, breakdown product, impurity, organophosphorous PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Pyrethrum + garlic extract, Permethrin		Py:EPA: NR G: Insecticide, botanical
Pyridaben	WHO 1b	Insecticide, unclassified
Quizalofop-p-tefuryl		EPA: NR

Rateid (anti-parasitic, spray) 5 % of cypermetrine, 30% of chlorphenvinphos, emulsifiers and organic solvents		Chlorphenvinphos: EPA: NR
S-bioallethrin=allethrin + bioresmthrin		S-b: insecticide, pyrethroid Biores: EPA: NR
Sebacilum=Sebatsil (anti-parasitic, spray)		EPA: NR
S-Metil-N-((metilcarbamoil) oxi) tioacetamidato		See Rateid above
S-Metolachlor + Mesotrione + Triazine = atrazine	WHO NL(S-M) (parent chemical, WHO III) WHO NL (M) WHO U (T)	S-M: as above M: Herbicide T: Herbicide, Triazine PAN Bad Actor: Carcinogen, GW cont. See PANNA site
Sodium molybdate		EPA: NR
Steinernema feltiae (1.5million infective juveniles/gram)		EPA: NR
Teflubenzuron		EPA: NR
Tefluthrin	WHO I b	Tefluthrin: Insecticide, pyrethroid PAN Bad Actor: acute toxicity
Terbuthyn=terbutryn		EPA: NR
Terbuthryn + S-Metolachlor		Terb: EPA: NR
Tetradifon		EPA: NR
Tetramethrin + Cypermethrin	WHO U (T) WHO NL (Cy) WHO 1b (cyper zeta)	
Tetramethrin + Cypermethrin + Propuxur	WHO U (T) WHO NL (Cy) WHO 1b (cyper zeta)	
Thiocyclam + Thiocyclam-Hydrogenoxalate		EPA: NR
Thiophanate		EPA: NR
Tolilfluanid=Tolyfluanid		EPA: NR
Topromazon + dicamba		T: EPA: NR
Toxaphene	WHO NL	EPA: NR, POP, PAN dirty dozen
Triazophos		Insecticide, organophosphorous EPA: NR
Tritosulfuron + dicamba		T: EPA: NR
Vardendrolimus (dendrobacillin) biological		EPA: NR
Varturin genzis (Bitoksibacillin powder)-biological		EPA: NR
Zinc ethyl bis (ditiocarbamate) + copper oxychloride		Z: EPA: NR
Zinc phosphide	WHO I b	Rodenticide, inorganic zinc. PAN Bad Actor: acute toxicity, dev/reprod toxin

Safe Use Action Plan (SUAP)

The Farmer-to Farmer (FTF) conditions from the 2007 and 2009 FTF IEE remain in force, as follows:

(1) Although the Farmer-to-Farmer programs are essentially training and advisory activities with no direct effect on the environment, the subject of the training or advice may involve use of pesticides so the some mandatory conditions are appropriate. The eventual effect on the environment is expected to be highly beneficial as trained host institutions and individuals are likely to make better decisions regarding pest management technologies and, when pesticides are used, they will be used in a safe and environmentally responsible manner. As a result, a Negative Determination with Conditions is recommended for the case of training on the use of pesticides, as per 22 CFR 216.2 (e) Pesticides. Training in how to decide when to use them and how to use them safely can be seen as constituting a "use." Therefore the following conditions are recommended.

- The syllabus for each training event will be reviewed and approved by the Mission environmental officer and/or the USAID COTR.
- A representative from USAID (preferably the Mission) should attend the training sessions to the extent possible.

(2) All implementing partners will be provided with and will familiarize themselves with Farmer-to-Farmer Program brochures on environmental and natural resources issues.

Safe Use Action Plan: Mitigation measures to be incorporated into the FTF Program

Based on the above pesticide evaluation report, and in accordance with 22 CFR 216.3(a) to (l), the following measures shall be implemented to ensure there will be no significant adverse effects on the environment or human health. With implementation of these recommendations, FTF assistance should result in positive effects, as compared to the current pesticide management situation in FTF countries.

The following recommendations shall be implemented by FTF implementing partners:

(1) FTF implementing partners shall retain a copy of this PERSUAP in all headquarter and country offices. Pertinent sections shall be provided to FTF volunteers as follows:

Attachment A: Compiled list of active ingredients allowed in FTF programs
Attachment B: Guide to minimizing the impacts of pesticides to human health
Attachment C: Guide to minimizing impacts of pesticides on the environment
Attachment D: Guide to Host Country Registered Pesticides
Attachment E: Pesticides of Global Concern
Attachment F: Guide to IPM Practices
Attachment G: Monitoring Pests and Pesticide Effects
Attachment H: Key Websites for Pesticide and IPM Research
Attachment I: Bullet Points for SOWs

***Type 1 Assignments*:** These volunteers are expected to provide direct assistance for the use or procurement of pesticides. They will likely recommend and/or provide advice on specific pesticide active ingredients or products, and they may provide training in pesticide use, safe use, and IPM.

> Send to volunteers: the PER, SUAP, SUAP-Attachments A, B, C D, E, F, G, H, and the Environmental Brochure

***Type 2 Assignments*:** These volunteers may provide indirect assistance for the use or procurement of pesticides; these assignments do not involve recommending or providing advice on specific pesticide active ingredients or products. These volunteers will likely be in the field and may have the opportunity to encourage good practices in pesticide use and discourage poor practices.

> Send to volunteers: the PER, SUAP, and SUAP-Attachments B, C, F, H, and the Environmental Brochure

Type 3 Assignments: These volunteers are not expected to be involved in pesticide issues.

> Send to volunteers: the Environmental Brochure

Type 4 Assignments: These volunteers will work on USAID projects outside of Farmer to Farmer.

> See the PERSUAP for the USAID project, and if there is no existing PERSUAP, see pertinent sections of the FTF Programmatic PERSUAP, as above for assignment Types 1, 2, and 3.

(2) Individual country lists of approved/registered pesticides shall be kept on file at the FTF country office, and shall be provided to FTF volunteers who may be recommending and advising on specific pesticide active ingredients and products as part of their assignment (Type 1 assignments). For all FTF countries, where there is an approved list of pesticides (currently, as of December 2009, this includes all FTF countries except Angola), this list must be obtained and provided to the FTF Volunteer (Type 1 assignments only) prior to or upon arrival of the volunteer in-country. For FTF assignments in countries with no nationally approved list of pesticides, the FTF office (where one exists) shall obtain a letter from the government indicating that there is no list of government approved pesticides, and noting any specific measures that should be taken when FTF volunteers recommend pesticides. FTF offices should encourage their partners to develop FTF SOWs to help establish policy and procedures for developing a database of government authorized pesticides in countries without a government approved list. For additional guidance on obtaining government approved lists, see SUAP-Attachment D.

(3) IPM practices, submitted as part of this PERSUAP, shall be retained in FTF country office files; and they should be built on and strengthened by knowledgeable FTF program volunteers. FTF volunteers whose assignments involve direct or indirect assistance for the use or procurement of pesticides should receive a copy of these practices for the specific country (Types 1 and 2 assignments).

(4) FTF implementing partners shall retain in country offices all tools, forms, protocols, and plans that volunteers develop such as: scouting protocols, IPM monitoring forms, and measures to monitor the efficacy of pesticides. These should be provided to subsequent volunteers so that they can build on and strengthen these resources (Type 1 assignments).

(5) Given the low level of understanding of pesticide impacts on human health and the environment, the lack of knowledge on IPM and safe pesticide use, as well as other pesticide issues cited by FTF Country Offices (see PER), FTF Implementing Partners shall consider recruiting volunteers (through FTF in-country hosts) for assignments in pesticide safe use and IPM.

The following recommendations shall be implemented by FTF volunteers to minimize potential impacts on human health and the environment, as identified in the Programmatic Pesticide Evaluation Report (factors (a) to (l)). FTF Country Offices shall provide oversight to ensure that these measures are implemented; and shall report to USAID in semi-annual reports on implementation of these measures. Therefore, FTF Country Offices are expected to work closely with FTF volunteers to ensure that volunteers understand the measures outlined in the SUAP and attachments, and that volunteers are submitting information needed by the Country Office so that they can adequately monitor and report on SUAP measures. Ultimately, FTF Home Offices are responsible to USAID for ensuring implementation of SUAP measures.

Mitigation measures have been adapted to the FTF Program methodology and to activities that involve the use and procurement of pesticides. To various degrees, the SUAP recommendations apply to all FTF volunteers--Types 1, 2, 3, and 4 assignments, as described above. No volunteers will be involved in procuring pesticides, although a volunteer's recommendations about a pesticide may lead to procurement.

This Programmatic PERSUAP and the following recommendations cover FTF volunteer technical assistance and the associated administrative, consultant, training, and technical assistance under the FTF Programs. This includes the core country FTF projects, flexible assignments, and volunteer services under Associate Awards and other mechanisms whereby Missions or other offices fund FTF programs. Any FTF volunteer who will be providing assistance as part of a USAID activity shall ensure compliance with the project-level PERSUAP, if one exists. If there is an existing project-level PERSUAP, that will take precedence over this Programmatic FTF PERSUAP. If there is no such PERSUAP, the FTF volunteer shall comply with the FTF Programmatic PERSUAP, as described below.

If any FTF program intends to provide assistance for the use or procurement of pesticide active ingredients other than those approved in SUAP-Attachment A, an amendment to this Programmatic PERSUAP must be prepared and approved by the EGAT Bureau Environmental Officer (BEO) prior to providing such assistance.

(1) **FTF volunteers shall recommend and encourage the use of US EPA registered, least toxic pesticide active ingredients (WHO Toxicity Class II and above).** FTF volunteers shall only provide recommendations for the use or procurement of pesticide active ingredients listed in SUAP-Attachment A, all of which are US EPA registered and WHO class II and above. This requirement applies to recommendations about the use or procurement of specific active ingredients; volunteers may provide general advice on safe use of pesticide active ingredients; and they may discourage the use of highly toxic chemicals not listed in SUAP-Attachment A.

(2) **FTF volunteers shall recommend and encourage the use only of products made up least toxic active ingredients.** SUAP-Attachment A lists *active ingredients* that FTF volunteers may specifically recommend. FTF volunteers shall provide specific recommendations for pesticide *products* that are comprised only of the active ingredients in SUAP-Attachment A.

(3) **FTF volunteers shall recommend and encourage the use only of pesticide products that are GUPs or the equivalent and that are US EPA toxicity level II and above or the equivalent.** Of the *pesticide products* that FTF volunteers may recommend, none shall be Restricted Use Pesticides (RUP), as determined by the US EPA, or products that are the equivalent of an RUP, if not US EPA registered. In accordance with 22 CFR 216, this PERSUAP covers only the use and procurement of

General Use Pesticides (GUPs). In addition, FTF *pesticide products* that are recommended by volunteers shall be US EPA toxicity level II or above, or if not US EPA registered, a product equivalent to US EPA II or above. FTF volunteers shall not provide recommendations for the use or procurement of pesticide products that are EPA toxicity level I or the equivalent.

(4) **FTF volunteers shall provide advice and recommendations for specific pesticides only in conjunction with recommendations for appropriate protective gear, and other safety precautions to mitigate pesticide impacts to human health (SUAP-Attachment B).** Volunteers should be aware of the limited accessibility of protective gear in many cases, and should be prepared to identify measures to access it. FTF volunteers should also be aware of the lack of intact (completely missing, missing some information, or counterfeit) labeling in some FTF countries. Given that pesticides labels may be unreliable in many FTF countries, volunteers should be prepared to provide alternative advice on protective gear and on other safety precautions to minimize impacts to human health (see SUAP –Attachment B). For Type 1 assignments, SUAP-Attachment A provides toxicity information for active ingredients such as acute toxicity, carcinogenic potential, endocrine disruptor, etc. Where these concerns are noted, FTF volunteers should recommend least toxic pesticides and the appropriate safety precautions (SUAP-Attachment B); SUAP-Attachment B offers information on best practices to mitigate adverse effects of pesticides on human health.

(5) **FTF volunteers shall provide advice and recommendations for specific pesticides only in conjunction with recommendations to mitigate impacts on the environment (SUAP-Attachment C).** For Type 1 assignments, volunteers should refer to SUAP-Attachment A for chemicals with the potential to contaminate groundwater, and should tailor recommendations and environmental safeguards accordingly (SUAP-Attachment C contains guidance for this). In addition, SUAP-Attachment C offers best practices to mitigate environmental harm; these should be referred to, and recommended, as appropriate, by Types 1 and 2 volunteers.

(6) **FTF volunteers shall recommend the use only of pesticides that are approved by the host country government.** Volunteers whose assignments will require providing advice/recommendations on the use of specific pesticides (Type 1 assignments) should see SUAP-Attachment D for information about acquiring these government lists. Lists of approved/registered pesticides for each country are required to be kept at FTF country offices.

(7) **FTF volunteers whose assignments will involve providing recommendations and advice on specific pesticide active ingredients and products shall review the www.epa.gov site for recent actions/decisions taken by US EPA.** Any changes to US EPA registration status and other decisions taken by US EPA shall take precedence over SUAP-Attachment A "approved" pesticides. If possible, this review should be conducted prior to travel since the volunteer may not have access to adequate internet once in-country.

(8) **FTF volunteers shall not recommend and shall strongly discourage the use of chemicals listed in Attachment E of the SUAP.** Attachment E contains:

(a) The 29 pesticides listed in Annex III of the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. These pesticides have been banned or severely restricted for health or environmental reasons by Parties to the Rotterdam Convention.

(b) "POPs Treaty" chemicals. Under the Stockholm Convention, also known as the "POPs Treaty," countries agree to reduce or eliminate the production, use, and/or release of 12 POPs.

(c) Organophosphate pesticides (OPs) of primary concern. OPs are among the most acutely toxic pesticides, with most of these chemicals classified by US EPA as toxicity class I (highly toxic) or toxicity class II (moderately toxic).

(9) **FTF volunteers shall provide assistance for the use or procurement of pesticides only within the context of an IPM approach.** For volunteers' reference, SUAP-Attachment F includes general recommendations on IPM. FTF country offices are required to retain a list of IPM practices that were submitted as supporting documentation for this PERSUAP. Volunteers, whose assignments will include advice/recommendations on specific pesticides (Type 1 Assignments), as well as those who may provide advice on safe use of pesticides (Type 2 Assignments), should obtain a copy of these IPM practices. Volunteers with specific knowledge in IPM should build on and strengthen these practices, and shall provide documentation in this regard to the FTF country office.

(10) **FTF volunteers shall provide training in and shall leave host country partners with the applicable tools (see SUAP-Attachment G) they will need once the volunteer departs the country.** Tools to monitor various parameters of pesticide use and pest and disease infestation such as scouting protocols, IPM monitoring forms, and measures to monitor the efficacy of pesticides will be useful, once a volunteer departs, to help ensure that the volunteer's recommendations on safe use and IPM will be implemented. Volunteers who prepare monitoring plans and forms shall submit them to the FTF Country Office so that future volunteers can build on them, and so that FTF Country Offices can report in semi-annual reports, on their preparation and updating.

Monitoring and Reporting

The following are the reporting requirements for Types 1, 2, 3, and 4 assignments, and for FTF implementing partners (country offices and home offices). FTF Country Offices are responsible for ensuring FTF volunteers understand, implement, and provide adequate reports on SUAP measures; and FTF Home Offices are ultimately responsible for ensuring implementation of SUAP measures and reporting to USAID. In addition, FTF Home Offices are responsible for providing the PERSUAP and Attachments, as noted above, to the volunteers, although certain information may be best obtained from the Country Office (Host Country list of approved pesticides; scouting plans developed by volunteers; etc.). The division of labor is up to the individual FTF implementing partners; the Home Office shall ensure this information is provided.

Volunteer end of trip reports, as described below, and any attachments, shall be submitted to the FTF Country Office.

Reporting by:

Type 1 Volunteer Assignments

Brief report shall include all or some of the following:

(1) Pesticides that the FTF country program should be able to recommend/use that are not included in SUAP-Attachment A.

(2) Limitations and successes of the PERSUAP

(3) Recommendations on additional technical assistance and training needed to improve pest and pesticide management practices.

(4) Tools, forms, and plans provided to FTF recipients to assist with implementing the volunteer's recommendations

Type 2 Volunteer Assignments

Brief report shall include all or some of the following:

(1) Limitations and successes of the PERSUAP

(2) Recommendations on additional technical assistance and training needed to improve pest and pesticide management practices.

Type 3 Volunteer Assignments

No reporting required

Type 4 Volunteer Assignments

Reporting as required by the project-level PERSUAP; or if no project-level PERSUAP, reporting as required above for Types 1, 2, and 3 assignments, as applicable.

Reporting required by FTF implementing partners to USAID/EGAT:

In a separate section of implementing partner's semi-annual reports, FTF partners shall report on:

(1) Key findings and recommendations from FTF volunteer reports regarding limitations and successes of the PERSUAP, and recommendations for additional technical assistance and training needed to improve pest and pesticide management practices.

SUAP Attachments

Attachment A: Compiled list of active ingredients allowed in FTF programs
Attachment B: Guide to minimizing the impacts of pesticides to human health
Attachment C: Guide to minimizing impacts of pesticides on the environment
Attachment D: Guide to Host Country Registered Pesticides
Attachment E: Pesticides of Global Concern
Attachment F: Guide to IPM Practices
Attachment G: Monitoring Pests and Pesticide Effects
Attachment H: Key Websites for Pesticide and IPM Research
Attachment I: Bullet Points for SOWs

SUAP Attachment A: Compiled list of active ingredients allowed in FTF programs

The table in this attachment lists active ingredients requested by FTF country programs that are approved for use based on EPA registration and toxicity level. Prior to providing assistance for the use or procurement of these, a volunteer should ensure that it is approved by the host country; and any product that is recommended should be US EPA toxicity level II or above, or the equivalent for non-US EPA registered products.[2] Assistance for the use or procurement of pesticides must be provided within an IPM approach, and judicious use of least toxic pesticides should be encouraged. Protective equipment and safeguards to protect human health and the environment shall be recommended in conjunction with assistance for the use or procurement of pesticides.

