PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN

PROJECT/ACTIVITY DATA

Project/Activity Name:	Office of American Schools and Hospitals Abroad (ASHA), Bureau for Democracy, Conflict and Humanitarian Assistance (DCHA), DCHA/ASHA
Amendment (Y/N):	N
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Prepared by:		DCHA/ASHA	
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Initial Environmental Examination Expiration Date:	Dec 31, 2022
Additional Analyses/Reporting Required:	N/A
Climate Risks Identified (#):	Low _N/A__ Moderate _N/A__ High _N/A__
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THRESHOLD DECISION MEMO AND SUMMARY OF FINDINGS

PURPOSE AND SCOPE OF THE INITIAL ENVIRONMENTAL EXAMINATION

The purpose of this Global Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) is to conduct a 1 2-factor environmental compliance and climate risk analysis of eight active ingredients approved for use in the chemical control of termites and rodents in vertical build construction. This PERSUAP, also known as the Global Construction PERSUAP, is comprised of a signatory Face sheet and a high -level analysis of several commonly used and effective active ingredients used for termite and rodent control before, during and after construction. It also contains templates and best practice guidelines for implementing partners to develop project specific a PERSUAP Supplement and IPM measures to accompany the use of the approved active ingredients in the manner prescribed by this Global Construction PERSUAP. This PERSUAP fulfills the requirements of Title 22, Code of Federal Regulations, Part 216 - precisely, 22 CFR 21 6.3 (b).

PROJECT/ACTIVITY SUMMARY

This PERSUAP analyses nine of the most commonly used and available Active Ingredients (Als) used in pesticides for termite and rodent control around the world, namely eight (8) termiticides including a wood preservative and one (I) rodenticide . This Construction PERSUAP also provides tools and resources for implementing partner to develop a PERSUAP Supplement outlining how they intend to effectively and safely use the approved active ingredients in pesticides for termite or rodent control as part of their IPM strategy.

ENVIRONMENTAL DETERMINATIONS

TABLE 1: ENVIRONMENTAL DETERMINATIONS

Projects/Activities	Recommended Environmental Threshold Determination	Recommended Climate Risk Rating
Procurement, use, transport, storage, or disposal of pesticides (requires PERSUAP).	Negative Determination with conditions	Low, as in ADS

BEO SPECIFIED CONDITIONS OF APPROVAL

Condition I: Develop PERSUAP Supplement: Implementing partners are required to complete a PERSUAP supplement to this Global PERSUAP. A template has been provided in Annex A This supplement may not modify the termiticide or rodenticide active ingredients that have been advanced for approval in this Global PERSUAP nor may the supplement circumvent the safety measures presented in this Global PERSUAP. Since this PERSUAP applies globally to ASHA projects, this supplement is intended to enhance the knowledge base provided by this Global PERSUAP by providing country- or regionally-specific information for ASHA projects.

Condition 2: Develop project specific IPM Plan: As part of the PERSUAP Supplement, implementing partners will need to develop and implement project-specific IPM plans that tier off of the generic plans provided in Annexes A and B.

USAID has also provided additional Annex C on Solicitation Language and Annex D on Contract Language. These templates are recommended for use when contracting pesticide applicators, to ensure that these service providers are certified and will conduct pesticide application in compliance to the requirements of this PERSUAP.

IMPLEMENTATION

In accordance with 22CFR216 and Agency policy, the conditions and requirements of this document become mandatory upon approval.

USAID APPROVAL OF PERSUAP

PROJECT/ACTIVITY NAME: GLOBAL PERSUAP FOR TERMITE AND RODENT CONTROL IN VERTICAL-BUILD CONSTRUCTION

Approval:

Anne Dix, ASHA Director	12/21/18 Date

Clearance:

Provided by email	6/21/2018
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Concurrence:

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**DCHA CIL clearance and BEO concurrence delayed pending discussions on potential amendment of PERSUAP to address wood preservatives more fully. PERSUAP amendment forthcoming.*

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GLOBAL PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN (PERSUAP)

FOR TERMITE AND RODENT CONTROL IN VERTICAL-BUILD CONSTRUCTION

BY THE OFFICE OF AMERICAN SCHOOLS AND HOSPITALS ABROAD IN THE BUREAU FOR DEMOCRACY, CONFLICT AND HUMANITARIAN ASSISTANCE (DCHA)

September 2019

GLOBAL PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN (PERSUAP)

For Termite and Rodent Control in Vertical-Build Construction

Prepared in Accordance with the Requirements of the

Initial Environmental Examination and 22 CFR 216

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September 2019

ABBREVIATIONS AND ACRONYMS

AIs	active ingredients
ASHA	American Schools and Hospitals Abroad
DCHA	The Bureau for Democracy, Conflict and Humanitarian Assistance
FY	fiscal year
GAP	Good Agricultural Practices
IPM	Integrated Pest Management
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute of Occupational Safety and Health
PERSUAP	Global Pesticide Evaluation Report and Safer Use Action Plan
PDS	Pesticide Data Sheet
P-IEE	Programmatic Initial Environmental Examination
PPE	Personal Protective Equipment
RED	Reregistration Eligibility Decision
RUP	Restricted Use Pesticide
ULV	Ultra Low Volume
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS i

1.0 INTRODUCTION 1

2.0 COUNTRY AND ENVIRONMENTAL INFORMATION 3

2.1 COUNTRY OVERVIEW 3

2.2 THE ROLE OF PESTICIDE MANAGEMENT 3

3.0 PESTICIDE EVALUATION REPORT 5

3.1 USEPA REGISTRATION STATUS OF THE PROPOSED PESTICIDES 5

3.2 BASIS FOR SELECTION OF THE PESTICIDES 5

3.3 EXTENT TO WHICH THE PROPOSED PESTICIDE USES ARE, OR COULD BE, PART OF AN IPM PROGRAM 8

3.4 PROPOSED METHOD OR METHODS OF APPLICATION, INCLUDING THE AVAILABILITY OF APPLICATION AND SAFETY EQUIPMENT 9

3.5 ANY ACUTE AND LONG-TERM TOXICOLOGICAL HAZARDS, EITHER HUMAN OR ENVIRONMENTAL, ASSOCIATED WITH THE PROPOSED USE, AND MEASURES AVAILABLE TO MINIMIZE SUCH HAZARDS 14

3.6 EFFECTIVENESS OF THE REQUESTED PESTICIDES FOR THE PROPOSED USE 20

3.7 COMPATIBILITY OF THE PROPOSED PESTICIDE USES WITH TARGET AND NON-TARGET ECOSYSTEMS 22

3.8 CONDITIONS UNDER WHICH THE PESTICIDES ARE TO BE USED, INCLUDING CLIMATE, FLORA, FAUNA, GEOGRAPHY, HYDROLOGY, AND SOILS 22

3.9 AVAILABILITY OF OTHER PESTICIDES OR NON-CHEMICAL CONTROL METHODS 23

3.10 HOST COUNTRY'S ABILITY TO REGULATE OR CONTROL THE DISTRIBUTION, STORAGE, USE, AND DISPOSAL OF THE REQUESTED PESTICIDES 23