Active ingredients not included on this list shall not be recommended or used.[3] If an FTF program wishes to provide assistance for the use or procurement of an active ingredient not included on this list, an amendment to this PERSUAP shall be submitted, at the request of the FTF program, through USAID/EGAT. The EGAT Bureau Environmental Officer must approve the amendment prior to providing assistance for the use or procurement of an active ingredient not included on the list below.

WHO Toxicity Class: The WHO bases its ratings on the lowest published rat oral LD_{50}, the lethal dose (in milligrams of substance per kilogram of body weight) that kills 50% of the test animals in a standard assay (see table below). WHO gives a hazard ranking of 1a (Extremely Hazardous) to the most hazardous pesticide active ingredients. While the WHO ratings generally reflect acute toxicity, they also take into account other toxic effects such as reproductive and developmental toxicity. WHO 1 (1a and 1b) are considered extremely toxic, and they are rejected for use by this PERSUAP.

WHO does not rank fumigants, a class of gaseous pesticides that are generally extremely hazardous, they instead have a no listing (NL) rating., The WHO also does not evaluate pesticides believed obsolete or discontinued, even though some of these "obsolete" pesticides are currently registered for use in the U.S. (these also have an NL rating).

[2] This can be verified on the EPA's website http://www.epa.gov/, or on www.pesticideinfo.org. Implementing Partners should have current lists of host country approved pesticides and provide this to volunteers as needed.
[3] Note: If a chemical name with alpha, beta, zeta, etc. was submitted, for example, beta cyfluthrin, please check under b for beta and c for cyfluthrin—the chemical may be listed either way

WHO Toxicity Classification		Rat LD_{50} (mg of chemical per kg of body weight)			
Class	**Description**	**Solids (oral)**	**Liquids (oral)**	**Solids (dermal)**	**Liquids (dermal)**
I*a*	Extremely hazardous	‹ 5	‹ 20	‹ 10	‹ 40
I*b*	Highly hazardous	5-50	20-200	10-100	40-400
II	Moderately hazardous	50-500	200-2,000	100-1,000	400-4,000
III	Slightly hazardous	› 500	›2,000	›1000	› 4,000
Table 5	Unlikely to present acute hazard in normal use	› 2,000	› 3,000	---	---
Table 6	Not classified: believed obsolete				
Table 7	Fumigants not classified by WHO				
U	Unlikely to be hazardous				

**NR: not registered; PANNA: Pesticide Action Network North America

The US EPA registers active ingredients and formulated pesticide products. The EPA gives only formulated pesticide products (which often include inert ingredients) acute toxicity rankings. These are reflected in the warning label on the pesticide container. The US EPA gives a warning label of Category 1 to the most acutely toxic pesticide products and Category 4 to the least acutely toxic pesticide products. The different toxicity categories are based on the LC_{50}, the lethal dose (in milligrams of substance per kilogram of body weight) that kills 50% of the test animals in a standard assay. For inhalation exposures, the LC_{50} is measured as the concentration in air in mg per liter that kills 50% of the test animals.

PAN Bad Actors are chemicals that are one or more of the following: high acute toxicity, cholinesterase inhibitor, known/probable carcinogen, known groundwater pollutant, or known reproductive or developmental toxicant. NOTE: Because there are no authoritative lists of endocrine disrupting (ED) chemicals, EDs are not yet considered PAN Bad Actor chemicals.

In order to identify a "most toxic" set of pesticides, the Pesticide Action Network (PAN) and Californians for Pesticide Reform (CPR) created the term PAN Bad Actor pesticides.[4] These pesticides are at least one of the following:

- Known or probable carcinogens, as designated by the International Agency for Research on Cancer (IARC), U.S. EPA, U.S. National Toxicology Program, and California's Proposition 65 list.
- Reproductive or Developmental Toxins, as designated by the state of California's Proposition 65 list.

[4] Definition on www.pesticideinfo.org,

- Neurotoxic cholinesterase inhibitors, as designated by California Department of Pesticide Regulation, the Materials Safety Data Sheet for the particular chemical, or PAN staff evaluation of chemical structure (for organophosphorus compounds).
- Known groundwater contaminants, as designated by the state of California (for actively registered pesticides) or from historic groundwater monitoring records (for banned pesticides).
- Pesticides with high acute toxicity, as designated by the World Health Organization (WHO), the U.S. EPA, or the U.S. National Toxicology Program.

PAN Parent Chemicals: The following is from the www.pesticideinfo.org site, and explains the inclusion of parent chemicals in the WHO ratings below. **The parent chemical was chosen on the basis of available toxicity information, where chemicals with the maximum amount of toxicity information assigned to parent status.** Where no toxicity information was available for any member of a group, PAN assigned parent status to the least derivatized member of the group for organic compounds (e.g., benzoic acid would be the parent instead of methyl benzoate), the sodium salt (for compounds with a common anion), or the chloride salt (for compounds with a common cation). For some groups with no obvious parent, assignment of parent status was arbitrary.

Active Ingredients Highlighted in Blue: No PERSUAP approval needed. These are mainly de-wormers, oral or injectable veterinary treatments.

SUAP Attachment A - Table 4: Active Ingredients Approved for use by FTF Programs

Chemical/Active ingredient	WHO Toxicity Class	Notes/Status of PERSUAP Request
1-decanol (or n-decanol)	WHO NL	Plant growth regulator, alcohol, either PAN Bad Actor: acute toxicity
2,4-D 2,4-Dichlorophenoxyacetic acid	WHO II	Herbicide, plant growth regulator, Chlorophenoxy acid or ester
Dimethylamine salt of 2,4- Dichlorophenyl acetic acid	WHO NL (parent chemical, WHO II)	Parent Chemical-2, 4-D
2, 4-DB	WHO III	Herbicide, Chlorophenoxy acid or ester PAN Bad Actor: dev/reprod toxin
2, 4-D + Dicamba	WHO II (2,4-D) WHO III	2,4-D: as above Di: Herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
2, 4-D + Picloram	WHO II (2,4-D) WHO U (P)	Herbicide, Pyridinecarboxylic acid PAN Bad Actor: GW contaminant
Abamectin	WHO NL	Insecticide, botanical PAN Bad Actor: Acute toxicity, dev/reprod Toxin
Acephate	WHO III	Insecticide, organophosphate PAN Bad Actor: cholinesterase inhibitor
Acetamiprid	WHO NL	Insecticide, neonicotinoid
Acetochlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: carcinogen
Acetochlor + Flurilazole =fusilazole	WHO III (A) WHO III (fusilazole)	Acetochlor as above Fusilazole: fungicide, azole
Actellic = pirimiphos methyl	WHO III	Insecticide, organophosporous PAN Bad Actor: cholinesterase inhibitor
Alachlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: Carcinogen, GW Cont., dev/reprod toxin

Alachlor + Atrazine	WHO III (Al) WHO U (At)	Al: as above At: Herbicide, triazine PAN Bad Actor: carcinogen, GW cont.
Albendazole		Oral veterinary drug for worms, no PERSUAP approval needed
Allethrin	WHO II	Insecticide, pyrethroid
Aluminum tris (0-ethyl phosphonate)		Same as Fosetyl-Al, see below
Ametryn	WHO III	Herbicide, triazine
Amicarbazone	WHO NL	Herbicide, triazolone
Amitraz	WHO III	Insecticide, formamidine PAN Bad Actor: dev/reprod toxin
Amoxicillin		Antibiotic, no need for approval in the PERSUAP
Asbiothrin (=esbiothrin) + Deltamethrin	WHO NL (Es) (parent chemical, WHO II) WHO II (D)	Es: Insecticide, pyrethroid D: Insecticide, pyrethroid
Asulam – Sodium	WHO NL	Herbicide, Other carbamate
Azadirachtin	WHO NL	Insecticide, nematicide
Azinox (anti-parasitic, oral)		No PERSUAP approval needed
Azoxystrobin	WHO U	Strobin, fungicide
Azoxystrobin + Cyproconazole	WHO U (Az) WHO III (Cypro)	Azoxy as above Cypro, Azole, fungicide PAN Bad Actor: Carcinogen
Bacillus sphaericus	WHO NL	Insecticide, microbial
Bacillus thuringiensis	WHO NL	Depends on the strain re EPA registration Insecticide, microbial
Bacillus thuringiensis (Subsp. Kurstaki)	WHO NL	Depends on more details of the strain of kurstaki re EPA registration Insecticide, microbial
Bt, Aizawai strain	WHO NL	Depends on more details of the strain of Aizawa re EPA registration Insecticide, microbial
Bt, subsp kurstaki HD-1 ABT S-351, sporic-crystalic complex	WHO NL	Insecticide, microbial
Beauveria bassiana	WHO NL	Depends on the strain of bassiana re EPA registration Insecticide, microbial
Benthiocarb	WHO II	Herbicide, thiocarbamate PAN Bad Actor
Benthiocarb + Propanil	WHO II (B) WHO III (P)	B: As above P: Herbicide, anilide
Benzalkonium	WHO NL	Microbiocide, algaecide, herbicide, Quarternary ammonium compound PAN Bad Actor: acute toxicity
Beta-Cyfluthrin	WHO II	Insecticide, pyrethroid
Beta-cyfluthrin + imidacloprid	WHO II (BC) WHO II (Im)	BC: as above Im: insecticide, neonicotinoid
Bifenazate	WHO NL	Insecticide, unclassified
Bifenthrin	WHO II	Insecticide, pyrethroid PAN Bad Actor: Dev/Reprod. Toxin
Bioallethrin + Pyriproxyfen	WHO II WHO U	B: Insecticide, pyrethroid P: Insecticide, unclassified
Bispyribac Sodium	WHO NL	Herbicide, unclassified
Boscalid	WHO NL	Fungicide, anilide

Boscalid + Kresoxim-methyl	WHO NL (B) WHO NL (K-m)	Boscalid, as above K-m, fungicide, strobin PAN Bad Actor: carcinogen
Boscalid + Pyraclostrobin	WHO NL	Boscalid, as above Pyraclostrobin, fungicide, strobin
Bromacil	WHO U	Herbicide, uracil PAN Bad Actor: GW cont.
Bromhexine		Oral veterinary drug for respiratory disorders?: PERSUAP approval not needed
Bromoxynil Octanoate + MCPA-2-ethyl Hexyl ester	WHO NL (parent chemical: WHO II) WHO NL (parent chemical: WHO III)	B: herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin MCPA,2: herbicide, Chlorophenoxy acid or ester
Bromoxynil phenol	WHO II	Herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin
Bromoxynil phenol + MCPA	WHO (NL (B: parent chemical: WHO II) WHO III (MCPA)	B: Herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin MCPA: herbicide, chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
Brompropilat=Bromopropylate	WHO U	Insecticide
Bromuconazole	WHO II	Fungicide, azole
Bronopol (Brontak, seed treatment)	WHO II	Microbiocide, fungicide PAN Bad Actor: acute toxicity
Buprofezin	WHO U	Insect growth regulator, unclassified
Butoxide = Piperonyl butoxide	WHO U (Piperonyl butoxide)	Synergist, unclassified
Butoxide + D-Allethrin	WHO U (PB) WHO NL (parent chemical, WHO II)	PB: as above DA: Insecticide, pyrethroid
Butralin	WHO III	Herbicide, 2, 6-Dinitroaniline
Calcium carbonate (lime): Stabilize soil acidity in aquaculture ponds	WHO NL	pH adjustment, fungicide, microbiocide, herbicide, inorganic
Calcium polysulfide (Lime-sulfur)	WHO NL	Insecticide, fungicide, inorganic
Captan	WHO U	Fu ngicide, Thiophthalimide PAN Bad Actor: Acute toxicity, carcinogen
Carbamato=Propamacarb hydrochloride	WHO NL	Fungicide, Other carbamate
Carbaryl	WHO II	Insecticide, Plant Growth Regulator, Nematicide; N-methyl carbamate PAN Bad Actor: Cholinesterase inhibitor
Carbendazim	WHO U	Fungicide, Breakdown product, Benzimidazole
Carbendazim + Propiconazole	WHO U (car) WHO II (propi)	Carbendazim: as above Propi: fungicide, azole Propi: PAN Bad Actor: Dev/Reprod Toxin
Carboxin (seed treatment)	WHO U	Fungicide, carboxamide PAN Bad Actor: dev/reprod toxin
Carboxin + Thiram	WHO U (C) WHO III (T)	C, as above T: Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Chlorfenapyr	WHO II	Insecticide, pyrazole
Chlorimuron ethyl + Metribuzin	WHO NL (CE) WHO II (M)	CE: Herbicide, sulfonylurea M: Herbicide, triazinone PAN Bad Actor: dev/reprod toxin

Chlorothalonil	WHO U	Fungicide, substituted benzene PAN Bad Actor: acute toxicity, carcinogen
Chlorsulfuron + dicamba	WHO U (Ch) WHO III (D)	Ch: as above D: herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
Chlorsulfuron + tribenuron-methyl	WHO U (Ch) WHO NL (T)	Ch: as above T: Herbicide, sulfonylurea
Chlorthal-dimethyl (DCPA)	WHO U	Herbicide, alkyl phthalate PAN Bad Actor: GW cont
Chlorthalonil + mefenoxam	WHO U (C) WHO NL (M), parent chemical, WHO III	C, as above M: Fungicide, Xylylalanine PAN Bad Actor: acute toxicity
Clethodim	WHO NL	Herbicide, cyclohexenone derivative
Clethodim	WHO NL	He rbicide, Cyclohexenone derivative
Clodinafop Propargyl	WHO NL	Plant growth regulator, Aryloxyphenoxy propionic acid
Clofentezine	WHO U	Insecticide, tetrazine
Clomazone	WHO II	Herbicide, unclassified
Clopiralid	WHO NL	Herbicide, pyridinecarboxylic acid PAN Bad Actor: acute toxicity
Cloridazon	WHO U	Herbicide, pyridazinone
Cloxacillin		Antibiotic for anti-mastitis; approval not required in a PERSUAP
Copper	WHO NL	Fungicide, inorganic-copper
Copper ammonium carbonate	WHO NL	Fungicide, inorganic copper
Copper hydroxide/ Cupric hydroxide	WHO III	Fungicide, microbiocide, nematacide, inorganic-copper
Copper octanoate=copper spray	WHO NL	Fungicide, inorganic copper
Copper oxide/Cuprous oxide	WHO II	Fungicide, insecticide, inorganic-copper
Copper oxychloride	WHO III	Fungicide, inorganic-copper
Copper oxychloride+Metalaxyl	WHO III (both)	Copper oxy: as above Meta: fungicide, Xylylalanine
Copper sulfate (basic)	WHO NL; parent chemical WHO II	Fungicide, algaecide, molluscicide, inorganic-copper
Copper sulfate (basic or pentahydrate) + lime	WHO NL; parent chemical WHO II WHO NL (L)	CS: as above L: pH adjustment, fungicide, microbiocide, inorganic
Copper sulfate basic: Cooperamino Acid Sulphate	WHO NL (basic) WHO II (parent chemical)	Fungicide, Algaecide, Molluscicide, Inorganic-copper
Cotoran=Fluometuron	WHO U	Herbicide, urea
Cyfluthrin	WHO II	Insecticide, pyrethroid
Cyfluthrin + Propoxur	WHO II (C) WHO II	C: as above P: insecticide, N-methyl carbamate PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Cyfluthrin + Tetramethrin	WHO II (C) WHO U	C: as above T: Insecticide, pyrethroid
Cymoxanil + Mancozeb	WHO III (Cy) WHO U (Manco)	Cymox: Fungicide, unclassified Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc
Cymoxanil + copper oxychloride	WHO III (Cy) WHO III (CO)	Cy: Fungicide, unclassified CO: Fungicide, inorganic-copper

Cymoxanil + famoxadone	WHO III (Cy) WHO U (F)	Cy: Fungicide, unclassified F: fungicide
Cyphenothrin + Prallethrin	WHO II (Cy) WHO II (P)	Cy: Insecticide, pyrethroid P: Insecticide, pyrethroid
Cyproconazole	WHO III	Fungicide, azole
Cyproconazole + Propiconazole	WHO III (cypro) WHO II (propi)	Cypro, as above Propi, Fungicide, azole PAN bad Actor: dev/reprod toxin
Cyprodinil/Ciprodinil	WHO NL	C: Fungicide, pyrimidine
Cyromazine	WHO U	Insecticide, triazine PAN Bad Actor: GW contam
D-Allethrin	WHO NL (parent chemical, allethrin WHO II)	Insecticide, pyrethroid
D-Allethrin + permethrin	WHO NL (D-A) WHO II (P)	D-A: as above P: insecticide, pyrethroid
D-Allethrin + piperonyl	WHO NL (D-A) WHO U (PB)	D-A: as above PB: synergist, unclassified (piperonyl butoxide)
Dazomet	WHO III	Fumigant, fungicide, nematacide
Deltamethrin	WHO II	Insecticide, pyrethroid
Deltamethrin + chlorpyriphos-methyl	WHO II (D) WHO NL (C-M) (parent chemical, WHO II)	D: as above C-M: insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Deltamethrin + fenitrothion	WHO II (D) WHO II (F)	D: as above F: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Desmedifam + fenmedifam + ethofumesate	WHO U (D) WHO U (F) WHO U (E)	D: Herbicide, bis-carbamate F: Herbicide, bis-carbamate E: Herbicide, unclassified
Dexamethasone		Injectable or oral veterinary drug, steroid: PERSUAP approval not needed
Diafethilone	WHO 1a	Rodenticide PAN Bad Actor: acute toxicity
Dicamba	WHO III	Herbicide, benzoic acid PAN Bad Actor: dev/reprod toxin
Dicamba + triasulfuron	WHO III (D) WHO U (T)	D: as above T: Herbicide, sulfonylurea
Diclofop-Methyl	WHO NL	Herbicide, Chlorophenoxy acid or ester, Aryloxyphenoxy propionic acid PAN Bad Actor: carcinogen, dev/reprod toxin
Dicofol	WHO III	Insecticide, organochlorine PAN Bad Actor: acute toxicity
Diethyl toluamide + DEET	WHO III (both)	Insecticide repellant, unclassified (both)
Difenconazole	WHO III	Fungicide, azole
Difenconazole + propiconazol	WHO III (D) WHO II (P)	D: as above P: Fungicide, azole PAN Bad Actor: dev/reprod toxin
Diflubenzuron	WHO U	Insecticide, benzoylurea
Dimethenamide-P	WHO NL	Herbicide, amide