3.11 PROVISION FOR TRAINING OF USERS AND APPLICATORS 23

3.12 PROVISION MADE FOR MONITORING THE USE AND EFFECTIVENESS OF PESTICIDES 25

4.0 GLOBAL SAFER USE ACTION PLAN 27

4.1 SUMMARY OF APPROVED AIS AND APPLICATION REQUIREMENTS 27

4.2 HANDLING, TRANSPORTING, AND STORING PESTICIDES 30

4.3 MEDICAL EMERGENCIES AND BASIC FIRST AID 31

4.4 UNDERSTANDING PESTICIDE LABELS 33

4.5 ENSURING USE OF QUALITY PESTICIDES 33

4.6 ADDITION MITIGATION MEASURES AND CONDITIONS 34

4.7 INSTRUCTIONS FOR ASHA PARTNERS WHEN DEVELOPING THE SUPPLEMENTS TO THIS PERSUAP 35

ANNEX A: TEMPLATE FOR PERSUAP SUPPLEMENT 36

ANNEX B: BEST PRACTICES AND INTEGRATED PEST MANAGEMENT FOR TERMITE AND RODENT CONTROL 5143

ANNEX C: SOLICITATION LANGUAGE 531

ANNEX D: CONTRACT LANGUAGE 53

ANNEX E: PESTICIDE DATA SHEETS 55

ANNEX F: AIS REJECTED FOR USE IN THIS GLOBAL PERSUAP AND WHO/USEPA TOXICITY CLASSIFICATIONS 58

LIST OF TABLES

TABLE 1. LIST OF USAID APPROVED PESTICIDES FOR TERMITE AND RODENT CONTROL IN VERTICAL BUILD CONSTRUCTION 7

TABLE 2. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS 11

TABLE 3. ENVIRONMENTAL FATE AND ECOLOGICAL TOXICITY OF THE APPROVED AIS 17

TABLE 4. KEY ACUTE AND CHRONIC TOXICITIES OF THE APPROVED AIS TO HUMANS 19

TABLE 5. SUMMARY OF APPROVED ACTIVE INGREDIENTS AND APPLICATION REQUIREMENTS 27

TABLE 6. LIST OF USAID APPROVED PESTICIDES FOR TERMITE AND RODENT CONTROL IN VERTICAL BUILD CONSTRUCTION 37

TABLE 7. ILLUSTRATIVE CLIMATE STRESSORS AND RISKS 43

TABLE 8. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS 48

TABLE 9. USEPA REGISTRATION STATUS, ACUTE TOXICITY CATEGORIZATION, RUP DESIGNATION, AND REQUEST FOR APPROVAL STATUS 60

TABLE 10. WHO – THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING OF CHEMICALS (GHS) 61

TABLE 11. EPA ACUTE TOXICITY CATEGORIES 61

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1.0 INTRODUCTION

The Bureau for Democracy, Conflict and Humanitarian Assistance (DCHA)/American Schools and Hospitals Abroad (ASHA) provides support for schools, libraries and hospitals in more than 70 countries across the world. This Global Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) supports the procurement and use of pesticide active ingredients (AIs) for termite and rodent control in conjunction with the construction of new permanent structures and the structural improvements or renovation/rehabilitation and maintenance of existing structures. This Global PERSUAP has been prepared as required by Condition 6 of the FY 15-19 Programmatic Initial Environmental Examination (P-IEE) for Technical Assistance, Commodities and Construction by USAID/DCHA/ASHA.

There is no agricultural nor livestock component to this Global PERSUAP. Likewise, while wood preservatives are not specifically addressed in this PERSUAP, two of the most widely-registered and commonly-used wood preservatives are recommended in this Global PERSUAP, namely: disodium octaborate and disodium octaborate tetrahydrate[1].

This document specifies the pesticides that may or may not be used specifically for termite and rodent control as well as the safety, training and monitoring measures that must be followed in ASHA projects across the globe when using termiticides and rodenticides. By necessity, this document lacks country- or region-specific information such as:

- Local/national registration status of the approved pesticides;
- Availability of formulated products for termite and rodent control that contain only the AIs that are approved in this Global PERSUAP. Proposed formulations of the AIs approved in this Global PERSUAP must be identified by IPs in supplements to this Global PERSUAP as discussed below;
- Local/regional environmental information, such as ecological zones, hydrogeology, soil types, annual precipitation, sensitive ecological receptors, etc.; and
- Detailed plans for new or existing construction, including footprint dimensions, foundation type, locations proposed for termite control or rodent trap deployment.

Local/regional data must be provided by Implementing Partners (IPs) in country- or regionally-specific supplements to this Global PERSUAP when an ASHA project scope includes termite and/or rodent control. This Global PERSUAP contains outlines of required written content for the supplement to this Global PERSUAP in Annex A and as discussed in the subsequent sections of this document. Note that the term "regionally" is defined broadly to mean that it pertains to a portion of a country, such as a county, or to a single building site or multiple building sites within a country. The rationale for differentiating between "country" and "region" is that AIs may not be uniformly available across an entire country and thus, multiple supplements might be required to cover multiple projects within a particular country. Conversely, if the AIs are uniformly available throughout the country in question a single, country-wide supplement to this Global PERSUAP may be a feasible approach.

[1] More information on wood preservatives can be found here: https://www.epa.gov/ingredients-used-pesticide-products/overview-woodpreservative-chemicals. A more in-depth analysis of wood preservatives may be conducted in future amendments of this PERSUAP.

The following Annexes are included in this Global PERSUAP:

Annex A: Template for PERSUAP Supplement
Annex B: Best Practices and Integrated Pest Management for Termite and Rodent Control
Annex C: Solicitation Language
Annex D: Contract Language
Annex E: Pesticide Data Sheets
Annex F: AIs Rejected for Use in this Global PERSUAP or Recommended for further study, and WHO/USEPA Toxicity Classifications

2.0 COUNTRY AND ENVIRONMENTAL INFORMATION

2.1 COUNTRY OVERVIEW

This section must be addressed in each country- or regionally-specific supplement to this Global PERSUAP. See Annex A for an outline of material that must be included in the PERSUAP Supplement to this Global PERSUAP.

2.2 THE ROLE OF PESTICIDE MANAGEMENT

The primary focus of this Global PERSUAP is the protection of the following:

- humans who mix and/or apply termiticides and those who deploy rodenticides only in tamper-resistant, pre-baited traps;
- humans who live, work or may otherwise be in close proximity to areas where termiticides and rodenticides are applied (including those who may consume drinking water obtained from groundwater wells or surface water bodies that may be impacted by applied termiticides and rodenticides, as noted in the following bullet); and
- non-targeted organisms and natural resources, including:
    - honeybee populations;
    - other beneficial insects;
    - bird populations;
    - mammalian populations;
    - aquatic vertebrates (freshwater and marine/estuarine);
    - aquatic invertebrates (freshwater and marine/estuarine);
    - aquatic plants;
    - amphibians; and
    - surface water bodies, shallow ground water and/or ground water underlying permeable soils.