Dimethomorph + folpet	WHO U (both)	Dimetho: Fungicide, morphaline F: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Dimethomorph + mancozeb	WHO U (both)	Dimetho: as above Manco: Fungicide, Dithiocarbamate, Inorganic-Zinc PAN Bad Actor: carcinogen, dev/reprod toxin
Dioctyl Sodium Sulfosuccinate	WHO NL	Insecticide, unclassified
Diquat dibromide	WHO NL	Herbicide, dessicant, Bipyridylium
Diuron	WHO U	Herbicide, urea PAN Bad Actor: carcinogen, GW contam, dev/reprod toxin
Doxiciclina		Antibiotic: no need for PERSUAP approval
D-tetramethrin (tetramethrin) + Permethrin + Deltamethrin	WHO U (tetra) WHO II (P) WHO II (D)	Tetra: insecticide, pyrethroid P: insecticide, pyrethroid D: insecticide, pyrethroid
Emamectin Benzoate	WHO NL	Insecticide, botanical PAN Bad Actor: acute toxicity
Enrofloxacin		Antibiotic: no need for PERSUAP approval
EPTC (+Safener for maize)	WHO II	Herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin
Esbiothrin	WHO NL (parent chemical, WHO II)	Insecticide, pyrethroid
Esfenvalerate	WHO II	Insecticide, pyrethroid
Etofenprox	WHO U	Insecticide PAN Bad Actor: carcinogen
Etoxazole	WHO NL	Insecticide, unclassified
Famoxadime + cymoxanil	WHO U (F) WHO III (cymox)	Famoxadone: Fungicide, unclassified Cymox: Fungicide, unclassified
Febantel + Pyrantel emboate + Praziquantel-de wormer (drontal)		Febantel=drontal, etc. de-wormer; no PERSUAP approval needed
Febantel + Pyrantel Pamoate (Para Tak: endoparasites)		Same as above
Fenamidon + fosetyl-Al	WHO NL WHO NL (parent chemical, WHO U)	Fe: Fungicide F-A: Fungicide, unclassified PAN Bad Actor: acute toxicity
Fenarimol	WHO U	Fungicide, pyrimidine
Fenbutatin oxide	WHO U	Insecticide, organotin, heavy metal PAN Bad Actor: acute toxicity, dev/reprod toxin
Fenetrazole =tebuconazole+ Terbutrazole=tebuconazole + triadimenol	WHO III (All)	All: fungicide, azole
Fenhexamid	WHO U	Fungicide, anilide
Fenitrothion	WHO II	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Fenitrothion + deltamethrin	WHO II (both)	F: as above D: Insecticide, pyrethroid
Fenitrothion + permethrin	WHO II (both)	F and P: Insecticide, pyrethroid
Fenitrothion + permethrin + tetramethrin	WHO II (F, P) WHO U (T)	All: insecticide, pyrethroid
Fenoxaprop-P-ethyl	WHO NL	Herbicide, Aryloxyphenoxy propionic acid

Fenoxicarb	WHO U	Insecticide, insect growth regulator, other carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor, dev/reprod toxin
Fenpropathrin	WHO II	Insecticide, pyrethroid PAN Bad Actor: acute toxicity
Fenpyroximate	WHO NL	Insecticide, unclassified
Fenvalerate	WHO II	Insecticide, pyrethroid
Fenvelerate + fenitrothion	Both are WHO II	Fen: as above Fenitroth: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Fipronil	WHO II	Insecticide, pyrazole
Fipronil Methoprene	WHO II (F) WHO U	F: as above M: insect growth regulator
Florfenicol		Antibiotic: PERSUAP approval not needed
Fluazifop-P-butyl	WHO III	Herbicide, Aryloxyphenoxy propionic acid
Fluazifop-R-methyl (see above; only registered as fluazifop-p-butyl)		
Flubendiamide	WHO NL	Insecticide, unclassified
Flubendiamide + spirotetramat	WHO NL (Fl) WHO NL (S)	FL: as above Sp: Insecticide, keto-enol
Fludioxonil + Metalaxyl M	WHO NL (F) WHO NL; parent chemical, WHO III (M)	Flud: fungicide, unclassified Meta M: fungicide, Xylylalanine PAN Bad Actor: acute toxicity
Flufenacet	WHO III	Herbicide, anilide
Flumetralin	WHO U	Plant growth regulator, 2, 6-dinotroaniline
Flumetralin + butralin	WHO U (F) WHO III (B)	F: as above B: herbicide, 2, 6-dinotroaniline
Flunixin		NSAID: PERSUAP approval not needed
Fluomethuron	WHO U	Herbicide, urea
Fluomethuron + prometryn (also below as P + F)	WHO U (F) WHO U (P)	Fl: as above P: herbicide, triazine PAN Bad Actor: dev/reprod toxin
Fluometuron	WHO U	Herbicide, urea
Flurasulam + flumetsulam	WHO U (both)	Flur: Herbicide, triazolopyrimidine Flum: Herbicide, triazolopyrimidine
Fluroxypyr + Clopyralid + MCPA	WHO U (F) WHO NL (C) WHO III (MCPA)	Fl: Herbicide, Pyridinecarboxylic acid Cl: Herbicide, Pyridinecarboxylic acid PAN Bad Actor: acute toxicity MCPA: Herbicide, Chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
Folpet	WHO U	Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Folpet + triadimenol	WHO U WHO III (T)	Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen T: fungicide breakdown product, Azole
Fosetyl-aluminum	WHO NL (parent chemical, WHO U)	Fungicide, unclassified PAN Bad Actor: acute toxicity

Fosetyl-aluminum + fluopicolid	WHO NL (F-A) (parent chemical, WHO U) WHO NL	F-A: as above F: fungicide
Fosetyl-aluminum + folpet	WHO NL (F-A) (parent chemical, WHO U) WHO U (F)	F-A: as above Fol: Fungicide, Thiophthalimide PAN Bad Actor: Carcinogen
Fosfomicina (fosfomicyn)		Antibiotic, injectable, oral veterinary drug: PERSUAP approval not needed
Fosthiazate	WHO NL	Nematicide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Furfural	WHO NL	Fumigant
Gamma cyhalothrin	WHO NL (parent chemical, WHO II)	Insecticide, pyrethroid
Garlic extracts	WHO NL	Insecticide, botanical
Gibberellic acid	WHO U	Plant growth regulator, botanical
Gibberellin	WHO U	Plant growth regulator, botanical
Glufosinate Ammonium	WHO NL	Herbicide, unclassified
Glyphosate	WHO U	Herbicide, phosphonoglycine
Hexaflumuron	WHO U	Insecticide, benzoylurea
Hexazinone	WHO III	Herbicide, triazinone PAN Bad Actor: acute toxicity, GW contam
Hexythiazox =Hexitiazox	WHO U	Insect growth regulator, unclassified
Hydramethylnon	WHO III	Insecticide PAN Bad Actor: dev/reprod toxin
Hymexazol	WHO U	Fiungicide, unclassified PAN Bad Actor: acute toxicity
Imamectin benzoate=emamectin benzoate	WHO NL	Insecticide, botanical PAN Bad Actor: acute toxicity
Imazamox	WHO NL	Herbicide, imidaaolinone
Imazapic: ammonium salt	WHO NL	Herbicide, imadazolinone
Imazapyr	WHO U	Herbicide, imadazolinone PAN Bad Actor: acute toxicity
Imazapyr + imazamox	WHO U (imazapyr) WHO NL (imazamox)	I and I: as above
Imazetapir= Imazethapyr	WHO U	Herbicide, plant growth regulator, imadazoline
Imidacloprid	WHO II	Insecticide, neonicotinoid
Imidacloprid + metalaxyl + carbendazim	WHO II (I) WHO III (M) WHO U (C)	Im: as above M: fungicide, xylylalanine C: fungicide, breakdown product, benzimidamole
Imidacloprid + thiram	WHO II (Imi) WHO III (Th)	Im: as above Th: fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Imidacloprid + triadimenol	WHO II (imida) WHO III (tria)	Im: as above Tria: fungicide breakdown product, Azole
Imidazolinone=imazapic, ammonium salt	WHO NL	Herbicide, imadazolinone
Imidocarb (Disodium cyanodithioimido carbonate)	WHO NL	Microcode, unclassified PAN Bad Actor: dev/reprod toxin
Imiprothrin + cyfluthrin	WHO NL (I) WHO II (C)	I: Insecticide, pyrethroid C: Insecticide, pyrethroid
Imiprothrin + d-phenothrin	WHO NL (I)	I: as above

Imiprothrin + phenothrin	WHO (I)	I: as above
Indoxacarb	WHO NL	Insecticide, unclassified
Iprodione	WHO U	Fungicide, dicraboximide PAN Bad Actor: carcinogen
Isopropyl amine glyphosate	WHO NL (WHO U, parent chemical)	Herbicide, phosphonoglycine
Isoxaflutole	WHO NL	Herbicide PAN Bad Actor: carcinogen
Isoxaflutole + aclonifen	WHO NL (I) WHO U (A)	Iso: Herbicide, unclassified PAN Bad Actor: carcinogen Ac: Herbicide, diphenyl ether
Ivermectin		Injectable or tablet anti-parasite: approval in PERSUAP not needed
Ivomectin		Same as above
Ketoprofeno		Anti-inflammatory drug: approval in PERSUAP not needed
Kresoxim-methyl	WHO NL	Fungicide, strobin PAN Bad Actor: carcinogen
Kresoxim-methyl + boscalid	WHO NL (K-M) WHO NL (B)	K-M: as above B: fungicide, anilide
Lambda cyhalothrin	WHO II	LC: insecticide, pyrethroid
Lambda cyhalothrin + acetamiprid	WHO II (LC) WHO NL (A)	LC: as above A: Insecticide, neonicotinoid
Lambda cyhalothrin + Imidacloprid	WHO II (LC) WHO II (I)	LC: as above I: Insecticide, neonicotinoid
Lambda cyhalothrin + profenofos	WHO II (LC) WHO II (P)	LC: as above Prof: Insecticide, oganophosphorous PAN Bad Actor: cholinesterase inhibitor
Lambda cyhalothrin + Thiamethoxam	WHO II (LC) WHO NL (Th)	LC: as above Th: fungicide, insecticide
Lambda cyhalothrin + chlorpyriphos-methyl	WHO II (LC) WHO U (C-M) parent chemical, WHO II	LC: as above C-M: insecticide, organophosporous PAN Bad Actor:
Lamda cyhalothrin + chlorpyriphos	WHO II (LC) WHO II (Ch)	LC: as above Ch: Insecticide, nematicide; organophosphorous PAN Bad Actor: cholinesterase inhibitor
Linuron	WHO U	Herbicide, urea PAN Bad Actor: deve/reprod toxin
Lufenuron	WHO NL	Insecticide, benzoylurea
Mancozeb	WHO U	Fungicide, Dithiocarbamate, Inorganic-Zinc
Mancozeb + Cymoxanil (also listed above as cymoxanil + mancozeb)	WHO U (Manco) WHO III (Cymox)	Mancozeb: as above Cymox: Fungicide, unclassified
Mancozeb + Dimethomorph	WHO U (both)	Mancozeb: as above Di: Dimetho: Fungicide, morphaline
Mancozeb + copper hydroxide	WHO U (M) WHO III (CH)	Mancozeb: as above CH: Fungicide, microbiocide, nematacide, inorganic-copper
Mancozeb + mefenoxam	WHO U (Ma) WHO NL (Me)	Mancozeb: as above Mef: fungicide, xylylalanine PAN Bad Actor: acute toxicity
Mancozeb + zoxium=zoxamide	WHO U (Ma) WHO NL	Ma: as above Z: fungicide
Mancozeb+Metalaxyl	WHO U (Ma) WHO U (Me)	Mancozeb: as above Met: fungicide, xylylalanine

Maneb	WHO U	Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin, carcinogen
MCPA	WHO III	Herbicide, chlorophenoxy acid or ester PAN Bad Actor: acute toxicity
MCPA + Bromoxynil octanoate	WHO III (MCPA) WHO NL (parent chemical, WHO II)	MCPA: as above BO: herbicide, hydroxybenzonitrile PAN Bad Actor: dev/reprod toxin
Mefenoxam + chlorothalonil	WHO NL (M) WHO U (C)	Me: fungicide, xylylalanine PAN Bad Actor Ch: Fungicide, substituted benzene PAN Bad Actor: Acute toxicity, carcinogen
Metalaxyl	WHO III	Fungicide, xylylalanine
Metalaxyl + Mono & Di-Potassium salts of phosphonic acid=fosetyl-al?	WHO II (Met) WHO NL (F-A) (parent chemical, WHO U)	Met: fungicide, xylylalanine F-A: Fungicide, unclassified PAN Bad Actor: acute toxicity
Metam Sodium	WHO II	Fumigant, Herbicide, Fungicide, Microbiocide, Algaecide, dithiocarbamate PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin
Metconazole	WHO III	Fungicide, azole
Metham sodium	WHO II	Fumigant, fungicide, herbicide, microbiocide, algaecide; dithiocarbamate PAN Bad Actor: acute toxicity, carcinogen, dev/reprod toxin
Metiram	WHO U	Fungicide, dithiocarbamate, inorganic zinc PAN Bad Actor: carcinogen, dev/reprod toxin
Metiram + copper hydroxide	WHO U (M) WHO III (CH)	M: as above CH: Fungicide, microbiocide, nematacide, inorganic-copper
Metiram + pyraclostrobin	WHO U (M) WHO NL (P)	M: as above P: fungicide, strobin
Metofluthrin	WHO NL	Insecticide, pyrethroid PAN Bad Actor: carcinogen
Metolachlor	WHO III	Herbicide, Chloroacetanilide PAN Bad Actor: GW cont
Metribuzin	WHO II	Herbicide, triazinone PAN Bad Actor: dev/reprod toxin
Metribuzin + chlorimuron ethyl	WHO II (M) WHO NL (C)	M: as above C: herbicide, sulfonylurea
Metribuzon + Paraquat	WHO II (both)	M: Herbicide, triazinone PAN Bad Actor: dev/reprod toxin P: Herbicide, bypiridylium PAN Bad Actor: acute toxicity
Metsulfuron methyl	WHO U	Herbicide, sulfonylurea
Miclobutanil	WHO III	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Miclobutanil + quinoxifen	WHO III (M) WHO U (Q)	M: as above Q: fungicide, quinoline
Milbemectin	WHO NL	Insecticide, antibiotic
Mineral oil	WHO NL	Insecticide, adjuvant, petroleum derivative PAN Bad Actor: carcinogen
Molinate	WHO II	Herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor, dev/reprod toxin

Mono-potassium and dipotassium phosphonates phosphonic acid		See Fosetyl-al
MSMA	WHO NL (parent chemical, WHO III)	Herbicide, defoliant, organoarsenic, heavy metal PAN Bad Actor: carcinogen
N,N-diethyl-m-toluamide=DEET	WHO III	Insecticide repellant, unclassified
Neem Oil, Neem extract	WHO NL	Insecticide, botanical
Neo-pynamin=tetramethrin		Insecticide, botanical
Nicosulfuron	WHO U	Herbicide, sulfonylurea
Nicosulfuron + rimsulfuron	WHO U (N) WHO U (R)	N: as above R: herbicide, sulfonylurea
Nicosulfuron + thifensulfuron-methyl	WHO U (N) WHO U (T)	N: as above T: herbicide, sulfonylurea
Novaluron	WHO NL	Herbicide, benzoylurea
Orthene=Acephate	WHO III	Insecticide, organophosphate PAN Bad Actor: cholinesterase inhibitor
Oxadiargyl	WHO NL	Herbicide, unclassified
Oxadiazon	WHO U	Herbicide, unclassified PAN Bad Actor: carcinogen, dev/reprod toxin
Oxadiazon + Propanil	WHO U (O) WHO III (P)	O: as above P: Herbicide, anilide
Oxyfluorfen	WHO U	Herbicide, diphenyl ether
Paecilomyces lilacinus	WHO NL	Insecticide, microbial
Pendimethalin (pentimetalin)	WHO III	Herbicide, 2,6-Dinitroaniline
Penoxsulam	WHO U	Herbicide, triazolopyrimidine
Permethrin	WHO II	Insecticide, pyrethroid
Permethrin + Bioallethrin	WHO II (P) WHO II (B)	P: as above B: insecticide, pyrethroid
Permethrin + Pirimiphos methyl	WHO II (P) WHO III (Pi)	P: as above PI: insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Petroleum oil	WHO NL	Insecticide, herbicide, fungicide, adjuvant; petroleum derivative
Phosmet	WHO II	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Picloram	WHO U	Herbicide, Pyridinecarboxylic acid PAN Bad Actor: GW cont
PIKS	WHO NL	Herbicide, sulfonylurea
Pinoxaden	WHO NL	Herbicide
Piridaben	WHO III	Insecticide, unclassified
Pirimetanil + trifloxtstrobin	WHO U (P) WHO NL (T)	P: fungicide, pyrimidine T: fungicide, strobin
Pirimicarb	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor
Policarbacine (see Metalaxyl)		
Polyaxin = polymyxin		An antibiotic, oral injectable veterinary drug; No PERSUAP needed
Polyethylene wax=polyethylene glycol	WHO NL	Adjuvant, soap/surfactant, polyalkyloxy compound
Prallethrin	WHO II	Insecticide, pyrethroid
Prallethrin + D-Phenothrin	WHO II (P) WHO U (D-P)	P: as above D-P: insecticide, pyrethroid
Praziquantel		De-wormer, internal: No PERSUAP approval needed