Thus, the goal of this Global PERSUAP is to identify pesticides that will be effective for termite control for construction projects and rodent control while minimizing adverse effects on humans, non-targeted organisms and natural resources (e.g., ground water). Many termiticides are classified as Restricted Use Pesticides (RUP) for agricultural uses and many rodenticides are of Acute Toxicity Category I according to USEPA documentation. While termite and rodent control are not agricultural uses for the purposes of this Global PERSUAP, improper application of termiticides and rodenticides that are, by their very nature, of high toxicity, could put humans and non-target organisms at risk. This Global PERSUAP includes the following important requirements:

- The approved termiticides may only be mixed and/or applied by certified professional pesticide mixers and applicators[2] that have been trained in termiticide use (including wood treatment) and applications may not be performed directly to termite colonies; and
- For the general public (including any construction workers and residents and/or employees at ASHA facilities), the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. Construction workers and the general public may only deploy pre-baited, tamper-resistant rodent traps within 50 feet of existing structures. Trained, certified professional pesticide applicators may deploy baited, tamper-resistant rodent traps within 100 feet of existing structures. Rodenticide products deployed outdoors must be labeled for outdoor use.

These requirements will greatly aid in reducing the risk to humans and ecological receptors associated with the use of pesticides that are either highly toxic to humans and/or other non-target organisms. It is not feasible to train members of the general public in rodenticide deployment; however, limiting use of the approved rodenticide by members of the general public to pre-baited, tamper-resistant traps mitigates the risk to human health and the environment. These types of products can be considered to be "household use" products.

[2] The term "trained, certified professional mixers and applicators that have been trained in termiticide use" implies a high degree of competence; however, not all training and/or certification programs are of equal or necessarily sufficient rigor. Refer to Section 3.11 and the SUAP portion of this Global PERSUAP for the minimum requirements that must be included in training and certification programs. Country- or regional-specific Supplements to this Global PERSUAP must indicate that these minimum requirements will be met.

3.0 PESTICIDE EVALUATION REPORT

3.1 USEPA REGISTRATION STATUS OF THE PROPOSED PESTICIDES

USEPA registers pesticides based on AI but confers either General Use or Restricted Use designations based on product formulation. USEPA has in the past utilized both reregistration and registration review processes for evaluating pesticides. If a pesticide was first registered on or after November 1, 1984[3], the process of reregistration does not apply, but the pesticide is subject to registration review. In either case, the processes are similar in that it involves the collection of data to fill possible data gaps and documents use patterns and potential risks associated with the pesticide. Pesticides that are either undergoing reregistration or registration review, are considered to be registered in the U.S. Currently USEPA is transitioning older pesticides from the reregistration process to the registration review process.

Occasionally, registered uses for a pesticide may be cancelled by USEPA; this may result from a request for voluntary cancellation of uses by the manufacturer or as a result of USEPA concerns over the toxicity of a pesticide. If a pesticide AI is not currently registered by USEPA for termite and rodent control then approval for use of the pesticide will not be requested in this PERSUAP. In addition to USEPA approved-pesticides, EU-approved pesticides may also be considered if the former are not locally available or registered for use by host country pesticide regulatory authorities.

The registration status of each of the pesticides being advanced for approval in this Global PERSUAP is presented in Table 1 in Section 3.2. Additional supporting information, including acute toxicity classifications from the World Health Organization (WHO) and USEPA, along with additional pesticide-specific information, is also included. All pesticides being advanced for approval in this Global PERSUAP are currently registered by USEPA. Documentation of host country registration at the formulated product level is to be included in country- or regionally-specific supplements to this Global PERSUAP as described in Section 3.10.

3.2 BASIS FOR SELECTION OF THE PESTICIDES

Table 1 summarizes the termiticides and rodenticides that are being advanced for approval in this Global PERSUAP along with their USEPA Registration status, WHO and USEPA Acute Toxicity Classification/Category (for the technical grade (>90%) product; formulated products are typically of lesser acute toxicity), RUP designation, and notes on use limitations. See Annex F for more information on the acute toxicity criteria used by WHO and USEPA. Several AIs were considered for approval but were rejected for a variety of reasons. Discussion and rationale for their rejection is presented in Annex F. These rejected AIs are not discussed in the main body of this Global PERSUAP.

Although some of the approved AIs may be Acute Toxicity Category I as technical grade products, termiticides and rodenticides are typically of low percent composition, which reduces the acute toxicity of the formulated product. Limitations on how the approved termiticides and rodenticide may be

[3] https://www.epa.gov/pesticide-reevaluation/reregistration-and-other-review-programs-predating-pesticide-registration

applied or deployed (see discussion in paragraph immediately above) will mitigate risks associated with these acutely toxic AIs.

Typically, RUPs and Acute Toxicity Category I pesticides are not approved in PERSUAPs. A few of the AIs approved in this Global PERSUAP may have RUP formulations when used for termite or rodent control (i.e., certain formulations containing bifenthrin, cypermethrin, fipronil and diphacinone). However, the termiticides approved in this Global PERSUAP may only be mixed and/or applied by certified professional pesticide mixers and applicators that have been trained in termiticide use (including wood treatment).

For construction workers and the general public, the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. Construction workers and the general public may only deploy pre-baited, tamper-resistant rodent traps within 50 feet of existing structures. Trained, certified professional pesticide applicators may deploy baited, tamper-resistant rodent traps within 100 feet of existing structures. Rodenticide products deployed outdoors must be labeled for outdoor use.

Only products containing the AIs in Table 1 may be used for termite and rodent control as part of ASHA construction and maintenance projects. The AIs in Table 1 are generally widely available, of reasonable cost, effective for termite or rodent control (acetamiprid must be formulated with bifenthrin for sufficient efficacy). A discussion of the relative risk of these AIs to humans, non-target ecological receptors and natural resources (e.g., ground water and surface water) is included in Section 3.5. This discussion can inform choice of lesser-risk AIs if options are available.

TABLE 1. LIST OF USAID APPROVED PESTICIDES FOR TERMITE AND RODENT CONTROL IN VERTICAL BUILD CONSTRUCTION			
ACTIVE INGREDIENT	ACUTE TOXICITY CATEGORY[4]	RUP?[5]	APPROVED PESTICIDE?
Termiticides			
Acetamiprid	WHO: Not listed EPA: II	No	**Yes; but only in products that are co-formulations with bifenthrin**
Bifenthrin	WHO: II EPA: II	Some RUPs	**Yes**
Cypermethrin	WHO: II EPA: II	All agricultural formulations; some termiticides	**Yes**
Deltamethrin	WHO: II EPA: II	Emulsifiable concentrate is RUP on cotton only	**Yes**
Fipronil	WHO: II EPA: II	Some RUPs	**Yes**
Imidacloprid	WHO: II EPA: "moderate" is most stringent	No	**Yes; but not adjacent to flowering vegetation or when honeybees are foraging**
Permethrin	WHO: II EPA: III	Not RUP for termite control	**Yes**
Wood preservatives			
Disodium octaborate*; disodium octaborate, tetrahydrate	WHO: III EPA: III	No	**Yes; but limited to products named as disodium octaborate; disodium octaborate, tetrahydrate; boron sodium oxide; or boron sodium oxide, tetrahydrate.** **<u>Do not use</u> anhydrous borax (sodium borate) or any other borates.**
Rodenticide			
Diphacinone	WHO: Ia EPA: I	Some RUPs	**Yes; but only in tamper-resistant pre-baited traps and within 50 feet (general public) or 100 feet (trained, certified professionals) of existing structures. Only products labeled for outdoor use may be deployed outdoors.** **<u>Do not use</u> diphacinone sodium salt as this is not formulated for bait traps.**

[4] Classifications and categories are for Technical Grade pesticide. Formulated products are often of lesser acute toxicity. WHO assigns a single classification (The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 2009. World Health organization, 2010. Available on the Internet at: http://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf). EPA has several toxicity categories for various routes of exposure. Only the most stringent EPA category is given here. EPA categories come from REDs, Pesticide Summaries, Facts Sheets, and Registration Review Documentation..

[5] RUP status obtained from USEPA documentation (e.g., REDs, Summary documents, etc. and the January 19, 2016 RUP Report: https://www.epa.gov/sites/production/files/2016-02/documents/rupreport-sec3-update-jan2016.pdf) where available. Other sources include:

Rhode Island Department of Environmental Management. No date. Federally Restricted and State-Limited Use Pesticides. Available on the Internet at: http://www.dem.ri.gov/programs/bnatres/agricult/pdf/frup.pdf

University of Florida (U.S.) IFAS Extension. 2009. Restricted Use Pesticides, available on the Internet at: http://edis.ifas.ufl.edu/pi073

University of Nebraska. 2003. Federally Registered Restricted Use Pesticides. (U.S.), available on the Internet at: http://www.ag.ndsu.nodak.edu/aginfo/pesticid/pdf/ec2500.pdf

* Also known as boron sodium oxide

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP. Pesticide Data Sheets (PDSs) for each AI approved in this Global PERSUAP are presented in Annex E.

3.3 EXTENT TO WHICH THE PROPOSED PESTICIDE USES ARE, OR COULD BE, PART OF AN IPM PROGRAM

Pesticidal measures are typically required for termite and/or rodent control; however, good practices can help to reduce the likelihood of termite or rodent infestation. The ASHA approach to Integrated Pest Management (IPM) will be supplemented by the protective measures that are detailed for each pesticide in the SUAP section of this Global PERSUAP. The ASHA Project approach to IPM is attached as Annex B. ASHA's approach to IPM stresses non-pesticidal measures in their IPM approach in cases where the more toxic pesticides such as termiticides and rodenticides represent the only chemical option.

Some good practices that may discourage termites include[6]:

- Use concrete for foundations where feasible;
- Minimize the amount of wood that contacts the soil surface and/or seal the wood or cover with metal barrier
- Keep soil around foundation dry through proper drainage and grading practices;
- Repair openings in the structure that allow termites access using cement, caulk or grout;
- Do not plant trees and plants too near the structure such that they grow against wooden features of the structure; and
- If wood is to be stored on-site, sore it remotely from on-site structures; however, this may encourage rodent infestation.

Some good practices that may discourage rodents include:[7]

- Clear rubbish and garbage from areas adjacent to buildings;
- Store food, seeds, garbage and other refuse in covered containers;
- Clean up livestock and pet droppings daily; and
- Properly dispose of old wood and garbage on a regular basis.

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

[6] https://www.epa.gov/safepestcontrol/termites-how-identify-and-control-them

[7] http://www.humanesociety.org/animals/rats/tips/solving_problems_rats.html?referrer=https://www.google.com/

3.4 PROPOSED METHOD OR METHODS OF APPLICATION, INCLUDING THE AVAILABILITY OF APPLICATION AND SAFETY EQUIPMENT

Due to the relatively high toxicity of most termiticides, only certified professional pesticide mixers and applicators that have been trained in termiticide use (including wood treatment) may handle, mix and apply termiticides. For construction workers and the general public, the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure; thus, only baseline Personal Protective Equipment (PPE; baseline consists of long-sleeved shirt, long pants, shoes plus socks) is required for construction workers and the general public. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. It is required that trained, certified professional pesticide applicators will have access to and will always use appropriate PPE as specified in this PERSUAP.

Additional items of PPE that are needed when using the various termiticides include chemical resistant gloves, chemical resistant gloves, chemical resistant aprons, eye protection and Mine Safety and Health Administration (MSHA)/National Institute of Occupational Safety and Health (NIOSH) equivalent respirators. The AIs for which these various additional items of PPE are required are discussed in Table 2, Section 3.5 and summarized in the SUAP portion as well as Annex B of this Global PERSUAP.

TERMITICIDE APPLICATION

For termiticides to be effective as a soil barrier, they must be well-distributed in soil. The ability to effect proper distribution in soil is highly dependent upon soil type. Coarse-grained soils such as sands and gravels readily allow for proper distribution; however, they are also susceptible to forming void spaces, especially if the coarse-grained content is high and/or if cobbles (diameter ~80-120 millimeters; ~3-5 inches) are present. Void spaces must be avoided to prevent pathways for termites to migrate without contacting the termiticide. Finer-grained soils such as loams, silts and clays tend to aggregate more tightly than do coarse-grained soils. As a result, care must be taken to ensure that termiticides are properly distributed in fine-grained soils. In cases of extreme drought, soil may crack and form preferential pathways. Termiticides must not be applied under these conditions to avoid transport of termiticides away from the treatment area. This could result in impacts to potable water wells, surface water bodies and will not result in effective termite control due to the large void spaces in soil. Arid, cracked soils must be rehydrated and compacted to remove preferential pathways prior to termiticide application (note that this is also good engineering practice to ensure a stable foundation for the structure).

This Global PERSUAP allows the following types of termiticide application. Those AIs that are approved in this Global PERSUAP are listed for each type of application; however, the products that are used must have labeled uses that correspond to these types of application (**e.g., products that are registered for agricultural uses only must not be used**). Application of termiticides is limited to soil at new construction sites, existing foundations/footings and immediately adjacent soil, wood treatment and spot/crack/crevices in existing structures. No application of termiticides directly to termite colonies is allowed and subsequent or annual re-treatment of soil is not allowed unless infestation is documented.

- Soil trenching and drenching for new construction – this process involves digging a narrow, shallow trench along the perimeter of where the new foundation is to be constructed. The

trench is then filled with termiticide solution and the solution is allowed to percolate into the native soil. The excavated soil from the trench should also be carefully mixed with termiticide solution and then backfilled into the trench.

Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

- Soil trenching and rodding for new construction – this process is similar to trenching and drenching; however, the termiticide is applied to the unexcavated soil by driving a rod several inches into the soil and the termiticide is introduced via gravity through the rod.

  Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

- Submersion, brushing or low-pressure spraying of wood to be used in construction with and only with disodium octaborate (boron sodium oxide) or disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate) – this process involves the pretreatment of wood that will be used for construction.

  Allowed AIs: **disodium octaborate (boron sodium oxide)** and **disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate)** products that are registered and labeled for wood treatment as part of termite control.

- Spot, crack and crevice (indoor or outdoor – use only products specifically labeled for the intended indoor or outdoor application) treatments for existing structures – this process serves as long-term prevention of reinfestation. Certain products are registered for indoor use while others are registered for outdoor use. Some may be registered for both. No indoor broadcast spraying is allowed (household low-pressure spraying of spots, cracks and crevices with deltamethrin ready-to-use spray formulations is allowed in this Global PERSUAP) and products must only be used on building structural elements such as foundations, wall voids, joists, etc. Do not apply to carpeting, drapery or other porous fabrics or in food preparation or storage areas. Treatment of impervious surfaces exterior to structures, such as concrete or asphalt walls and walkways is not to be performed.