Profenofos	WHO II	Insecticide, oganophosphorous PAN Bad Actor: cholinesterase inhibitor
Profenofos + Lambda cyhalothrin	WHO II (P) WHO II (LC)	P: as above LC: insecticide, pyrethroid
Prometryn	WHO U	Herbicide, triazine PAN Bad Actor: dev/reprod toxin
Prometryn + fluometuron + glyphosate	WHO U (all)	P: as above F: herbicide, urea G: Herbicide, phosphonoglycine
Prometryn + s-metolachlor	WHO U (P) WHO NL (S-M); parent chemical: WHO III	P: as above S-met: herbicide, chloroacetanilide PAN Bad Actor: GW cont.
Propanil	WHO III	Herbicide, analide
Propanil + thiobencarb	WHO III (P) WHO II (T)	P: as above Thio: herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor
Propargite	WHO III	Insecticide, unclassified
Propiconazole	WHO II	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Propoxur	WHO II	Insecticide, N-methyl carbamate PAN Bad Actor: acute toxicity, carcinogen, cholinesterase inhibitor
Propuxur + Cyfluthrin	WHO II (P) WHO II (C)	P: as above C: Insecticide, pyrethroid
Propoxycarbazone-Sodium	WHO NL	Herbicide, unclassified
Pyraclostrobin + Boscalid	WHO NL (both)	Pyra: fungicide, strobin Bosc: Fungicide, analide
Pyrethrin + Permethrin	WHO NL (Py)	Py: as above Per: as above
Pyrethrins + piperonyl (piperonyl butoxide)	WHO NL (Py) WHO U (Pi)	Py: as above Pi: synergist, unclassified
Pyriproxyfen	WHO U	Insecticide, unclassified
Quinoxifen	WHO U	Fungicide, quinoline
Quizalofop-P-ethyl	WHO NL (parent chemical, WHO II)	Herbicide, aryloxyphenoxypropionic acid
Rimsulfuron	WHO U	Herbicide, sulfonylurea
Rimsulfuron + thifensulfuron-methyl	WHO U (R) WHO U (T)	F: as above T: herbicide, sulfonylurea
Sethoxydim	WHO III	Herbicide, cyclohexanone derivative
Sevin=see carbaryl		
Simazine	WHO U	Herbicide, Triazine PAN Bad Actor: GW cont., dev/reprod toxin
S-Metolachlor	WHO NL (parent chemical, WHO III)	Herbicide, chloroacetanilide PAN Bad Actor: GW cont.
Sodium borate	WHO U	Insecticide, herbicide, inorganic
Spinosad	WHO U	Insecticide, microbial
Spinosyn A and D=spinosad	WHO U	Insecticide, microbial
Spiromesifen	WHO NL	Insecticide, Keto-enol
Spiroxamine	WHO II	Fungicide, unclassified
Sprioxamine + tebuconazole + triadimenol	WHO II (S) WHO III (T) WHO III (Tr)	S: as above T: Fungicide, azole Tr: Fungicide breakdown product, Azole

Sulfosulfuron	WHO NL	Herbicide, sulfonylurea PAN Bad Actor: carcinogen
Sulfur	WHO U	Fungicide, insecticide, inorganic
Tabamex EC=Butraline	WHO III	Herbicide, 2, 6-dinitroaniline
Tau-fluvalinate	WHO U	Insecticide, pyrethroid PAN Bad Actor: dev/reprod toxin
Tebuconazole	WHO III	Fungicide, azole
Tebuconazole + Triadimenol	WHO III (both)	Teb: as above Triad: Fungicide, breakdown product
Tebuconazole + trifloxistrobin	WHO III (T) WHO NL (Tr)	Teb: as above Tr: Fungicide, strobin
Tebupenpirat=Tebufenpyrad	WHO III	Insecticide, pyrazole
Tebuthiuron	WHO III	Herbicide, urea PAN Bad Actor: dev/reprod toxin
Temephos	WHO U	Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Tepraloxidim	WHO NL	Herbicide, Cyclohexenone derivative
Terbuthylazine +Mesotrione + S-Metolachlor	WHO U (T) WHO NL WHO NL (parent chemical, WHO III)	Ter: Algaecide, herbicide, microbicide, Triazine Mes: Herbicide, unclassified S-Meto: Heribicide, Chloroacetanilide PAN Bad Actor: GW cont.
Tetraconazole	WHO II	Fungicide, azole PAN Bad Actor: carcinogen
Tetramethrin	WHO U	Insecticide, pyrethroid
Tetramethrin + D-Phenothrin=Phenathrin + D-Allethrin	WHO U (T, Ph) WHO NL (D-A) (parent chemical, WHO II)	T: as above Ph: insecticide, pyrethroid D-A: insecticide, pyrethroid
Tetramethrin + Fenitrothion	WHO U (T) WHO II (F)	T: as above F: Insecticide, organophosphorous PAN Bad Actor: cholinesterase inhibitor
Tetramethrin + Permethrin + Fenitrothion	WHO U (T) WHO II (P) WHO II (F)	T: as above P: insecticide, pyrethroid F: as above
Thiabendazole	WHO U	fungicide, benzimidazole PAN Bad Actor: dev/reprod toxin
Thiacloprid	WHO II	Insecticide, neonicotinoid PAN Bad Actor: carcinogen
Thiacloprid + betacyfluthrin	WHO II (Th) WHO II (Beta)	Th: as above Beta: insecticide, pyrethroid
Thiacloprid + deltamethrin	WHO II (Th) WHO II (D)	Th: as above D: insecticide, pyrethroid
Thiamethoxam + Metalaxyl –M + Difenoconazole	WHO NL (thia) WHO NL (Meta) (parent chemical, WHO III) WHO III (Di)	Thia: as above Meta-M: Fungicide, xylylaline PAN Bad Actor: acute toxicity Difen: frungicide, azole
Thiamethoxan	WHO NL	Fungicide, insecticide, unclassified
Thifensulfuron-methyl	WHO U	Herbicide, sulfonylurea
Thiobencarb + Prometryn	WHO II (Th) WHO U (P)	Th: herbicide, thiocarbamate PAN Bad Actor: cholinesterase inhibitor P: Herbicide, triazine PAN Bad Actor: dev/reprod toxin

Thiodicarb	WHO II	Molluscicide, insecticide, N-methyl carbamate PAN Bad Actor: carcinogen, cholinesterase inhibitor
Thiophanate methyl	WHO U	Fungicide, benzimidazole precursor PAN Bad Actor: carcinogen, dev/reprod toxin
Thiophanate methyl + Maneb	WHO U (Tm) WHO U (M)	Tm: as above Fungicide, dithiocarbamate PAN Bad Actor: carcinogen, dev/reprod toxin
Thiram	WHO III	Fungicide, dithiocarbamate PAN Bad Actor: dev/reprod toxin
Thiram + Carboxin	WHO III (Th) WHO U (Car)	Th: as abov Car: fungicide, carboximide PAN Bad Actor: dev/reprod toxin
Tidiazuron + diuron (Tidiazuron = Thidiazuron)	WHO U (Th) WHO U (D)	Th: Defoliant, plant growth regulator; urea D: Herbicide, urea PAN Bad Actor: carcinogen, GW contam, dev/reprod toxin
Toltrazuril		Oral veterinary drug for parasites: no approval needed in PERSUAP
Tralomethrin	WHO II	Insecticide, pyrethroid
Triadimefon	WHO III	Fungicide, azole PAN Bad Actor: dev/reprod toxin
Triadimenol	WHO III	Fungicide breakdown product, Azole
Tribenuron-methyl	WHO NL	Herbicide, sulfonylurea
Trichlorfon	WHO II	Insecticide, organophosphorous PAN Bad Actor: carcinogen
Trichoderma harzianum	WHO NL	Fungicide, microbial
Triclopyr	WHO III	Herbicide, chloropyridinyl
Triclopyr Paraquat	WHO III (T) WHO II (P)	T: as above P: Herbicide, bypiridylium PAN Bad Actor: acute toxicity
Trifloxystrobin	WHO NL	Fungicide, strobin
Trifloxysulfuron Sodium + Ametryn	WHO NL (T) WHO III (A)	Tri: Herbicide, sulfonylurea Am: Herbicide, triazine
Triflumizole	WHO III	Fungicide, azole
Trifluralin	WHO U	Herbicide, dinitroaniline
Triflusulfuron-methyl	WHO U	Herbicide, sufonylurea
Triforine	WHO U	Fungicide, insecticide, unclassified PAN Bad Actor: dev/reprod toxin
Triphanante-methyl = Thiophanate methyl, see above		
Triticonazole	WHO U	Fungicide, azole
Vinclozolin		Fungicide, dicarboximide PAN Bad Actor: carcinogen, dev/reprod toxin
Zinc max (zinc)	WHO NL	Herbicide, inorganic-zinc PAN Bad Actor: dev/reprod toxin
Zinc oxide	WHO NL	Fungicide, adjuvant, inorganic-zinc PAN Bad Actor: dev/reprod toxin

Note:

iii. No PERSUAP approval needed for oral or injectible veterinary drugs such as anti-parasitics and antibiotics.

iv. NR: not registered; PANNA: Pesticide Action Network North America

SUAP Attachment B: Guide to minimizing the impacts of pesticides to human health

Attachment contains:
(1) General guidance on mitigating potential pesticide dangers
(2) Mitigation of human toxicological exposures
(3) Protective clothing guide

FTF volunteers who assist in the use or procurement of pesticides shall ensure that this assistance is provided concurrent with guidance on mitigating the potential dangers of pesticides on human health. The following guidance is general and is meant to prepare a volunteer for issues s/he may find once s/he goes to the field and to trigger ideas for solutions. The measures below can be –and should be—adapted to the local situation. Assistance for the use or procurement of pesticides must be provided within the context of an overall IPM approach.

(1) General Guidance on Mitigating Potential Pesticide Dangers

Measures to ensure safe transport, mixing, use, storage, and disposal
If there are no feasible alternatives to pesticides, take the following measures to mitigate and reduce the risks to human health and the environment. Note that risk is a function of both toxicity and exposure. Reducing risk means (1) selecting less toxic pesticides and (2) selecting pesticides that will lead to the least human exposure before, during, and after use. The key is to ***reduce exposure time or the degree of exposure.***

Before use

Transport:
- Separate pesticides from other materials being transported.
- Ensure no spillage during transport.

Packaging:
- Follow international and national norms and guidelines.
- Use packaging (i.e. small containers) adapted to local needs, and always retain the label.
- Eliminate re-use of packaging materials.

Storing:
- Develop strict guidelines for village-level storage.
- Ensure permanent, well-marked labeling.
- Follow and respect national norms.
- Use appropriate language and approved pictograms.
- Keep all pesticide containers, mixed pesticide, sprayed pesticide, pesticide sprayers, and empty pesticide containers away from children. Ensure safe storage—in a clean dry location *away from children.* Use a well-recognized "danger" symbol to warn people away from areas where pesticides are stored.

Formulating:
- Use appropriate type and concentration
- Only re-use containers to mix pesticides and do not re-use without first cleaning in accordance with safe practices

During use

Training:

- Should be continuous
- Should identify level and audiences (distributors, farmers, transporters, etc.)

Application equipment:

- Should be adapted to user needs and possibilities
- Should assure maintenance and availability of parts and service

Use protective equipment and clothing:

- Should be adapted to local climatic conditions
- Should be adapted to user needs and resource possibilities
- Should eliminate exposure rather than just reduce it, if at all possible

After use

- Know, enforce, respect, and provide training on exclusion or reentry periods after application.
- Assure proper cleaning and rinsing off of:
  - Applicators' preparation and application equipment
  - Applicators' clothing
  - Storage containers
- Train on safe practices in washing and storing pesticide application equipment, containers, and leftover pesticides.
- Assure proper disposal of pesticide containers.
- Develop a workable monitoring and evaluation system for:
  - Health effects on applicators, the local population, and domestic animals
  - Efficacy on target pests
  - Adherence to national and international policies regarding pest management and pesticides
  - Impacts on environment: water, soils, etc.
  - Elimination of pesticide leftovers and containers

Focus on providing protective "buffer zones" around the following:

- Housing
- Environment: water, sensitive areas

(2) Mitigation of Human Toxicological Exposures (as revised from the AgVANTAGE PERSUAP, USAID/Georgia)

Most pesticide poisonings result from careless handling practices or from a lack of knowledge regarding the safe handling of pesticides. The time spent learning about safer procedures and how to use them is an investment in the health and safety of oneself, one's family, and others. Pesticides can enter the body in four major ways: through the skin, the mouth, the nose, and the eyes. A checklist is given below to help avoid these various routes of overexposure to pesticides.

To avoid dermal (skin) exposure

- Check the label for special instructions or warnings regarding dermal exposure.
- Use recommended protective clothing and other equipment as listed on the label.
- Do not re-enter the area until deposit has dried or re-entry interval is past.

To avoid oral (mouth) exposure

- Check the label for special instructions or warnings regarding oral exposure.
- Never eat, drink, or smoke, chew tobacco while working with any pesticide.
- Wash thoroughly with soap and water before eating, drinking, smoking, or chewing tobacco.
- Do not touch lips to contaminated objects (such as nozzles).
- Do not wipe mouth with contaminated hands or clothing.
- Do not expose food, beverages, drinking vessels, or cigarettes to pesticides.
- Wear a face shield when handling concentrated pesticides.

To avoid respiratory (lungs) exposure

- Read the label to find out if respiratory protection is required.
- If respiratory protection is required, use only an approved respiratory device.
- Stay upwind during application.

To avoid eye exposure

- Read the label to find out if eye protection is required.
- If eye protection is required use goggles to protect eyes or a face shield to protect eyes and face.
- Keep pesticide container below eye level when pouring.

(3) Protective Clothing Guide

In addition to the common sense measures above, use of the prescribed protective gear will also help ensure against exposure to pesticides. If a pesticide product is US EPA registered, specific protective gear will be described on the label for each pesticide by EPA toxicity class I, II, III, or IV, with signal word DANGER, WARNING, CAUTION. If the pesticide product is not EPA registered, the label will carry instructions, as required by the regulating authority, regarding safety gear requirements. If the label is missing or the pesticide product was repackaged and no label was provided, an FTF volunteer can identify a similar product and the protective gear required for that. However, purchase of pesticide product that is re-packaged and unlabelled should be strongly discouraged.

The following guide for protective clothing is helpful, but keep in mind that if a product is unlabelled or if it is not EPA registered, it will not have EPA toxicity classes, and a proxy is needed. An FTF volunteer can check on similar products that are EPA registered, and identify the protective gear required. Better to be on the safe side and encourage the use of available protective gear—it is unlikely, as most FTF country programs stated in the submissions for this PERSUAP, that extensive protective gear will be available and accessible to most farmers. An FTF volunteer may need to be innovative in identifying appropriate, acceptable, alternative safety gear.

Protective Clothing and Equipment Guide

	Label Signal Words		
Formulations	Caution	Warning	Danger
Dry	Long-legged trousers and long -sleeved shirt; shoes and socks.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves; cartridge or canister respirator if dusts in air or if label precautionary statement says *Poisonous or fatal if inhaled*.
Liquid	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; rubber gloves. Goggles if required by label precautionary statement. Cartridge or canister respirator if label precautionary statement says: *Do not breathe vapors or spray mists,* or *Poisonous if inhaled*.	Long-legged trousers and long-sleeved shirt; rubber boots, wide-brimmed hat; rubber gloves, goggles or face shield. Canister respirator if label precautionary statement says: *Do not breathe vapors or spray mists,* or *Poisonous if inhaled*.
Liquid (when mixing)	Long-legged trousers; long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves; rubber apron.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; rubber gloves; goggles; or face shield; rubber apron. Respirator if label precautionary statement says: *Do not breathe vapors or spray mist,* or *Poisonous (or fatal or harmful) if inhaled*.	Long-legged trousers and long-sleeved shirt, rubber boots, wide-brimmed hat, rubber gloves, goggles or face shield. Canister respirator if label precautionary statement says: *Do not breathe vapors or spray mists*, or *Poisonous if inhaled*.
Liquid (when mixing the most toxic concentrates)	Long-legged trousers; long-sleeved shirt; boots, rubber gloves, water proof wide-brimmed hat.	Water repellant, long-legged trousers and long-sleeved shirt, rubber boots; rubber gloves; rubber apron; water-proof wide-brimmed hat, face shield, cartridge or canister respirator	Water-proof suit, rubber gloves, water-proof hood or wide-brimmed hat.

SUAP Attachment C: Guide to minimizing impacts of pesticides on the environment

Attachment contains:
(1) Mitigation measures to minimize impacts on protected areas
(2) Mitigation measures to minimize impacts on non-target ecosystems and organisms
(3) General information and recommendations to mitigate impacts on wildlife
(3) Safety precautions to protect bees and other pollinators
(4) Safety precautions to mitigate impacts on groundwater resources

(1) Mitigation Measures to Minimize Impacts on Protected Areas (national parks, forests, wildlife reserves, etc):

To mitigate any potential impacts to protected areas (PAs), FTF volunteers must have information on hand about the PAs' location in relation to agricultural fields of interest, sensitive ecosystems/habitats and wildlife, important water bodies and wetlands, and climate and soil information. To anticipate protected-area-related pesticide issues that may arise in the field, FTF volunteers can take the following step, as appropriate, prior to going out in the field:

- Identify national parks, forests, other protected areas, important waterways (including drinking and washing water sources), and habitat of threatened/endangered species in volunteer's work area.
- Link with local environmental authorities (e.g., District Environmental Officers) and environmental NGOs, who may be aware of important ecological features and safeguards that should be taken to minimize environmental impacts of pesticide use.
- Solicit the assistance of an environmental NGO to partner with on field visits

In conjunction with the provision of assistance for the use or procurement of pesticides, FTF volunteers should provide information on mitigation measures, such as the following, to minimize environmental impacts which may be adapted to environmental specifics and the availability of appropriate safeguards:

- A minimum distance of 100 meter buffer area should be allowed between agricultural fields that are sprayed and any protected areas to minimize impact from pesticide spray drift.
- Pesticides should not be used in areas where the water table is in within three meters of the surface.
- Crops that require pesticide treatment should not be planted within 100 meters of bodies of water or wetland areas.
- Pesticides should not be applied in areas adjacent to protected areas unless precautions are taken to ensure that habitat and wildlife (including birds, fish, and other organisms) will not be affected.
- Construct erosion barriers to prevent runoff of soil from agricultural fields into waterways and wetland areas.
- When washing sprayers and disposing of pesticides, measures must be taken to protect waterways, wetlands, and drinking water sources for humans and wildlife. Safe areas for washing and disposing of remaining pesticides should be delineated or created.