  Allowed AIs: **acetamiprid** with **bifenthrin (outdoor use only)**; **bifenthrin**; **deltamethrin**; **permethrin (outdoor use only)** products that are registered and labeled for household spot, crack and crevice use as part of termite control

- Soil trenching and rodding for existing structures – this process is conducted as described above for "soil trenching and drenching for new construction" but is used to protect existing structures at sites that were not treated for termite control or structures where infestation is observed and documented. The trench must not be dug to a depth below existing footings. Due to the potential for sub-surface migration to potable wells or surface water bodies, sub-slab injection is not allowed for existing structures; only passive introduction of the termiticide via rodding may be performed.

Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

Termiticides must not be applied to soil that is frozen or already completely saturated with water. Do not apply termiticides if run-off is likely. No indoor or outdoor fogging or fogging/misting is allowed. The only AIs for that may be applied via spraying are disodium octaborate (boron sodium oxide) or disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate) for wood treatment.

Note that not all termiticide AIs that are approved in this Global PERSUAP may be used for all of the uses listed above. Use only products that are labeled for termite control. The termiticide AIs that are approved in this Global PERSUAP also have agricultural uses. Products containing the termiticide AIs must be specifically labeled for termite control and they must be registered for this use in the host country.

RODENTICIDE DEPLOYMENT

For construction workers and the general public, the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. Construction workers and the general public may only deploy pre-baited, tamper-resistant rodent traps within 50 feet of existing structures. Trained, certified professional pesticide applicators may deploy baited, tamper-resistant rodent traps within 100 feet of existing structures. Rodenticide products deployed outdoors must be labeled for outdoor use.

Procedures for pesticide application and safe use (for human health and natural resources/ecological receptors) are also presented in the PDSs and on pesticide labels. These procedures must also be included in the ASHA training program, as detailed in Section 3.11 and the SUAP portion of this PERSUAP.

TABLE 2. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS

ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
Termiticides				
Acetamiprid [+ Bifenthrin]	Microemulsion and water-soluble packet; both AIs at similar concentrations; total of both not to exceed 50%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Acetamiprid must be co-formulated with bifenthrin and labeled for termite control
Bifenthrin	Emulsifiable concentrate, flowable liquid, microencapsulation and	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space	Must be labeled for termite control

TABLE 2. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS				
ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
	microemulsion; not to exceed 25%		Eye protection if in unventilated space or applying via rodding	
Cypermethrin	Emulsifiable concentrate, termiticide concentrate and ready-to-use; not to exceed 26%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant boots, gloves, apron Eye protection Respiratory protection if in unventilated space	Must be labeled for termite control
Deltamethrin	Ready-to-use spray and dust; not to exceed 0.05%	Long-sleeved shirt, long pants, and shoes plus socks	None	Only household products for spot, crack, crevice termite control may be used
Fipronil	Soluble concentrate; not to exceed 10%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Imidacloprid	Water-dispersible granules and flowable liquid; not to exceed 70%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Permethrin	Flowable liquid; not to exceed 40%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Wood Preservative				
Disodium octaborate; disodium octaborate, tetrahydrate	Powder and granular; typically 95-100%	Long-sleeved shirt, long pants, and shoes plus socks	<u>If treating wood:</u> Chemical resistant gloves Respiratory protection Eye protection <u>If using pre-treated wood:</u> Chemical resistant gloves	Must be labeled for wood treatment for termite control
Rodenticide				

TABLE 2. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS

ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
Diphacinone	Trained, certified professional applicators: blocks and pellets to be applied in tamper-resistant traps within 100 feet of existing structures; not to exceed 0.005% General public: blocks in pre-baited, tamper-resistant traps within 50 feet of existing structures; not to exceed 0.005%	Long-sleeved shirt, long pants, and shoes plus socks	None	Only trained, certified professional applicators may bait traps; all others must procure and use only pre-baited, tamper-resistant traps. Only products labeled for outdoor use may be deployed outdoors.

The availability of PPE is critical, but PPE is only effective if those who use pesticides are properly trained in their use and the reasons for their use. Typical obstacles to the proper use of application and safety equipment include:

- Potentially low literacy rate in the host country. Pesticide labeling is the cornerstone of USEPA's pesticide registration process and labels are of little use to those who cannot read (other than the symbols that may be present on the labels). This is where the use of trained, certified professional pesticide applicators for termite control exhibits a primary benefit;
- Hot climates make use of bulky PPE uncomfortable and inconvenient, even when it is available;
- Supply lines may not be well-established in the host country;
- Poor storage practices;
- Poor cleanup and disposal practices;
- A lack of understanding that pesticide toxicity to humans may be very different than the toxicity of a pesticide to non-target organisms.

All of these topics apply primarily to certified professional pesticide mixers and applicators that have been trained in termiticide and/or rodenticide use (since the use of household rodenticide products in pre-baited, tamper-resistant traps by the general public is beyond the scope of training). These topics must be addressed in the training and certification program specific too the country or region in question as further detailed in Section 3.11 and in the SUAP portion of this Global PERSUAP.

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.5 ANY ACUTE AND LONG-TERM TOXICOLOGICAL HAZARDS, EITHER HUMAN OR ENVIRONMENTAL, ASSOCIATED WITH THE PROPOSED USE, AND MEASURES AVAILABLE TO MINIMIZE SUCH HAZARDS

Acute and chronic risks to humans and ecological receptors, as well as procedures to minimize these hazards (including use of PPE and proper pesticide storage practices) are detailed in Section 3.4, later in this section and in Section 3.7. These topics must be included in any training and certification programs for projects that are conducted under this Global PERSUAP.

In addition to the use of pesticide formulation-specific PPE detailed in Table 2, some general hygienic procedures, applicable to all pesticide-use scenarios, are presented here. The following general hygienic procedures for worker safety from USEPA's Reregistration Decision (RED) document for permethrin[8] can be generally applied for all pesticide application scenarios. However, the label of the pesticide may specify details that differ from these general measures or additional measures (particularly for worker protection), and must be consulted.

3.5.1 GENERAL HYGIENIC PROCEDURES

- *Application Restrictions: Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application;*
- *User Safety Requirements: Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions exist for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched (except as required by directions for use) or heavily contaminated with this product's concentrate. Do not reuse them; and*
- *User Safety Recommendations: Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.*

3.5.2 USEPA'S APPROACHES TO CARCINOGENICITY

USEPA has established several classification schemes for carcinogenicity[9] since 1986. Since toxicological data for many pesticides have been published over the course of many years, there is no single carcinogenicity classification scheme that can be used to describe all of the pesticides in this PERSUAP.