(2) Mitigation Measures to Minimize Impacts on Non-target Ecosystems and Organisms

FTF volunteers should provide information on safety precautions to minimize effects of pesticides on non-target ecosystems and organisms in conjunction with the provision of assistance for the use or procurement of pesticides. The information in this section is for use by FTF volunteers and can be used in training and technical assistance, as appropriate. It has been adapted from http://edis.ifas.ufl.edu/PI122 (University of Florida Extension), and focuses on the effects of pesticides

on non-target ecosystems and organisms and measures to mitigate impacts.

Soil Microorganisms

Soil organisms are responsible for contributing to the decomposition of dead animal and plant material into organic matter, an important component of our soil fraction. Others are involved in the natural control of soil pests. Aside from their direct effects on pest organisms, soil microbes are a major agent in degrading pesticides. The breakdown of pesticides is beneficial for crop rotation and food residue concerns, and provides herbicide selectivity in some instances. The value of certain soil bacteria that have a symbiotic relationship with leguminous plants in fixing nitrogen translates into reduced synthetic nitrogen fertilizer inputs and increased crop yields. Fortunately, the effect of soil-applied pesticides is short-lived; in fact, in some instances they may enhance the population of certain soil microorganisms.

Fish and Wildlife

The most obvious effects of pesticides on fish and other wildlife are direct effects of acute poisoning. At times, pesticides are solely blamed for fish kills; however, in many cases, indirect effects of pesticides that cause dissolved oxygen depletion are the reason for the kill. Pesticides can enter water sources through drift, runoff, soil erosion, leaching, and occasionally, accidental or deliberate release. The table below lists pesticides which are classified as very highly- or highly-toxic to fish. These pesticides, ranging in concentrations of less than 0.1 to 1.0 ppm, can kill fish.

Pesticides can kill birds in several ways: direct ingestion of granules, baits, or treated seeds and direct exposure from sprays; and indirect kills may result from consumption of treated crops, contaminated water, or feeding on contaminated prey. Birds and other wildlife can be poisoned when baits, such as those targeting rodents, are improperly placed or not recovered in a timely fashion. Pellet and granular-formulated pesticides may be mistaken for food and consumed by birds and other wildlife. The table below lists pesticides that are classified as very highly- and highly-toxic to birds. These pesticides have bird acute oral LD_{50} values ranging from less than 10 to 50 mg/kg of body weight. Some pesticides have been associated with negative effects on the reproductive potential of certain wildlife.

Certain practices can minimize harmful effects of pesticides on fish and wildlife:

- When given a choice of pesticides to control a certain pest, choose one that is relatively non-toxic towards fish and wildlife.
- Pesticide products, with intact labels, should have an “Environmental Hazards” section. This section lists special precautions and measures that should be taken to minimize harmful effects.
- Treat only the areas needing treatment.
- Leave a buffer zone between bodies of water and treated areas.
- If wildlife is present in a certain area, use precaution with placement of baits.

Plants and Phytotoxicity

Phytotoxicity refers to plant injury. Of all pesticide types as a group, herbicides are considered to have the greatest potential for causing phytotoxicity, since they are designed to control unwanted vegetation. Inert ingredients in pesticide formulations may also be capable of causing phytotoxicity.

There are many species of plants in natural and undeveloped areas that are desirable because they protect the watershed by reducing erosion and runoff; they provide food and cover for wildlife, and are part of an ecosystem's balance. A disruption of this balance may increase the likelihood of undesirable vegetation becoming more prevalent. There are situations where desirable plants are injured because of one or more of the following reasons:

- Excessive application rate
- Inadequate mixing and agitation
- Environmental conditions, such as extreme temperatures and humidity at the time of application
- Plants which are under stress from lack of water and/or nutrients

Positive confirmation of phytotoxicity caused by pesticides can be difficult. Keeping accurate application records can assist in trying to determine if a pesticide is responsible for the suspected injury. Even with accurate records, pesticide injury can easily be confused with environmental disorders.

FTF volunteers should use the following tables to help ensure that assistance for the procurement or use of pesticides will not have an effect on birds or fish. FTF volunteers should recommend pesticides that are the least toxic to birds, fish, and other non-target organisms. FTF volunteers shall only provide assistance for the use or procurement of pesticides in SUAP Attachment A; pesticides listed below that are not in SUAP-Attachment A and are of high toxicity, should be strongly discouraged.

Table 5: Pesticides Classified as Highly- to Very Highly-Toxic to Fish

Pesticide	Type*	Toxicity**	Pesticide	Type*	Toxicity**
Alachlor	H	HT	Maneb	F	HT
Aldicarb	I	HT	Maneb + streptomycin	F	HT
Amitraz	I	HT	Metam-sodium	F	HT
Azinphos-ethyl	I	VHT	Methyl parathion	I	HT
Beta-cypermethrin	I	HT	Methyl-isothiocyanate	FM	HT
Beta-cypermethrin	I	HT	Naled	I	HT
Bifenazate	A	HT	Niclosamide	I	HT
Bifenthrin	I	HT	Oxadiazon	H	HT
Bromadiolone	R	HT	Oxyfluorfen	H	HT
Bromoxynil	H	HT	Pendimethalin	H	HT
Butylate	H	HT	Permethrin	I	HT
Captan	F	HT	Petroleum distillate	I	HT
Carbaryl	I	HT	Pirimiphos-methyl	I	HT
Chloropicrin	FM	HT	Prometryn	H	HT
Chlorothalonil	F	HT	Propargite	I	HT
Chlorpyrifos	I	HT	Pyraclostrobin	F	HT
Dazomet	F	HT	Pyraclostrobin	F	HT
Deltamethrin	I	HT	Pyrazophos	F	HT
Diazinon	I	HT	Quizalofop-ethyl	H	HT
Dichlorvos	I	HT	Resmethrin	I	HT
Diclofop-methyl	H	HT	Rotenone	I	HT

Pesticide	Type*	Toxicity**	Pesticide	Type*	Toxicity**
Dicofol	I	HT	*Tau*-fluvalinate	I	HT
d-trans-allethrin	I	HT	Tefluthrin	I	HT
Endothall	H	HT	Tetramethrin	I	HT
Esfenvalerate	I	HT	Thiodicarb	I	HT
Ethion	I	HT	Thiophanate-methyl	F	HT
Ethoprop	I	HT	Thiram	F	HT
Fenbutatin-oxide	I	VHT	Tralomethrin	I	HT
Fenvalerate	I	HT	Tribufos	D	HT
Fludioxonil	F	HT	Triflumizole	F	HT
Folpet	F	HT	*Zeta*-cypermethrin	I	HT
Malathion	I	HT			
*Type: A = acaricide; D = defoliant; F = fungicide; FM = fumigant; H = herbicide; I = insecticide; R = rodenticide.					
**Toxicity: VHT = <0.1 ppm; HT = 0.1 – 1.0 ppm.					

Table 6: Pesticides Classified as Highly- to Very Highly-Toxic to Birds

Pesticide	Type*	Toxicity**
Pirimiphos-methyl	I	HT
Aldicarb	I	HT
Dicamba	H	HT
Carbofuran	I	HT
Chlorpyrifos	I	HT
Diazinon	I	HT
Dimethoate	I	HT
Ethoprop	I	HT
Dichlorvos	I	HT
Thiodicarb	I	HT
Metaldehyde	M	HT
Methamidophos	A/I	HT
Methyl parathion	I	HT
Phorate	I	VHT
*Type: A = acaricide; H = herbicide; I = insecticide; M = molluscicide.		
**Toxicity (Bird LD_{50}): VHT = <10 mg/kg; HT = 10 – 50 mg/kg.		

(3) General Information and Recommendations to Mitigate Impacts to Wildlife

The following information is adapted from:
Wildlife and Pesticides - Corn
Authors: William E. Palmer, Peter T. Bromley, and John R. Anderson, Jr.
North Carolina Cooperative Extension Service AG-463-2; and
Reducing Pesticide Risks to Wildlife
Authors: Dale Rollins, Thomas W. Fuchs, C. Wayne Hanselka and Judy Winn

How Do Pesticides Harm Wildlife?
Most insecticides kill insects by damaging their central nervous systems and can harm wildlife in the same way. Wildlife may be exposed to insecticides by breathing the chemical, swallowing contaminated food or water, absorbing the chemical through the skin or feathers, or by swallowing the chemical when grooming. Some birds may eat granular insecticides, mistaking them for seeds or grit.

Some animals may become sick or die when exposed to pesticides. This is a lethal effect and it is measured as the particular chemical's toxicity. The toxicity of a pesticide to animals is commonly expressed as either its LD_{50} (lethal dose) or LC_{50} (lethal concentration). The LD_{50} of a particular chemical is the dose that kills 50 percent of the animals exposed to it. The LC_{50} is the concentration of the chemical in the diet, air or water required to kill 50 percent of the animals exposed. LD_{50}s and LC_{50}s are different for every animal species and are determined by laboratory research. For any species, the lower the LD_{50} or $LC_{50,}$ the higher the toxicity.

Wildlife also may suffer sub-lethal effects from pesticides. In such cases they do not die, but their behavior may be altered or their survival or reproductive abilities affected. For example, in one study, bobwhites that received sub-lethal doses of the insecticide terbufos (Counter) suffered higher mortality from predators. This kind of sub-lethal effect of pesticides is difficult to measure and may be underestimated.

Pesticides and Endangered Species
Exposure to pesticides may pose particular problems for certain endangered species. In fact, the presence of threatened or endangered plants or animals may restrict the use of pesticides in certain areas.

Application Hazards
One of the greatest risks associated with pesticides is the movement of the chemical, through drift or runoff, from the target crop to adjacent wetlands or other sensitive habitats. Most pesticides are applied either as liquids (sprays) or granules. Spray should be applied under conditions that will minimize drift into sensitive habitats.

Drift can be minimized by:

- making ground rather than aerial applications, especially near sensitive habitats;
- using nozzles and spray pressures that produce large spray droplets;
- spraying when the wind will carry the chemical droplets away from sensitive habitats;
- not spraying when wind speed is more than 8 mph; and
- using a drift control agent

Granular pesticides are much less susceptible to drift, but they pose a special threat to some species of wildlife, especially seed-eating birds. Birds may mistake pesticide granules for grit or seed. It takes only a few granules of some insecticides to kill a sparrow-sized bird. When granules are applied, take special care to cover them with soil and completely disk under any spills.

Herbicides and Wildlife

Most herbicides are only slightly toxic to wildlife. (A notable exception is Paraquat.) While herbicides rarely have lethal effects, they can affect wildlife populations indirectly by altering the structure of the habitat. Many species of weeds and brush provide important food or shelter for wildlife. Care should be taken to protect wildlife habitats when applying herbicides.

How Risks Can Be Minimized

- Use Integrated Pest Management practices to decrease pesticide use.
- Use the pesticide least toxic to fish and wildlife.
- Completely cover pesticide granules with soil, especially spilled granules at the ends of rows.
- Minimize drift when applying chemicals near fish and wildlife habitats.
- Avoid spraying over ponds, drainage ditches or other wetlands.
- Use filter strips along drainages to decrease pesticide runoff into streams.
- Never wash spray equipment or containers where rinse water could enter ponds or streams.
- Read and follow the instructions on pesticide labels.

Table 7: The Effects of Commonly Used Insecticides on Wildlife

Chemical Name	Trade name(s)	Chemical Group	Effect on Wildlife
Aldicarb	Temik®	Carbamate	Highly toxic to birds, mammals and fish
Carbaryl	Sevin®	Carbamate	Low toxicity for birds, mammals and fish
Carbofuran	Furadan®	Carbamate	Highly toxic to birds, mammals, and fish
Chlorpyrifos	Lorsban®, Dursban®	Organophosphate	Moderately to highly toxic to birds and fish; low toxicity to mammals
Diazinon	Diazinon®, Spectracide®	Organophosphate	Highly toxic to birds; moderately toxic to mammals
Dicrotophos	Bidrin®	Organophosphate	Highly toxic to birds and mammals; moderately toxic to fish
Dimethoate	Cygon®, Dimate®, Dimethoate®	Organophosphate	Highly toxic to birds; moderately toxic to mammals and fish
Disulfoton	Di-Syston®	Organophosphate	Highly toxic to birds, mammals and fish
Malathion	Cythion®	Organophosphate	Low toxicity to birds and mammals; highly toxic to fish
Methomyl	Lannate®	Carbamate	Highly toxic to birds, mammals and fish
Parathion	several	Organophosphate	Highly toxic to birds, mammals and fish; methyl form slightly less toxic than ethyl form
Permethrin	Ambush®, Pounce®	Synthetic pyrethroid	Low toxicity to birds and mammals; extremely toxic to fish
Phorate	Rampart®, Thimet®	Organophosphate	Highly toxic to birds, mammals and fish
Terbufos	Counter®	Organophosphate	Highly toxic to birds, mammals and fish

Ways to Reduce Pesticide Use

Reducing pesticide use is one of the best ways to protect fish and wildlife resources. Using sound cultural practices reduces pest problems and, therefore, results in lower pesticide use. Cultural practices that decrease the need for, pesticides include rotating crops, selecting resistant varieties (when possible), planting and harvesting at the proper time, and using integrated pest management (IPM) techniques. IPM is a farming approach that employs alternative methods of pest control, rather than relying solely on agrichemicals. With IPM, pesticides are used *only* when the cost of applying a pesticide is outweighed by the cost of pest damage to the crop. This "threshold" must be reached before chemical pest control is economically justified. In this way, IPM practices help to reduce pesticide use and protect wildlife and the environment.

Insecticides

Species that live in and around corn fields are exposed to insecticides when they eat granules and chemical residues on plants or in insects. Wildlife that enter crop fields soon after an insecticide has been sprayed are exposed when they inhale its vapor or when the insecticide contacts their skin or eyes.

The effects of insecticides on wildlife and fish can be minimized by using the least toxic alternative. The hazard of an insecticide is based on its toxicity to wildlife, the way it is used, and other characteristics, such as its persistence in the environment. For example, methomyl (Lannate) is acutely toxic to birds and mammals. However, because methomyl does not persist in the field, careful use of this chemical presents only a moderate hazard to wildlife. Wildlife exposed to insecticides rated high may die or

become sick. Insecticides rated moderate may also cause death or sickness, although death is unlikely. Insecticides rated low are unlikely to harm wildlife directly.

Granular Insecticides
Granular insecticides present a serious hazard to birds. Many highly toxic insecticides are formulated as granules, such as fonofos (Dyfonate) and terbufos (Counter). Birds eat granules exposed on the soft surface, mistaking them for food and grit. Ingesting only a few granules of a toxic insecticide can kill a small bird.

To reduce the hazard to wildlife from granular formulations:

- use the least toxic insecticide that will control the insect pest
- fully incorporate granules into the soil

Incorporation is especially important near field edges where many birds search for food and grit. *Disking spilled granules under the soil at row ends* significantly reduces wildlife exposure to the granules. If soil incorporation is not possible, consider using a liquid formulation following the guidelines in the next section.

Liquid Insecticides
Several insecticides that are sprayed on corn foliage are toxic to wildlife; these include carbofuran (Furadan), methyl parathion, and methomyl (Lannate). Other foliar insecticides are only slightly toxic to most birds and mammals; for example, malathion, carbaryl (Sevin), esfenvalerate (Asana XL), and permethrin (Pounce or Ambush). However, many of these insecticides are toxic to fish and other aquatic animals.

To reduce danger to wildlife from foliar applications:

- spray only when IPM thresholds are met
- use the least toxic insecticide that will control the insect pest
- minimize drift of insecticides into wildlife habitats

Several studies of aerial applications of pesticides have reported significant drift of material into nearby wildlife habitats. If it is necessary to use highly toxic insecticides, apply them with ground equipment; this will help to minimize drift and reduce the hazard to wildlife. Ground application may also allow wildlife more time to leave the area during the spraying operation.

Spray drift can be minimized by using application equipment with low drift characteristics, replacing inappropriate or worn nozzles, using appropriate pressure and volume for the chosen nozzle, and adding a drift control agent. Ultra-low-volume sprays are more likely to cause drift than low pressure sprays. Avoid spraying when the wind is blowing faster than 8 mph.

Nematicides
Nematicides commonly used on corn include carbofuran (Furadan), ethoprop (Mocap), and terbufos (Counter). All three are highly toxic and therefore potentially hazardous to wildlife. If granular formulations are used, full incorporation is required on the label. Incorporating spilled granules at row ends greatly reduces the danger to wildlife that feed along the edges of treated fields.

Herbicides
Most herbicides used during corn production are only slightly toxic to birds and mammals. One exception is paraquat (Gramoxone), which is moderately toxic to birds. When paraquat is sprayed directly on bird eggs it can cause abnormal growth of embryos and has been shown to reduce the hatching success of waterfowl eggs. Some herbicides are very toxic to fish, such as pendimethalin

(Prowl) and bromoxynil (Buctril). Care should be taken to ensure ponds and streams are not contaminated with herbicides.

Herbicides can harm or destroy wildlife habitats. Herbicide use can often be reduced by employing IPM practices. Keep records of weed problems and use postemergent herbicides only when needed. New postemergent herbicides (such as Accent or Dimension) may help to reduce costs and the total amount of herbicide needed. When applying herbicides, avoid spraying past the outer row of corn because it wastes chemical and can destroy wildlife habitats.

Also, protecting noncrop areas from herbicides is important. Wildlife, especially small game and song birds, benefit from the cover provided by strip habitats. These strips are linear noncrop areas, such as hedgerows, ditch banks, filter strips, field borders, and fencerows. The vegetation in strip habitats provides wildlife valuable cover for nesting, brood rearing, and escaping from predators. These habitats also allow wildlife safe access to corn fields during winter months when these fields provide a good source of food.