USEPA's current classification scheme consists of the following five elements:

- ***Carcinogenic to humans;***
- ***Likely to be carcinogenic to humans;***

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[8] USEPA. 2009. Reregistration Eligibility Decision for Permethrin. EPA 738-R-09-306. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-109701_11-May-09.pdf

[9] USEPA. 2011. Evaluating Pesticides for Carcinogenic Potential; website. Last updated March 14, 2017; accessed June 7, 2017. Available on the Internet at: https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/evaluating-pesticides-carcinogenic-potential

- Suggestive evidence of carcinogenic potential;
- Inadequate information to assess carcinogenic potential; and
- Not likely to be carcinogenic to humans

In 1999, USEPA established a draft classification scheme that closely-resembles the current (2005) scheme:

- ***Carcinogenic to humans;***
- ***Likely to be carcinogenic to humans;***
- Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential;
- Data are inadequate for an assessment of human carcinogenic potential; and
- Not likely to be carcinogenic to humans

In 1996, USEPA proposed an update to the 1986 scheme:

- ***Known/likely;***
- Cannot be determined; and
- Not likely

USEPA's initial carcinogenicity classification scheme (1986) consisted of five primary classifications:

- ***Group A - Human carcinogen;***
- ***Group B1 and B2 - Probable human carcinogen***
  - ***Group B1 - limited evidence of carcinogenicity from epidemiologic studies***
  - ***Group B2 - sufficient evidence from animal studies, but inadequate evidence or no data from epidemiologic studies***
- Group C - Possible human carcinogen;
- Group D - Not classifiable as to human carcinogenicity; and
- Group E - Evidence of non-carcinogenicity for humans

Of the AIs being advanced for approval in this PERSUAP, only permethrin is classified in one of the classifications of greatest concern that appear above in ***bold italics***. Permethrin has been classified by USEPA as "likely to be carcinogenic to humans" by the oral route of exposure. Permethrin is an effective termiticide and the limitation imposed by this Global PERSUAP that the termiticides be used only by certified professional mixers and applicators that have been trained in termiticide use mitigates this risk to sufficient levels, **provided that each country- or regionally-specific supplement to this Global PERSUAP documents that the components of the country- or regionally-specific certification and training programs meet the minimum requirements of Section 3.11 and the SUAP section of this Global PERSUAP**.

The USEPA classifications for each AI approved in this Global PERSUAP are:

- Acetamiprid – Not likely to be carcinogenic to humans[10]
- Bifenthrin – Possible human carcinogen[11]
- Cypermethrin – Group C, possible human carcinogen[12]
- Deltamethrin – Not likely to be carcinogenic to humans[13]
- Diphacinone – Not established by USEPA due to lack of food-related use[14]
- Disodium octaborate – Group E, no evidence of non-carcinogenicity to humans[15]
- Fipronil – Group C, possible human carcinogen[16]
- Imidacloprid – Group E, no evidence of non-carcinogenicity to humans[17]
- Permethrin – Likely to be carcinogenic to humans[18]

If, during the evolution of the ASHA project, less toxic yet at least as effective alternatives among these approved AIs are identified, these alternatives should be prioritized for use instead of permethrin.

3.5.3 ENVIRONMENTAL FATE, ECOLOGICAL TOXICITY AND ACUTE/CHRONIC TOXICITY TO HUMANS

To reduce the likelihood of termiticides leaching from soil and impacting groundwater (which may lead to contamination of potable water wells and/or surface water bodies), if there is concern based on the presence of a shallow water table, choose a termiticide that is not likely to be mobile or stable enough to impact ground water based on the information in Table 3. The qualitative assessment of mobility and persistence of the AIs summarized in Table 3 has, in many cases, been based on numerical data for solubility, sorption and degradation in the cited references.

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[10] Federal Register. 2015. 80 FR 68772. November 6, 2015. Available on the Internet at: https://www.federalregister.gov/documents/2015/11/06/2015-28356/acetamiprid-pesticide-tolerances

[11] USEPA. 2010. Bifenthrin Summary Document Registration Review: Initial Docket June 2010. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0384-0003

[12] USEPA. 2008. Reregistration Eligibility Decision for Cypermethrin (Revised 1/14/08). EPA OPP-2005-0293. Available on the Internet at: https://archive.epa.gov/pesticides/reregistration/web/pdf/cypermethrin_revised_red.pdf

[13] Federal Register. 2004. 69 FR 62602, October 27, 2004. Available on the Internet at: https://www.gpo.gov/fdsys/pkg/FR-2004-10-27/pdf/04-24040.pdf

[14] USEPA. 1997. Reregistration Eligibility Decision, Rodenticide Cluster. EPA 738-R098-007. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_G-69_1-Sep-97.pdf

[15] USEPA. 1994. Reregistration Eligibility Decision, Boric Acid and its Sodium Salts. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-011001_16-Feb-94.pdf

[16] USEPA. 2011. Fipronil Summary Document Registration Review. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2011-0448-0003

[17] USEPA. 2008. Imidacloprid Summary Document. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2008-0844-0002

[18] USEPA. 2009. Reregistration Eligibility Decision for Permethrin (Revised May 2009). EPA 738-R-09-306. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-109701_11-May-09.pdf

TABLE 3. ENVIRONMENTAL FATE AND ECOLOGICAL TOXICITY OF THE APPROVED AIS				
ACTIVE INGREDIENT	MOBILITY	PERSISTENCE	ECOLOGICAL TOXICITY	REFERENCES (SEE FOOTNOTES)
TERMITICIDES				
Acetamiprid	Fairly mobile	Degrades rapidly via aerobic biodegradation	Toxic to certain aquatic invertebrates; moderately toxic to bees	19, 20
Bifenthrin	Immobile	Very Persistent	Highly toxic to freshwater fish, aquatic amphibians and bees; very highly toxic to freshwater invertebrates and marine fish and invertebrates	21
Cypermethrin	Relatively immobile	Moderately persistent	Highly toxic to freshwater fish and invertebrates, marine invertebrates and bees	22, 23
Deltamethrin	Relatively immobile	Moderately to highly persistent	Highly toxic to bees; very highly toxic to freshwater and marine fish and invertebrates	24
Fipronil	Relatively immobile	Relatively persistent	Toxic to freshwater and marine fish and invertebrates, birds and terrestrial vertebrates	25, 26
Imidacloprid	Low to moderately mobile	Persistent	Toxic to bees, birds, small mammals, freshwater and marine invertebrates	27, 28

[19] USEPA. 2002. Pesticide Fact Sheet, Acetamiprid. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/registration/fs_PC-099050_15-Mar-02.pdf

[20] USEPA. 2001. HIARC Briefing Packages, Acetamiprid. Available on the Internet at: https://archive.epa.gov/pesticides/chemicalsearch/chemical/foia/web/pdf/099050/099050.pdf

[21] USEPA. 2010. Bifenthrin Summary Document Registration Review: Initial Docket, June 2010. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0384-0003

[22] USEPA. 2012. Cypermethrin Summary Document Registration Review: Initial Docket, March 2012. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2012-0167-0002

[23] USEPA. 2008. Reregistration Eligibility Decision for Cypermethrin (Revised 1/14/08). EPA OPP-2005-0293. Available on the Internet at: https://archive.epa.gov/pesticides/reregistration/web/pdf/cypermethrin_revised_red.pdf

[24] USEPA. 2010. Deltamethrin Summary Document Registration Review: Initial Docket March 2010. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0637-0002

[25] Fipronil Summary Document Registration Review: Initial Docket June 2011. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2011-0448-0003