Mowing strip habitats also reduces their value for wildlife. When field borders, filter strips, ditch banks, and other fallow areas are mowed during spring and summer, wildlife cover is reduced. Consider maintaining strip habitats by mowing only once per year or less frequently if possible. Mow during early spring only. Mowing alternate sides of strip habitats every other year will ensure that cover will be available to wildlife year-round.

(4) Safety Precautions to Protect Bees and Other Pollinators

In conjunction with assistance for the use or procurement of pesticides, FTF volunteers should provide information on mitigating the impacts of pesticides on bees and other pollinators. Pesticides vary in their effect on bees and other pollinators. The following information is provided to assist FTF volunteers in this effort.

Most research on the effect of pesticides on beneficial insects has focused on bees. Contact insecticides kill by contact with the organism, and will affect insects that are sprayed. Systemic insecticides that are incorporated by treated plants can contaminate nectar or pollen and kill bees in their hive.

Active ingredients can be ranked for toxicity to bees, but the actual formulation and mode of application provide the ultimate indication for degree of toxicity to bees. A stronger formulation of a pesticide that might be considered highly toxic might be less toxic if applied only to the soil rather than as spray. Dusts and wettable powders are usually more hazardous to bees than emulsifiable concentrates or solutions.

The following is adapted from "*Protecting Honey Bees from Pesticides*" by Dr. James E. Tew:

Protecting pollinators, especially honey bees, from pesticide poisoning should be part of any pesticide program. The following recommendations can help minimize bee kills.

Pesticides on Blossoms. The blossom is usually the only part of a plant that bees visit. To avoid killing bees, do not apply pesticides hazardous to bees during the blooming period. When the treated area contains the only attractive plants, in bloom within flight range, injury may occur to colonies several miles away. Treating non-blooming crops with a hazardous pesticide when cover crops, weeds, or wild flowers are in bloom within (or near) the treated field may also cause heavy bee losses.

Drift of Pesticides. Drift occurs from nearly all spray or dust applications of pesticides from a short distance to miles downwind. Pesticide dusts drift farther than sprays. Pesticides applied by plane usually drift farther than those applied by ground equipment. Generally, it is less hazardous to apply pesticides

near apiaries with ground equipment than by plane. Drift can be reduced by applying pesticides in the evening or early morning when the air is calm.

Time of Application. Ideally, pesticides should be applied when there is no wind and when bees are not visiting plants in the area. The time and intensity of bee visitation to a given crop depends on the abundance and attractiveness of the bloom. For example, apple trees or clover in bloom may be attractive to bees all day while cucumbers and corn are usually attractive in the morning and early afternoon hours. In general, evening or early night applications are the least harmful to bees.

Formulation of Pesticides. Dusts are usually more hazardous to bees than sprays. Wettable powders often have a longer residual effect than emulsifiable concentrates. Granular pesticides seem to present very little hazard. Ultra-low volume (ULV) formulations of some pesticides are much more toxic than regular sprays. No effective repellent has been developed that can be added to pesticides to keep bees from treated areas.

Toxicity of Pesticides. Most agricultural pesticides have been tested for their toxicity to honey bees. However, laboratory and field results do not always coincide, due to peculiarities of bee behavior, length of residual life of the pesticide, or the effects of different formulations.

Insecticides affect bees in one or more ways: as stomach poisons, as contact poisons, and as fumigants. Pyrethroids, organophosphates, and carbamates vary in their toxicity to bees from relatively nonhazardous to very hazardous, depending upon the individual material or combination of materials. Some bacteria, protozoans, and viruses that are currently recommended for biological control pose a serious hazard to bees.

Herbicides, defoliants, and desiccants such as paraquat, MAA, and MSMA reportedly were extremely toxic when fed to newly emerged worker honey bees or when sprayed onto older bees in field tests. Most tests have shown other materials in this class to be nonhazardous to bees, except that they kill or damage nectar- or pollen-producing plants.

Fungicides seem to cause little trouble for bees. Captan at field dosages has caused brood damage.

Sex lures, attractants, and other hormones usually cause no problem for bees. Occasionally, a few honey bees and bumblebees have been found in traps containing Japanese beetle lures.

Precautions for Farmers and Applicators

1. Apply pesticides only when needed.
2. Use the recommended pesticide at the lowest effective rate.
3. Use the pesticide least hazardous to bees that will control the pest involved. If all recommended pesticides are equally hazardous to bees, use the one that has the shortest residual effect.
4. Use sprays or granules instead of dusts.
5. Use ground equipment instead of aerial application to apply pesticides near bee hives.
6. Apply pesticides in late afternoon or at night when bees are not working the blooms.
7. Avoid drift of pesticides onto plants that are attractive to bees.
8. Notify beekeepers several days before applying any pesticide that is hazardous to honey bees. This will give them a chance to protect their colonies. However, notifications are not a release of responsibility.

Precautions for Beekeepers

1. Place colonies where they will be away from fields that are routinely treated with hazardous pesticides and will not be subjected to pesticide drifts.

2. Identify your apiary. Post your name, address, and phone number in a conspicuous place near your apiary. Let farmers and custom applicators in your area know where your apiaries are located so they will not unknowingly poison them.
3. Be familiar with pesticides commonly used in your area and what their application dates are.
4. Relocate colonies that are exposed repeatedly to hazardous pesticides. Also, remember that soon after colonies are moved to a new location, foraging bees search for water. They may collect water that has been contaminated with pesticides. To reduce the chance of bee losses, provide clean water near the hives.

Bee Kill Estimations	
0 - 100 dead bees per day	Normal Die-off
200 - 400 dead bees per day	Low Kill
500 - 900 dead bees per day	Moderate Kill
1000 or more dead bees per day	High Kill

Pesticides Toxic to Bees

Pesticide labels provide important information about toxicity to honey bees and other non-target organisms. However, in some FTF countries, pesticides are re-packaged, and a farmer may purchase pesticides without labels.

The FTF volunteer can provide recommendations to farmers on using best practices—described above—to minimize impacts to pollinators, and should use the below information as a guide for recommending specific pesticides and discouraging the use of more toxic pesticides with the aim of minimizing effects on honey bees. While the FTF volunteer may only recommend pesticide active ingredients in SUAP-Attachment A, the volunteer should *discourage* the use of any of the active ingredients below that are highly toxic to honey bees.

The following partial list of pesticides represents groups of materials ranked by toxicity to honey bees. Toxicity ranking may vary depending on the formulation of a pesticide. [5]

<u>Group 1.</u> Hazardous: Generally, these materials kill bees on contact during application and for one or more days after application.

[5] Sourcebooks *Farm Chemicals Handbook*, '95, Meister Publishing Company. *Pollinator Protection*, Johansen & Mayer, Wicwas Press, 1990. *The New Pesticide User's Guide*, Bert L. Bohmont, Reston Publishing Company.

Highly Toxic

- 2,4-D
- abamectin
- acephate
- azinphos-methyl
- bifenthrin
- carbaryl
- carbosulfan
- chlormephos
- chlorpyrifos
- cyfluthrin
- d-phenothrin
- demeton-s-methyl
- diazinon
- dichlorvos
- dicrotophos
- dimethoate
- esfenvalerate
- ethion
- etrimfos
- fenitrothion
- fenpropathrin
- fensulfothion
- fenthion
- fenvalerate
- flucythrinate
- fonofos
- heptachlor
- lindane
- malathion
- methamidophos
- methidathion
- methiocarb
- mevinphos
- monocrotophos
- naled
- omethoate
- oxydemethon-methyl
- oxydisulfoton
- parathion
- permethrin
- phosmet
- phosphamidon
- propoxur
- pyrazophos
- resmethrin
- tetrachlorvinphos
- tralomethrin

Group II. Moderately Hazardous: These materials can be used with limited damage to bees if not applied on bees in the field or on hives near the field. Correct application rate, timing, and method of application, are factors that can reduce pesticide kills.

Moderately Toxic

- Acetochlor
- Aclonifen
- allethrin
- alphacypermethrin
- ametryn
- bromopropylate
- cinmethylin
- crotoxyphos
- DCPA
- diphenamid
- disulfoton
- endosulfan
- endrin
- ethoprop
- flufenoxuron
- fluvalinate
- formetanate hydrochloride
- mancozeb
- methanearsonic acid
- neburon
- pebulate
- phorate
- pirimiphos-methyl
- sethoxydim
- sulfosate
- terbufos
- thiocyclam hydrogen oxalate
- thiodicarb
- triforin

Group III. Relatively Nonhazardous: These materials can be applied with little harm to bees. Regardless, follow label instructions.

Relatively Non-Toxic

- 2,4-D butoxyethyl ester
- 2,4,5-T
- alachlor
- aldicarb
- aldoxycarb
- alloxydim sodium
- amitraz
- amitrole
- ammoniacal copper sulfate
- anilazine
- anthraquinone
- atrazine
- azadirachtin
- azamethiphos
- azocyclotin
- Bacillus thuringiensis
- benomyl
- bentazon
- bitertanol
- Bordeaux mixture
- bromacil
- bromadiolone
- bromofenoxim
- bromoxynil
- buminafos
- bupirimate
- butylate
- butylate
- captan
- captfol
- carbendazim
- carbetamide

- carboxin
- chinosol
- chloramben
- chloranil
- chlorbromuron
- chlordimeform
- chlorflurenol
- chloridazon
- chlormequat chloride
- chlorobenzilate
- chlorophacinone
- chloropicrin
- chlorothalonil
- chlorotoluron
- chloroxuron
- chlorpropham
- clofentezine
- copper oxide
- copper oxychloride
- cyanazine
- cycloate
- cycloxydim
- cyhexatin
- cyproconazole
- dalapon
- daminozide
- dazomet
- DCNA
- desmetryn
- dibromochloropropane
- dicamba
- dichlobenil
- dichlofenthion
- dichloroprop-P
- dichlorprop
- diclofop-methyl
- dicofol
- dienochlor
- diflubenzuron
- dikegulac sodium
- dimethirimol
- diniconazole-M
- dinocap
- diquat dibromide
- dithianon
- dithiocarbamates
- diuron
- dodemorph acetate
- dodine
- endothall
- epoxiconazole
- ethephon
- ethidimuron
- ethion
- ethirimol
- ethofumesate
- ethylfluralin
- fenaminosulf
- fenamiphos
- fenarimol
- fenfuram
- fenpropimorph
- fentin hydroxide
- fenuron
- ferbam
- fluometuron
- fluorodifen
- fluoroglycofen
- folpet
- fosamine ammonium
- fuberidazole
- furalaxyl
- gibberellic acid
- glyodin
- glyphosate
- glyphosate
- guazatine
- indole-3-butyric acid
- iprodione
- Isopropalin
- isoproturon
- lenacil
- linuron
- maneb
- MCPA
- MCPB
- mecoprop
- mecoprop-p
- MEMC
- mepiquat chloride
- metalaxyl
- metalaxyl
- metaldehyde
- methamitron
- methazole
- methoxychlor
- methyl bromide
- Metiram
- metobromuron
- metolachlor
- metoxuron
- metribuzin
- monalide
- monolinuron
- monuron
- MSMA
- nabam
- napropamide
- naptalam acid
- naptalam
- nicotine
- nitralin
- nitrapyrin
- nitrofen
- norflurazon
- nuarimol
- oryzalin
- ovex
- oxycarboxin
- oxyfluorfen
- oxythioquinox
- paraquat
- PCNB
- pendimethalin
- phenmedipham
- phosalone
- picloram
- pirimicarb
- PMA
- prochloraz
- procymidone
- profluralin
- prometon
- prometryn
- pronamide
- propachlor
- propam
- propamocarb hydrochloride
- propargite
- propazine
- propineb
- prothiocarb
- pyrethrins
- pyridate
- pyroquilon
- quinclorac
- quizalofop-ethyl
- rotenone
- ryania
- sabdilla
- sethoxydim
- simazine

- sulfur
- TCA
- terbacil
- terbumeton
- terbutryn
- tetradifon
- thiabendazole
- thiophanate-methyl
- thiram
- triadimefon
- triadimenol
- tribufos
- trichlamide
- trichlorfon
- triclopyr
- trietrazine
- trifluralin
- triphenyltin hydroxide
- validamycin A
- vernolate
- vinclozolin
- warfarin
- WSSA
- zineb
- ziram

(5) Safety Precautions to Mitigate Impacts on Groundwater Resources

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 FTF requested 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 (this is also indicated in SUAP-Attachment A). 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 or research.

As noted in the table in SUAP-Attachment A, some of the proposed pesticides are potential ground water contaminants. These pesticides in particular, but in general no pesticides, should be mixed, applied, stored, or disposed of adjacent to or upslope from waterways, wetlands or drinking water sources without appropriate safeguards.

Endnotes: Guide to minimizing impacts of pesticides on the environment

1. This document is PI-85, one of a series of the Pesticide Information Office, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date November, 2005. Reviewed December 2008. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.
2. Frederick M. Fishel, Associate Professor, Agronomy Department, and Director, Pesticide Information Office; Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

Additional information on effects of pesticides on non-target ecosystems and organisms can be found in:

Crop Protection Handbook. 2005. vol. 91. Willoughby, Ohio: Meister Publishing Co. http://www.meisterpro.com/modules.php?name=MP_Pages.

Fishel, F.M. 2005. Pesticide toxicity profiles. UF/IFAS EDIS Document Series. http://edis.ifas.ufl.edu/TOPIC_SERIES_Pesticide_Toxicity_Profiles.

Florida Agricultural Statistical Directory 2004: http://www.florida-agriculture.com.

Henn, T., R. Weinzierl, and P.G. Koehler. 2005. Beneficial insects and mites. UF/IFAS EDIS Document ENY-276. http://edis.ifas.ufl.edu/IN078.

Olexa, M. T., A. Leviten, K. Samek. 2003. Florida Solid and Hazardous Waste Regulation Handbook: Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). UF/IFAS Circular FE446. http://edis.ifas.ufl.edu/FE446.

Olexa, M. T., L. Minton, D. Miller, and S. Corbett. 2002. Pesiticides. *In* Handbook of Florida Water Regulations. UF/IFAS Circular 1026. http://edis.ifas.ufl.edu/FE054.

Short, D.E., F.A. Johnson and J.L. Castner. 2005. Beneficial insects sheet 1. UF/IFAS EDIS Document SP-88. http://edis.ifas.ufl.edu/IN002.
Short, D.E., F.A. Johnson and J.L. Castner. 2005. Beneficial insects sheet 2. UF/IFAS EDIS Document SP-89. http://edis.ifas.ufl.edu/IN003.
Short, D.E., F.A. Johnson and J.L. Castner. 2005. Beneficial insects sheet 3. UF/IFAS EDIS Document SP-05. http://edis.ifas.ufl.edu/IN012.

SUAP Attachment D: Guide to Host Country Registered Pesticides

FTF volunteers shall only recommend a pesticide that is registered by the host country. FTF volunteers who will provide assistance for the use or procurement of pesticides should request the country list from the FTF country office. FTF country offices should provide the most recent government list of approved pesticides to FTF Type 1 volunteers prior to or upon arrival in-country.

As of the date of this PERSUAP, lists of registered pesticides are available in the following FTF country offices: El Salvador, Nicaragua, Dominican Republic, Guyana, South Africa, Tanzania, Kenya, Mozambique, Malawi, Mali, Uganda, Moldova, Belarus, Tajikistan, Uzbekistan, and Georgia. Volunteers may be able to find this information online, although many countries do not yet have it available online or even in electronic form.

Several countries (listed below) did not submit a host country registered pesticide list. Before a Type 1 volunteer can be recruited, the FTF country office should obtain the list and provide it to the volunteer. For FTF programs in countries without an approved list, the FTF country office should obtain a letter from the local government stating that they do not have a list of pesticides approved for use. This letter may include any provisions that a Type 1 volunteer should take when recommending pesticides. The FTF country office should provide this letter to the volunteer prior to or upon arrival in-country.

Below are suggestions to help locate the government-approved list. Angola is the only FTF country that indicated that indicated a list of government registered pesticides may not exist. FTF volunteers to Angola who may be expected to provide recommendations and advice on specific pesticides should plan to meet with the appropriate ministry to determine applicable regulations/requirements.

For FTF country programs that submitted a list, volunteers and country staff should ensure that their reference list reflects the most recent information throughout the life of the project. For FTF volunteer assignments expected to involve recommendations and advice for specific pesticides in non-core countries, the volunteer should check that the specific pesticides are approved for use in that country prior to travelling. USAID mission offices are another source of information for non-core FTF country assignments, or countries where a list of approved pesticides is not readily available, especially if a PERSUAP has previously been conducted for a project in their country.

Below are potential sources for FTF country programs that did not submit a list, as well as clarification on Kenya's fee-for-use database.

Egypt. This website lists all 358 pesticides approved by the Agricultural Pesticides Committee for use in the Arab Republic of Egypt: http://www.apc.gov.eg/en/products/showall.aspx [6]

Nigeria. The approved list should come from NAFDAC (http://www.nafdacnigeria.org/regulation.html) and should be listed at http://www.nafdacregistry.net/ (currently, it is not).

Ghana. The Environmental Protection Agency of Ghana is the lead agency responsible for a comprehensive national pesticide regulatory program. As of January 2005 the government list included 62 *Registered* (approved for general or restricted use), 27 *Provisionally Cleared* (temporarily approved but not registered), and 25 *Banned* pesticides. This list may be obtained from the EPA or from Plant Protection and Regulatory Services of the Ministry of Agriculture (http://www.mofa.gov.gh/plant_protection_regulatory_services.html). Separate regulations or approvals may be published for biopesticides.

Kenya. Access to the Pesticide Database requires a fee; Kenya FTF staff can provide volunteers who need to check the government list with a user name and password for access to this site (http://www.pcpb.or.ke).

[6] Additional information can be found in Ministry of Agriculture and Land Reclamation: *Ministerial Decree No. 90 of 2007 Concerning the criteria for the registration, renewal of registration, and use of agricultural pesticides in the Arab Republic of Egypt* www.apc.gov.eg

SUAP Attachment E. Pesticides of Global Concern

This attachment contains the following:

(1) Chemicals banned in accordance with the Rotterdam Convention, PIC Procedure
(2) The Pesticide Action Network "Dirty Dozen"
(3) The "Dirty Dozen" POPs
(4) Organophosphate products of concern

While FTF volunteers may only provide assistance for the use or procurement of active ingredients in SUAP-Attachment A, volunteers shall strongly discourage the use of the pesticides on the lists in this attachment. **If additional active ingredients, other than those listed in SUAP Attachment A, will be used/recommended in the future, FTF volunteers shall ensure that none of these are included on the lists in this attachment.**

(1) Rotterdam Convention, PIC Procedure

The following is from the *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.* The chemicals listed in Annex III of the convention include pesticides and industrial chemicals (not included herein) that have been banned or severely restricted for health or environmental reasons by Parties. There are a total of 40 chemicals listed in Annex III, 29 are pesticides (including four severely hazardous pesticide formulations) and 11 industrial chemicals. This information, as well as additional information on the Rotterdam Convention and Prior Informed Consent Procedure can be found at http://www.pic.int/home.php?type=t&id=29&sid=30

The pesticides in Annex III of the convention (below) shall not be used or recommended by FTF volunteers. Use of any of them should be strongly discouraged.

Annex III (**) of the Convention

Chemical *(CAS number(s))*
2,4,5-T and its salts and esters *(93-76-5)* *
Aldrin *(309-00-2)*
Binapacryl *(485-31-4)*
Captafol *(2425-06-1)*
Chlordane *(57-74-9)*
Chlordimeform *(6164-98-3)*
Chlorobenzilate *(510-15-6)*
DDT *(50-29-3)*
Dieldrin *(60-57-1)*
Dinitro-ortho-cresol (DNOC) and its salts(such as ammonium salt, potassium salt and sodium salt) *(534-52-1; 2980-64-5; 5787-96-2; 2312-76-7)*
Dinoseb and its salts and esters *(88-85-7)*

1,2-dibromoethane (EDB) *(106-93-4)*
Ethylene dichloride *(107-06-2)*
Ethylene oxide *(75-21-8)*
Fluoroacetamide *(640-19-7)*
HCH (mixed isomers) *(608-73-1)*
Heptachlor *(76-44-8)*
Hexachlorobenzene *(118-74-1)*
Lindane *(58-89-9)*
Mercury compounds including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds (CAS numbers)
Monocrotophos (6923-22-4)
Parathion
Pentachlorophenol and its salts and esters *(87-86-5)* *
Toxaphene *(8001-35-2)*
Tributyltin compounds
Dustable powder formulations containing a combination of : benomyl at or above 7 per cent, carbofuran at above 10 per cent, thiram at or above 15 per cent *(17804-35-2; 1563-66-2; 137-26-8)*
Methamidophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l) *(10265-92-6)*
Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l) *13171-21-6* (mixture, (E)&(Z) isomers) *23783-98-4* ((Z)-isomer) *297-99-4* ((E)-isomer))
Methyl-parathion (emulsifiable concentrates (EC) at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient) *(298-00-0)*

Annex III Notes:
* Only the CAS numbers of parent compounds are listed. For a list of other relevant CAS numbers, reference may be made to the relevant decision guidance document.
** As amended by the First Meeting of the Conference of the Parties by its decision RC 1/3 of 24 September 2004

(2) Pesticide Action Network (PAN) Dirty Dozen Pesticides

PAN International launched its Dirty Dozen Campaign in 1985 to target a list of extremely hazardous pesticides for bans or strict controls on production and use worldwide, and to advocate their replacement with safe and sustainable pest control methods. The pesticides on the PAN list shall not be used or recommended by FTF volunteers, and use of any of them should be strongly discouraged.

Collectively, Dirty Dozen pesticides cause many deaths and widespread environmental damage every year. Most have been banned or restricted in the industrialized countries because of their known hazards. Yet the Dirty Dozen are still heavily promoted and widely used in many developing nations, where the

lack of protective equipment, safety training, and medical services makes their impact even more devastating.

The Dirty Dozen are:

- Aldicarb
- Toxaphene
- Chlordane and Heptachlor
- Chlordimeform
- Chlorobenzilate
- Dbcp
- Ddt
- The "Drins" (Aldrin, Dieldrin, and Endrin)
- Edb
- Hch
- Lindane
- Paraquat, Parathion and Methyl Parathion, Pentachlorophenol, and 2,4,5-T

Most of these pesticides qualify as persistent organic pollutants (POPs), which are notable for their toxicity to humans and animals, longevity, and their ability to be transported globally through the atmosphere.

The United Nations Environment Programme (UNEP) has identified a number of the Dirty Dozen chemicals as the initial targets for global elimination under an international treaty signed in May 200. FTF volunteers should check the status of the UNEP list; no pesticides on this list shall be used or recommended by FTF volunteers, and use of any of them should be strongly discouraged.

Nine of the UNEP targeted chemicals are organochlorine pesticides (aldrin, endrin, dieldrin, DDT, chlordane, heptachlor, hexachlorobenzene, toxaphene and mirex). The industrial chemicals dioxin, furans and PCBs are also on the POPs treaty list (see below). The treaty, which will come into force when ratified by 50 countries, will have provisions to add additional chemicals which meet the agreed-upon criteria for persistence in the environment, bioaccumulation, and transportability.

There is widespread agreement that some of the remaining PAN Dirty Dozen pesticides which are still in use in the United States and other industrialized countries (e.g., lindane and endosulfan) meet these criteria. Other, less persistent but still highly toxic PAN Dirty Dozen chemicals like methyl parathion, pentachlorophenol, paraquat, and 2,4,5-T remain in use in the U.S. or other countries.

(3) The "Dirty Dozen" POPs

POP chemicals are targeted because they exhibit a combination of particularly dangerous properties: they are toxic; they are persistent in the environment, resisting normal processes that break down contaminants; they accumulate in the body fat of people, marine mammals and other animals, and are passed from mother to fetus; and they can travel great distances, typically from temperate and tropical regions to the poles, on wind and water currents. Because of this last trait, even though most of these named POPs have been banned or severely restricted in many countries, the only way to provide adequate protection is assuring global elimination. In addition, because they are widely recognized as being impossible to keep from escaping to the environment and causing harm once they are manufactured, the only way to prevent their effects is to not create them in the first place and eliminate those already there. Even very small quantities of POPs can be harmful, causing cancer and developmental disorders, as well as damage to the reproductive, nervous and immune systems.
FTF volunteers shall not provide assistance for the use or procurement of any of the following, and should strongly discourage use of any of them:

POP - Date of Definition and Primary Use

- Aldrin - 1949 - Insecticide used against soil pests (primarily termites) on corn, cotton and potatoes.
- Chlordane - 1945 - Insecticide now used primarily for termite control.
- DDT - 1942 - Insecticide now used mainly against mosquitoes for malaria control.
- Dieldrin - 1948 - Insecticide used on fruit, soil and seed crops, including corn, cotton and potatoes.
- Endrin - 1951 - Rodenticide and insecticide used on cotton, rice and corn.
- Heptachlor - 1948 - Insecticide used against soil insects, especially termites. Also used against fire ants and mosquitoes.
- Hexachlorobenzene - 1945 - Fungicide. Also a by-product of pesticide manufacturing and a contaminant of other pesticide products.
- Mirex - 1959 - Insecticide used on ants and termites. One of the most stable and persistent pesticides. Also a fire retardant.
- Toxaphene - 1948 - Insecticide used especially against ticks and mites; a mixture of up to 670 chemicals.
- PCBs - 1929 - Used primarily in capacitors and transformers, and in hydraulic and heat transfer systems. Also used in weatherproofing, carbonless copy paper, paint, adhesives and plasticizers in synthetic resins.
- Dioxins - 1920s - By-products of combustion (especially of plastics) and of chlorine product manufacturing and chlorine bleaching of paper.
- Furans - 1920s - By-products, especially of PCB manufacturing, often with dioxins

(4) Organophosphate pesticides (OPs) are among the most acutely toxic pesticides, with most of these chemicals classified by the US EPA as toxicity class I (highly toxic) or toxicity class II (moderately toxic). In addition, some OP pesticides cause developmental or reproductive harm, some are carcinogenic, and some are known or suspected endocrine disruptors. From the PAN site, the following are **organophosphates of primary concern**, and FTF volunteers shall not provide assistance for the use or procurement of them, and should strongly discourage any use of these products. Residential uses of chlorpyrifos and diazinon were recently banned by the USEPA:

- azinphos-methyl
- chlorpyrifos
- diazinon
- dichlorvos
- dimethoate
- ethephon
- malathion
- methamidophos
- naled
- oxydemeton-methyl

SUAP Attachment F: Guide to IPM Practices

Attachment contains:
(1) Mozambique example
(2) A General IPM Planning and Design Protocol
(3) Non-chemical and less toxic pesticide websites

FTF assistance for the use or procurement of pesticides must be provided only within the context of an IPM approach.

As stated in the Farmer-to-Farmer IEE, IPM is a systems approach designed to use the best combination of cultural, biological, and chemical measures to manage pests under particular circumstances. This provides the most sustainable, cost effective, environmentally sound and socially acceptable methods of managing diseases, insects, weeds, and other pests. Synthetic chemical pesticides are, and will continue to be, a primary tool used within IPM. Improper handling and misuse of pesticides poses risks to users, bystanders, and the environment. Proper training of all individuals who may use, or may make a decision to use, pesticides will reduce the prevalence of misuse. Improper use of pesticides by hosts is a common finding by FTF volunteers.

FTF volunteers whose assignments directly or indirectly include pesticide use should be prepared to recommend standard IPM measures as well as identify any locally recommended IPM tactics. FTF volunteers should contact the Ministry of Agriculture in the host country, agricultural institutes, universities, etc. to identify practices and issues related to IPM in the host country. Lessons learned should be identified, and as appropriate, crop protection factsheets may be prepared or if they already exist, can be strengthened or revised based on the volunteer's knowledge and experience. Local languages should be used, sometimes pictorials work best, and local practices that work should be emphasized.

(1) Mozambique FTF Example

The Mozambique FTF program provided the following example of IPM for use in weed control, which can be adapted and used in many FTF situations.

Insect Management Tactics

Preventative Methods

- Only plant seed that is certified to be free of disease causing organisms
- Destroy crop residue that may harbor disease inoculum by plowing, burning, or physically removing
- Crop rotation to avoid inoculum
- Use a fungicide seed treatment to prevent infection
- Control insects that may transmit a disease agent
- Scout fields to identify diseases present then select resistant cultivar if available
- Increased row width to reduce humidity levels in the plant canopy
- Do not plant crop in a soil that it is not adapted to
- Maintain good soil fertility and pH
- Mow young forage stands first to prevent transmission of disease from older fields
- Clean all harvesting equipment of plant residue before using

Remedial Methods

- Apply a fungicide when economically justified (seldom an economic option in most field crops)

Weed Management Tactics

Preventative or Cultural Methods

- Plant weed-free seed
- Avoid buying and using weed-seed contaminated
- Avoid spreading weed-seed contaminated manure on fields, if manure is contaminated spread it on fields that are already contaminated
- Compost manure to destroy weed seed viability
- Ensile weed infested crops to help destroy weed seed
- Watch for new weed species
- Develop weed management programs based on biology of weeds in the field
- Plant crops into a clean seedbed (free of live vegetation)
- Plant crops in narrow rows when applicable to provide early season crop competition
- Plant crops early to achieve maximum yield and to avoid competition from some summer annual weeds (i.e. later germinators)
- Follow soil fertility guidelines that favor a fast- establishing competitive crop
- Row width

Remedial Methods (non-herbicide based)

- Moldboard plow where possible to suppress perennials and bury small seeded annual weeds
- No-till fields where possible to suppress large-seeded annuals
- Mow field border areas to prevent weed seed production
- Mow pastures to prevent weed establishment and weed seed production
- Row cultivate once or twice (3 to 5 weeks after planting and two weeks later) to remove weeds between two crops rows and reduce dependence on herbicides
- Hand-hoe or hand-pull isolated weeds to prevent further weed spread

Remedial Methods (herbicide based)

- Plan herbicide program based on weed species and severity
- Use pre-emergence herbicides in a planned weed management program
- Use selective post-emergence herbicides at the lowest effective rate in a timely manner
- Use selective post-emergence herbicides when weeds are most susceptible (i.e. seedling annual weeds)
- Select cost effective herbicides that are the most "environmentally friendly"
- Rotate certain herbicide modes of action (e.g. ALS, ACCase, triazine) to prevent herbicide resistant weeds and weed species shifts
- Apply more than one effective mode of action for certain herbicides (e.g. ALS, ACCase, triazine) when possible to help prevent herbicide resistant weeds
- Spot treat isolated infestations to prevent further weed spread

(2) A General IPM Planning and Design Protocol

The following has been adapted from the AgVantage PERSUAP (USAID/Georgia). Depending on the extent of involvement and the length of the assignment, a volunteer may be able to focus on some or all of these elements. The protocol can be adapted for an FTF volunteer's specific situation.

The vital parts of an IPM plan include a definition of the targeted primary (small or large-holders) and secondary (markets, processors, transporters, and consumers) beneficiaries, implementation partners (farmers, laborers, extension personnel, national, regional and international organizations), production constraints, and IPM strategies for dealing with them.

Elements of IPM Program

The basic steps needed in an IPM program are addressed below.

Step 1: Evaluate and use non-pesticide management options first.

Use both preventive and responsive/curative options that are available to manage pest problems. Farmers may prevent pests (and avoid using pesticides) by the way they select plants, prepare the site, plant and tend growing plants. Along with prevention, farmers may respond to or cure the problem via physical, mechanical, or biochemical methods.

General Preventive Interventions:

Plant selection

- choose pest-resistant strains
- choose proper locally-adapted plant varieties
- diversify plant varieties or inter-crop plants
- provide or leave habitat for natural enemies

Site preparation and planting

- choose pest-free or pest-avoidance planting dates (e.g., early planting in rainy season avoids stem borers in cereals)
- enhance/provide shade for shade-grown crops
- assign crop-free (fallow) periods and/or rotate crops
- install buffer zones of non-crop plants and/or physical barriers
- improve soil health
- use and appropriate planting density
- rotate crops
- low-till, no-till

Plant tending/cultivation practices

- fertilize and irrigate appropriately
- remove weeds while small and before sowing crop

Responsive/Curative Interventions:

Physical/mechanical control

- remove or destroy diseased plant or plant parts & pests
- weed
- install traps

Biochemical control

- pheromones (very effective, but not currently easily accessible or economical, however, they are becoming more so)
- homemade botanical pesticides
- repellents

Biological control

- release or augment predators
- release or augment parasite s/parasitoids
- release or augment microbial pesticides

Step 2: Assess IPM Needs and Establish Priorities. In planning IPM, consider crop protection needs, farmers' perceptions of pest problems, pesticide use history and trends, availability of IPM technology, farming practices, access to sources of IPM expertise, support for IPM research and technical assistance, and training needs for farmers and project field extension workers.

Next, identify strategies and mechanisms for fostering the transfer of IPM technology under various institutional arrangements, mechanisms, and funding levels. Define what is available for immediate

transfer and what may require rapid and inexpensive adaptation and validation research. During the planning stages of an IPM program, the inputs from experienced IPM specialists will be extremely useful. If possible, set up an initial planning workshop to help define and orient implementation activities, and begin to assign individual responsibilities.

Step 3: Learn and value farmers' indigenous IPM tactics, and link with and utilize all local resources/partners. Most farmers are already using their own forms of IPM, many of which are novel, self-created, adapted for local conditions, and many of which work well. These may include: mechanical and physical exclusion; crop rotation, trap crops, cover crops, and green manures; local knowledge of strategic planting or harvesting times; water, soil, and fertilizer resource management; intensive intercropping with pest-repellent plants; leaving refuge habitat for natural enemies; soil augmentation and care leading to healthy nutrient cycling; transplanting; and weeding.

Accurate assessments of these farmer technologies, as well as of actual losses due to different constraints in farmers' fields are a must, before designing a crop production and pest management program. Crop loss figures provided by small and large farmers alike, and thus projected and reported by international organizations, are often inaccurate and overestimated.

Step 4: Identify key pests for each target crop. Although hundreds of species of organisms can be found in a crop at any one time, only a few of them may cause substantial crop losses, and be considered pests. Become familiar with the key pests of target crops, whether they are primary or secondary pests, how to positively identify them. Monitor their population size, the kind of damage that they cause, and their life cycle. These usually amount to a relatively small number of species on any one crop and can include any combination of insects, pathogens, weeds, diseases, and vertebrates. A few other species, known as secondary or occasional pests, attain damaging status from time to time; especially if over-spraying occurs and kills natural predators that naturally regulate their populations.

The vast majority of insect species found in any one crop are actually predators and parasites of the plant-feeding species. Many farmers may not be aware of these distinctions and must be taught to correctly identify the more common beneficial species, as well as pests, found in their crops. Incorrect identification of beneficial insects, predators or neutral insect species, may lead to unnecessary pesticide applications. This diagnostic phase requires sampling and careful observation. Usually, most key pests are fairly well known by local farmers and government extension personnel. However, a few species may be poorly known or understood because they occur at night, are hidden, or small. These include soil-inhabiting species such as nematodes and insect larvae (wireworms, white grubs, cutworms), mites, and pathogens (viruses, bacteria, mycoplasma, fungi). In addition, farmers often do not understand the role of some insects as vectors of plant diseases.

Step 5: Use activities and training to promote IPM. A number of activities are very effective in promoting IPM in developing countries:

Learning-by-doing/discovery training programs

The adoption of new techniques by small- and large-holder farmers occurs most readily when program participants acquire knowledge and skills through personal experience, observation, analysis, experimentation, decision-making and practice. First, frequent (usually weekly) sessions are conducted for 10–20 farmers during the cropping season in farmers' fields by trained instructors or extension agents. Because these IPM training sessions take place in the farmers' own environment, (1) they take advantage of the farmers' own knowledge; and (2) the farmers understand how IPM applies to their own farms.