[26] USEPA. 2005. Fipronil Environmental Fate and Ecological Effects Assessment and Characterization for Section 18 Registration of In-Furrow Applications to Rutabaga and Turnips. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-129121_31-Aug-05_a.pdf

[27] National Library of Medicine. 2016. HSDB Profile for Imidacloprid. Last revised October 25, 2016. HSDB is available for chemical name search on the Internet at: https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

[28] USEPA. 2008. Imidacloprid Summary Document Registration Review: Initial Docket December 2008. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2008-0844-0002

TABLE 3. ENVIRONMENTAL FATE AND ECOLOGICAL TOXICITY OF THE APPROVED AIS				
ACTIVE INGREDIENT	MOBILITY	PERSISTENCE	ECOLOGICAL TOXICITY	REFERENCES (SEE FOOTNOTES)
Permethrin	Immobile	Persistent	Very highly toxic to freshwater and marine fish and invertebrates; very highly toxic to freshwater amphibians; highly toxic to bees	29
WOOD PRESERVATIVE				
Disodium octaborate; disodium octaborate, tetrahydrate	Mobile	Elemental boron is naturally-occurring and persistent but will cycle through various forms depending on environmental conditions.	Of low ecological toxicity; some risk to aquatic plants	30, 31, 32
RODENTICIDE				
Diphacinone	Relatively immobile	Moderately persistent	Moderately toxic to birds and freshwater and marine fish and invertebrates; very highly toxic to mammals	33

If impacts to ground water or surface water are of concern due to the presence of potable water wells or surface water bodies in the immediate vicinity, selecting a termiticide that is: 1) of very low mobility; and/or 2) not persistent and/or 3) or low ecological toxicity will help to reduce impacts to non-target ecosystems. Of the approved termiticides, all but imidacloprid meet at least one of the aforementioned criteria. Imidacloprid is thus the least optimal choice for use in termite control with respect to potential

[29] USEPA. 2009. Reregistration Eligibility Decision (RED) for Permethrin, Revised May 2009. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-109701_11-May-09.pdf

[30] USEPA. 1994. Reregistration Eligibility Decision, Boric Acid and its Sodium Salts. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-011001_16-Feb-94.pdf

[31] Schlesinger, W.H. and A. Vengosh. 2016. Global Boron Cycle in the Anthropocene. AGU Publications, Global Biogeochemical Cycles. Available on the Internet at: http://sites.nicholas.duke.edu/avnervengosh/files/2011/08/Global-boron-cycle-in-the-Anthropocene.pdf

[32] National Library of Medicine. 2009. Hazardous Substances Data Bank (HSDB) Profile for Disodium Octaborate. Last revised August 20, 2009. HSDB is available for chemical name search on the Internet at: https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

[33] USEPA. 1997. Reregistration Eligibility Decision, Rodenticide Cluster. EPA 738-R098-007. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_G-69_1-Sep-97.pdf

impacts to non-target ecosystems. The human health component of termiticide selection, based on the primary health concerns associated with each approved AI, is addressed in Table 4.

It is important to note that immobile termiticides are expected to bind strongly to soil, but may still be transported to surface water bodies via surface run-off. It is important to use termiticides in the immediate footprint of existing structures and new construction to minimize the potential for run-off containing scoured soil particles and termiticide. Treatment of impervious surfaces exterior to structures, such as concrete or asphalt walls and walkways is not to be performed.

TABLE 4. KEY ACUTE AND CHRONIC TOXICITIES OF THE APPROVED AIS TO HUMANS

ACTIVE INGREDIENT	ACUTE TOXICITY	CHRONIC TOXICITY	REFERENCES (SEE FOOTNOTES)
TERMITICIDES			
Acetamiprid	Neurotoxicity	Developmental/reproductive toxicity; oncogenicity (tumor formation)	34
Bifenthrin	Neurotoxicity	Possible human carcinogen	35
Cypermethrin	Neurotoxicity	Possible human carcinogen; changes in body weight	36
Deltamethrin	Neurotoxicity	Decreased motor activity due to neurotoxicity	37
Fipronil	Neurotoxicity; Irritation of eyes	Possible human carcinogen	38, 39
Imidacloprid	Neurotoxicity; corneal abrasion	Liver toxicity; developmental toxicity	40
Permethrin	Neurotoxicity	Likely to be carcinogenic to humans	41
WOOD PRESERVATIVE			
Disodium octaborate; disodium octaborate, tetrahydrate	Irritation of eyes and skin	Developmental/reproductive toxicity; kidney and liver toxicity	42
RODENTICIDE			

[34] USEPA. 2001. HIARC Briefing Packages, Acetamiprid. Available on the Internet at: https://archive.epa.gov/pesticides/chemicalsearch/chemical/foia/web/pdf/099050/099050.pdf

[35] USEPA. 2010. Bifenthrin Summary Document Registration Review: Initial Docket, June 2010. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0384-0003

[36] USEPA. 2008. Reregistration Eligibility Decision for Cypermethrin (Revised 1/14/08). EPA OPP-2005-0293. Available on the Internet at: https://archive.epa.gov/pesticides/reregistration/web/pdf/cypermethrin_revised_red.pdf

[37] USEPA. 2010. Deltamethrin Summary Document Registration Review: Initial Docket March 2010. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0637-0002

[38] Fipronil Summary Document Registration Review: Initial Docket June 2011. Available on the Internet at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2011-0448-0003

[39] National Library of Medicine. 2013. Hazardous Substances Data Bank (HSDB) Profile for Fipronil. Last revised March 8, 2013. HSDB is available for chemical name search on the Internet at: https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

[40] National Library of Medicine. 2016. Hazardous Substances Data Bank (HSDB) Profile for Imidacloprid. Last revised October 25, 2016. HSDB is available for chemical name search on the Internet at: https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

[41] USEPA. 2009. Reregistration Eligibility Decision (RED) for Permethrin, Revised May 2009. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-109701_11-May-09.pdf

[42] USEPA. 1994. Reregistration Eligibility Decision, Boric Acid and its Sodium Salts. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-011001_16-Feb-94.pdf

TABLE 4. KEY ACUTE AND CHRONIC TOXICITIES OF THE APPROVED AIS TO HUMANS

ACTIVE INGREDIENT	ACUTE TOXICITY	CHRONIC TOXICITY	REFERENCES (SEE FOOTNOTES)
Diphacinone	Internal hemorrhaging; neurotoxicity	Concerns are with hemorrhaging following acute exposure	[43]

With respect to human health, nearly all of the approved AIs are neurotoxic, while various other adverse effects may be associated with acute and/or chronic exposure to the approved AIs. When considering the human health component of risk along with the persistence, mobility and ecological risk components discussed above, imidacloprid remains among the least optimal choices for use in termite control along with permethrin as a likely human carcinogen. Disodium octaborate (and its tetrahydrate) is the AI of least risk although the process of wood treatment can result in splashing that may be less likely to occur in a trenching, soil mixing, and/or rodding application scenario. In general, for termite control through amendments to soil, from lowest to highest risk (considering persistence, mobility and risks to humans and non-target ecological receptors):

Lower Risk Higher Risk

Bifenthrin = Fipronil < Cypermethrin < Acetamiprid + Bifenthrin < Imidacloprid = Permethrin

Disodium octaborate and deltamethrin are not listed because they are for wood treatment and spot, crack and crevice treatment, respectively, but are likely among the lower risk AIs approved in this Global PERSUAP. See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.6 EFFECTIVENESS OF THE REQUESTED PESTICIDES FOR THE PROPOSED USE

The approved termiticides and rodenticide are very effective for termite and rodent control with one exception: since acetamiprid is not sufficiently effective on its own for control of termites, acetamiprid products must be formulated with bifenthrin. The acetamiprid and bifenthrin must be present at similar levels and the aggregate of their percent composition must not exceed 50% in the formulated product.