Of these IPM training sessions, four or five analyze the agro-ecosystem. They identify and describe conditions such as soil type, fertility, and needs, weather, crop stage, each pest, their natural enemies, and

relative numbers of both. Illustrations and drawings are provided, as necessary. The underlying idea is to guide farmers with questions to discover important insights and supplying information only when absolutely necessary.

Farmers may also experiment with insect zoos where they can observe natural predators of their pests in action and the impact of pesticide on both. Knowledge and skills necessary for applying IPM are best learned and understood through practice and observation, understanding pest biology, parasitism, predation and alternate hosts; identifying plant disease symptoms; sampling population size; and preparing seed beds.

Recovering collective memory

Pest problems often emerge because traditional agricultural methods were changed in one way or another, or lost. These changes can sometimes be reversed. This approach uses group discussions to try to identify what changes might have prompted the current pest problem.

Smallholder support and discussion groups

Weekly meetings of smallholders, held during the cropping season, to discuss pest and related problems can be useful for sharing the success of various control methods. However, maintaining attendance is difficult except when there is a clear financial incentive (e.g., credit).

Project

Subsidized experiments and field trials at selected farms can be very effective at promoting IPM within the local community. These pilots demonstrate IPM in action and allow comparison with traditional synthetic pesticide-supported cultivation.

Educational material

In many countries, basic written and photographic guides to pest identification and crop-specific management techniques are unavailable or out of date. Such material is essential. Videos featuring graphic pictures of the effects of acute and chronic pesticide exposure, and interviews with poisoning victims can be particularly effective. A study in Nicaragua found videos to be the most important factor in motivating farmers to adopt IPM.

Youth education

Promoting and improving the quality of programs on IPM and the risks of synthetic pesticides has been effective at technical schools for rural youth. In addition to becoming future farmers, these students can bring informed views back to their communities.

Organic food market incentive

Promoting organic certification for the rapidly growing organic food market can be a strong incentive to adopt IPM.

Step 6: Partner successfully with other IPM implementers. Many IPM efforts consist of partnerships between two or more organization, e.g., donors, governments, PVOs and NGOs. If these partnerships are not forged with care, the entire project may be handicapped. The following design steps are considered essential.

Articulate the partnership's vision of IPM

Organizations may forge partnerships based on a common commitment to "IPM"—only to discover too late that that their visions of IPM differ considerably. It is important that partners articulate a common, detailed *vision* of IPM, centered on the crops and conditions the project will encounter.

Confirm partner institutions' commitment

Often, organizations make commitments they do not intend to (or are unable to) fulfill completely. The extent of commitment to IPM integration into project, design, and thus implementation depends strongly upon the following key variables:

- **IPM program integration into larger project.** The IPM program may be part of a larger "sustainable agriculture" project. The IPM program must fit into a partner's overall program. The extent of this integration should be clearly expressed in the proposed annual work plan.
- **Cost sharing.** Extent of funds or in-kind resources is a good measure of genuine partner commitment.
- **Participation of key IPM personnel.** Large partner organizations should have staff with expertise in IPM who are assigned specifically to IPM work. In strong partnerships, these staff members are actively involved in the partnership.

Step 7: Monitor the fields regularly. The growth of pest populations usually is related closely to the stage of crop growth and weather conditions, but it is difficult to predict the severity of pest problems in advance. The crops must be inspected regularly to determine the levels of pests and natural enemies and crop damage. Current and forecast weather should be monitored. Farmers, survey personnel, and agricultural extension staff can assist with field inspections.

They can train other farmers to be able to separate pests from non-pests and natural enemies, and to determine when crop protection measures, are necessary.

Step 8: Select an appropriate blend of IPM tools. A good IPM program draws from and integrates a variety of pest management techniques. IPM does not require predetermined numbers or combinations of techniques, nor is the inclusion or exclusion of any one technique required for IPM implementation. Flexibility to fit local needs is a key variable. Pesticides should be used only if no practical, effective, and economic non-chemical control methods are available. Once the pesticide has been carefully chosen for the pest, crop, and environment, it should be applied only to keep the pest population low. When dealing with crops that are already being treated with pesticides, IPM should aim first at reducing the number of pesticide applications through the introduction of appropriate action thresholds, while promoting appropriate pesticide management and use practices and shifting to less toxic and more selective products and non-chemical control methods. In most cases, NGOs/PVOs will probably need to deal with low to moderate levels of pesticide use. Either way, an IPM program should emphasize preventive measures and protect a crop, while interfering as little as possible with the production process.

Step 9: Develop education, training, and demonstration programs for extension workers. Implementation of IPM depends heavily on education, training, and demonstration to help farmers and extension workers develop and evaluate the IPM methods. Hands-on training conducted in farmers' fields (as opposed to a classroom) is a must. Special training for extension workers and educational programs for government officials and the public are also important.

Step 10: Monitor and Evaluate. First, develop data collection tools, and then collect baseline data at the beginning of the project to identify and determine the levels of all variables that will need to be tracked. These may include numbers and types of pests, predators, and soil microorganisms; relative numbers of all non-target animals (birds, lizards, etc.) that may be negatively impacted if pesticides are used; soil and water samples to determine levels of pesticide residue; soil samples to learn dominant soil types and to predict soil nutrition, requirements, and fertilizer/pesticide activities; pesticides, application and safety equipment available; and, amounts and type of training received by target audiences.

Develop methods for measuring the effectiveness of each IPM tactic used, and of their sum in reducing pest damage and crop losses. Also, develop methods for monitoring environmental health (maintaining and encouraging high levels of predators and soil microorganisms) and human health if pesticides are used. Kits

are available for determining the level of cholinesterase-inhibiting pesticides to which farmers and applicators have been exposed. Make checklists for farmers to use when applying pesticides that indicate the type of application and safety equipment used, and the rates at which pesticides were applied.

(3) Non-chemical and Less toxic Alternatives

FTF volunteers can investigate the potential use of biological and organic pesticides prior to travelling to the host country, and can encourage their use while in-country. Even biological and organic pesticides must comply with this PERSUAP: they must be registered by the US EPA, WHO Toxicity II or above, the product must be EPA Toxicity Level II or above, they must be registered/approved by the host country.

For biological control products, see company websites:

Koppert http://www.koppert.com
Biobest http://www.biobest.be
Bio-Bee http://www.bio-bee.com/english/welcome.html

SUAP Attachment G. Monitoring Pests and Pesticide Effects

Attachment contains:

(1) Measures to help ensure efficacy of pesticides used/recommended
(2) Developing a scouting and recordkeeping protocol

(1) The following measures will help ensure the efficacy of pesticides used or recommended. Improved efficacy is expected to reduce the amount of pesticide used, the frequency of use, and result in reduced exposure to pesticides for humans and the environment.

Rotate pesticides to reduce the build-up of resistance

SUAP-Attachment A includes a wide range of insecticides, herbicides, fungicides, etc. available to FTF volunteers. A sub-set of these will actually be available for FTF volunteers to recommend—those pesticides that are registered by the host country, products that are available and accessible, as well as US EPA toxicity class II or above (or the equivalent). Even with these restrictions, there are a range of families that volunteers should be able to choose from and rotate among to avoid resistance.

FTF volunteers, who provide assistance for the use or procurement of pesticides, shall, concurrently with this assistance, provide recommendations on rotating pesticides to avoid resistance.

FTF volunteers shall provide training to ensure that farmers understand the specific target pests and diseases that each pesticide product is designed to manage.

Many FTF country programs reported that inappropriate pesticides were used for target pests (eg. insecticide to control a plant disease or an insecticide effective only against aphids to control borers). This leads to wastage and loss of production. FTF volunteers shall ensure that not only do they recommend pesticides that are labeled for the target pest, but that they train farmers to understand that pesticides have narrow ranges of efficacy and that for each pest there are specific pesticides.

FTF volunteers shall provide information to farmers to help protect against the use of adulterated and obsolete products.

Most FTF country programs identified adulterated and obsolete pesticides as a significant problem in their countries. Provisions to protect against purchasing and using adulterated and obsolete products will differ, country to country. FTF volunteers should be aware that obsolete and adulterated products may be widely available in the host country, and they should be prepared to recommend provisions, including buying from reputable dealers, and scouting for efficacy—and switching pesticides if scouting indicates—to protect farmers.

(2) The following measures will help FTF volunteers to develop scouting and recordkeeping protocols for FTF recipients. Implementation of good scouting practices and regular recordkeeping will help minimize the need for pesticides, and help ensure that pesticides are used as a last resort protection measure.

Set up a scouting and recordkeeping program for recipients of FTF technical assistance to help monitor the need for pesticide application, pesticide efficacy, and environmental impacts of pesticides.

IPM is a dynamic process, and monitoring is a critical part of an IPM program. FTF volunteers shall help develop a scouting strategy and protocol, and shall train recipients in scouting techniques. IPM tactics should constantly be evaluated and changed in accordance with findings of the monitoring program. Many websites are available that provide information on scouting and recordkeeping, however most have been developed for use in the US, Australia, and Canada. These however, can be adapted to the local

situation. The following sites provide useful information that can be adapted to the volunteer's and farmers' needs:

http://www.hort.uconn.edu/ipm/greenhs/htms/scoutdecision.htm

http://www.umass.edu/umext/floriculture/fact_sheets/pest_management/ipmscout.html

http://www.nysipm.cornell.edu/publications/bpguide99/

FTF volunteers shall provide training to recipients so that they can collect data on reduction in efficacy and any other noted environmental impacts which should trigger a change to a different pesticide or other method of control; this should be done in conjunction with FTF assistance for the use or procurement of pesticides.

Along with this training, volunteers shall encourage farmers to communicate to neighboring farmers and extension officers any efficacy information gathered by farmers.

Prepare simple monitoring forms (scouting, recordkeeping) so that farmers have the tools to monitor efficacy and environmental impacts once the FTF volunteer leaves the country.

Because FTF volunteers are in-country for only a short period of time, they should leave farmers with the tools to monitor efficacy once the volunteer is gone. A simple monitoring/scouting plan with appropriate forms should be developed to suit the volunteer's and farmers' requirements.

Volunteers who prepare such plans should submit them to the FTF country office so that future volunteers can build upon these monitoring plans. In this way, the monitoring plan will remain a dynamic and up-to-date resource, available for future volunteers.

Volunteers should consider preparing an "IPM Notebook" with scouting forms, scouting records, MSDS sheets, pesticide labels, etc. for reference and use by farmers once the volunteer departs.

Volunteers who prepare such notebooks should submit them to the FTF country office for the use of future volunteers.

SUAP Attachment H: Key Websites for Pesticide and IPM Research

Key Websites for Pesticide Searches

http://www.pesticideinfo.org (PAN most complete pesticides database)
http://extoxnet.orst.edu/pips/ghindex.html (Extoxnet Oregon State database)
http://www.epa.gov/ecotox/ (EPA Ecotox Database)
http://www.cdpr.ca.gov/docs/epa/m2.htm (link to OPP site)
http://cfpub.epa.gov/oppref/rereg/status.cfm?show=rereg (EPA Registr.Eligib.Decisions)
http://www.epa.gov/pesticides/biopesticides/ai/all_ais.htm (EPA regulated biopesticides)
http://www.epa.gov/opppmsd1/RestProd/rupjun02.htm (EPA restricted use pesticides)
http://www.epa.gov/pesticides/health/tox_categories.htm (EPA Toxicity Classifications)
http://www.epa.gov/opppmsd1/PPISdata/index.html (EPA pesticide product information)
http://www.chemfinder.camsoft.com (chemical database & internet search, free & fee)
http://www.hclrss.demon.co.uk/index.html (compendium of pesticide common names)
http://www.agf.gov.bc.ca/pesticides/f_2.htm (all types of application equipment)
www.who.int/ipcs/publications/pesticides (WHO classification)
www.kellysolutions.com (for formulations registration status information)
www.greenbook.net and www.cdms.com for efficacy information and Material Safety Data Sheets found on pesticide labels

CABI Site for Crop Protection Compendium (CPC)

http://www.cabi.org/compendia/cpc/index.htm to enter CABI CPC for crop/pest reccs.

Obsolete Pesticides

http://www.fao.org/ag/AGP/AGPP/Pesticid/Disposal/en/103401/index.html

Pesticide Toxicity to Honey Bees

http://www.entm.purdue.edu/Entomology/ext/targets/e-series/EseriesPDF/E-53.pdf
http://www.ohioline.osu.edu/hyg-fact/2000/2161.html (Ohio State Extension site)

Pesticide Toxicity to Natural Enemies (Beneficials)

http://www.ipm.ucdavis.edu/PMG/r108900111.html

Biological Pesticides List

http://www.koppert.com (a Dutch biologicals company doing business internationally)
http://www.biobest.be (a Belgian biologicals company doing business internationally)
http://www.epa.gov/pesticides/biopesticides/ai/all_ais.htm (EPA's biopesticide list)
http://www.bio-bee.com/english/welcome.html (a biopesticide company in Israel)

PERSUAP Sites

http://www.encapafrica.org/sectors/pestmgmt.htm (PERSUAP guidance)
http://www.wateriqc.com/millenium_conference/Proceedings/powerpoint_presentations/Day_4/1030rossier.pps#285,10,Critical Pesticide Management Issues (EA History PPT)

International Conventions

http://www.pops.int/ (POPs website)

http://www.pops.int/documents/convtext/convtext_en.pdf (POPs Convention text)
http://www.chem.unep.ch/pops/pdf/redelipops/redelipops.pdf (reduce & eliminate POPs)

methyl-bromide site
http://www.epa.gov/ozone/mbr/harmoniz.html

www.wateriqc.com/millenium_conference/Proceedings/powerpoint_presentations/Day_4/1030rossier.pps#285,10, Critical Pesticide Management Issues

Audio-Visual IPM and SPU resources
http://entweb.clemson.edu/pesticid/publictn/resource.htm

SUAP Attachment I. Bullet Points for SOWs

The following information is provided for FTF implementers to include in volunteer SOWs.

Type 1 Assignments: These volunteers are expected to provide direct assistance for the use or procurement of pesticides. They will likely recommend and/or provide advice on specific pesticide active ingredients or products, and they may provide training in pesticide use, safe use, and IPM.

Items for Type 1 Assignment SOWs:

- The consultant shall review the FTF Environmental Brochure and the FTF Programmatic Pesticide Evaluation Report-Safe Use Action Plan (PERSUAP) and shall comply with requirements described in Section 4 of the SUAP when providing "assistance for the procurement or use" of pesticides.
- The consultant shall review the guidance in attachments A through H of the PERSUAP prior to providing recommendations for the use or procurement of pesticides; and shall be prepared to provide recommendations, based on this guidance, to recipients of FTF technical assistance.
- The consultant shall submit all monitoring forms, scouting forms, and other documents the FTF consultant may develop in regard to pesticide use, pesticide safe use training, and IPM to the FTF country office for use by future FTF volunteers.
- The consultant shall, at their discretion, provide recommendations to the FTF country office for additional FTF support for pesticide safe use training, IPM, or other pesticide-related topics.

If the consultant will be providing training in pesticides, IPM, pest management or other pesticide-related topics, s/he shall provide the syllabus for each training event for review and approval by the Mission Environmental Officer and/or the USAID COTR.

Consultant shall submit a brief report describing: (1) Pesticides that the FTF country program should be able to recommend/use that are not included in SUAP-Attachment A; (2) Limitations and successes of the PERSUAP; (3) Recommendations on additional technical assistance and training needed to improve pest and pesticide management practices; and (4) Tools, forms, and plans provided to FTF recipients to assist with implementing the volunteer's recommendations.

Type 2 Assignments: These volunteers may provide indirect assistance for the use or procurement of pesticides; they are not expected to recommend or provide advice on specific pesticide active ingredients or products. They will likely be in the field and may have the opportunity to encourage good practices in pesticide use and discourage bad practices.

Items for Type 2 Assignment SOWs:

- The consultant shall review the FTF Environmental Brochure and the FTF Programmatic Pesticide Evaluation Report-Safe Use Action Plan (PERSUAP) and shall comply with requirements described in Section 4 of the SUAP when providing "assistance for the procurement or use" of pesticides. The consultant is not expected to provide recommendations for specific pesticide active ingredients or products, but rather to provide advice, if necessary, on safe use of pesticides, and to discourage poor practices in pesticide use, transport, mixing, storage, application, and disposal.

- The consultant shall review the guidance in attachments B, C, F, and H of the PERSUAP and shall be prepared to provide recommendations, based on this guidance, to recipients of FTF technical assistance.
- The consultant shall, at their discretion, provide recommendations to the FTF country office for additional FTF support for pesticide safe use training, IPM, or other pesticide-related topics.

Consultant shall submit a brief report describing: (1) Limitations and successes of the PERSUAP; and (2) Recommendations on additional technical assistance and training needed to improve pest and pesticide management practices.

Type 3 Assignments: These volunteers are not expected to be involved in pesticide issues.

Items for Type 3 Assignment SOWs:

- The consultant shall review the FTF Environmental Brochure and be aware of FTF's legal requirements regarding the provision of assistance for the procurement or use of pesticides. The consultant shall not recommend or provide advice on specific pesticides.

Type 4 Assignments: These volunteers will be working on a USAID project/activity which may have a PERSUAP governing its activities related to the use and procurement of pesticides.

Items for Type 4 Assignment SOWs:

- If an existing Pesticide Evaluation Report-Safe Use Action Plan (PERSUAP) exists for the USAID activity the consultant will be working on, that PERSUAP takes precedence over the FTF Programmatic PERSUAP. The consultant should obtain a copy of the PERSUAP governing that project, and ensure compliance with the Safe Use Action Plan (SUAP). If there is no existing PERSUAP for the USAID project, the consultant shall obtain and review pertinent portions of the FTF Programmatic PERSUAP and comply with the SUAP (based on whether this is a Type 1, 2, or 3 assignment).

If governed by the FTF Programmatic PERSUAP, consultant shall submit a brief report, as required for [Type 1, 2, and 3 assignments].