An important issue that may affect the effectiveness of termiticides and rodenticides is climate change. Climate change may affect termite behavior and distribution, intensity of termite infestations and may be deleterious to the effectiveness of termiticides. Termites prefer habitats that are well drained and are not too dry or too wet. Changing rainfall patterns due to climate change could impact termites geographic range and size of colonies, therefore influencing termiticide use[44]. Termites tend to live in warmer rather than cooler areas and termite damage has been observed to be of greater intensity

[43] USEPA. 1997. Reregistration Eligibility Decision, Rodenticide Cluster. EPA 738-R098-007. Available on the Internet at: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_G-69_1-Sep-97.pdf

[44] https://carnegiescience.edu/news/termites-foretell-climate-change-africa%E2%80%99s-savannas

during periods of drought or excessive rainfall in contrast to periods of regular precipitation[45]. Thus, if climate change results in extremes such as drought and heavy rainfall, damage from termites may increase. An increase of temperature may also cause areas that were not previously typical habitats for termites to reach temperatures that are conducive for termites to invade.

While global average temperatures are expected to continue to rise, rainfall patterns are expected to change differently depending on geography. For example, general climate projections for the Democratic Republic of Congo include[46]:

- A 2-3°C increase in temperatures by 2050;
- An increase in extreme weather with intense precipitation and resultant flooding; and
- Longer dry periods.

Although there is uncertainty regarding the degree to which these changes will occur and what their magnitude and severity may ultimately be, climate change could lead to increased surface run-off, increased soil percolation/infiltration and an increased threat from termites. Considering future climate scenarios is relevant for determining when and where to use termiticide.

While evidence is largely lacking about how climate change will impact distribution of rodents, there is concern that increases in temperatures and rainfall will impact rodent distribution and the potential exposure of populations to zoonotic diseases. Studies suggest that some climate change scenarios could lead to an increase in rodent populations in temperate regions, potentially increasing risk of disease transmission, particularly in urban areas[47].

Lastly, the impact of climate change on pesticide spatial distribution in the environment should be considered. For example, it is possible that more frequent and intense storms could lead to flushing of pesticides into above and below ground water resources. These concerns are discussed in more detail in Annex B[48].

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

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[45] Ahmed, B.M., P.O.Y. Nkunika, G.W. Sileshi, J.R.J. French, P. Nyeko and S. Jain. 2011. Potential Impact of Climate Change on Termite Distribution in Africa. British Journal of Environment and Climate Change, 1(4): pp. 172-189. Available on the Internet at: http://www.journalrepository.org/media/journals/BJECC_10/2011/Sep/1317149951-Ahmedetal_2011BJECC561.pdf

[46] USAID. 2016. Climate Risk Screening, Democratic Republic of Congo, Goma and Lakes Sentral Areas; Snapshot.

[47] https://ecdc.europa.eu/en/climate-change/climate-change-europe/rodent-borne-diseases

[48] http://www.groundwateruk.org/Predicted-impact-of-climate-change-pesticides-in-groundwater.aspx

3.7 COMPATIBILITY OF THE PROPOSED PESTICIDE USES WITH TARGET AND NON-TARGET ECOSYSTEMS

Applying pesticides with regard for the potential to impact humans and non-target ecosystems is an important tool for minimizing risks associated with termiticides and rodenticides. Considerations for minimizing adverse impacts include:[49]

- Avoid spraying of disodium octaborate (for low-pressure spray application to wood) or deltamethrin (for spot, crack and crevice treatments) during windy conditions. Disodium octaborate and deltamethrin are the only two AIs that may be applied via low-pressure spray;
- Avoid pesticide application immediately prior to irrigation or precipitation;
- Strictly adhere to product application rates listed on product labels;
- Avoid pesticide application in the vicinity of water bodies per labeling instructions; and
- Dispose of pesticides and/or cleanup washwater in accordance with certification training program and this Global PERSUAP.

In addition, always choose the least risky termiticide, when options are available, per the discussion presented in Section 3.5. See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.8 CONDITIONS UNDER WHICH THE PESTICIDES ARE TO BE USED, INCLUDING CLIMATE, FLORA, FAUNA, GEOGRAPHY, HYDROLOGY, AND SOILS

Because this Global PERSUAP has no agricultural component and the approved AIs are to be applied in relatively small areas associated with new or existing construction, the emphasis of this section is less on the bigger-picture features of the country as a whole and more on the potentially ecologically-sensitive regions that are in the proximity of areas where termiticides and rodenticides are to be used. Key information includes:

- Ecological zones;
- Soil characteristics;
- Precipitation and temperature/humidity data;
- Depths to ground water and ground water flow direction;
- Proximity of surface water bodies (creeks, streams, rivers, ponds, lakes, salt water bodies);
- Proximity of wetlands;
- Proximity of non-target organism habitats; and
- Proximity of potable water wells and well construction details

[49] UC IPM Online, 2012; Pesticides: Safe and Effective Use in the Home and Landscape. Website last updated June 21, 2016; accessed June 20, 2017. Available on the Internet at:: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74126.html

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.9 AVAILABILITY OF OTHER PESTICIDES OR NON-CHEMICAL CONTROL METHODS

Only the pesticide AIs approved in this Global PERSUAP may be used in support of termite and rodent control in support of ASHA projects. Other chemical or microbial products, be they synthetic or "natural," may not be used. Limiting termite and rodent infestations may be aided by implementing the good practices presented in Section 3.3 of this Global PERSUAP. Alternatives to pesticide use are detailed in the IPM Plan in Annex B. Key components of IPM may include:

- Pest scouting, monitoring, and identification for precision decision-making;
- Natural pest control by encouraging and protecting local and introduced parasitoids, predators, and pest diseases by, among others, planting predator-attracting plants/flowers;
- Mechanical pest control using manual and machine practices; and

IPs should also monitor international developments in IPM to evaluate whether new concepts and techniques might be included in their IPM strategy for host countries. See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.10 HOST COUNTRY'S ABILITY TO REGULATE OR CONTROL THE DISTRIBUTION, STORAGE, USE, AND DISPOSAL OF THE REQUESTED PESTICIDES

Since it is not feasible to address in-country registration of the approved AIs in this globally-focused Global PERSUAP, in-country registration of the AIs and formulated products proposed for use must be documented in the supplements to this Global PERSUAP. All products must be registered in-country for termite or rodent control. See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

3.11 PROVISION FOR TRAINING OF USERS AND APPLICATORS

There are two groups of people that will be applying pesticides in accordance with this Global PERSUAP:

- The general public (including construction workers and residents and/or employees at AHSA facilities) may deploy the rodenticide only in pre-baited, tamper-resistant traps within 50 feet of existing structures; and
- Certified professional pesticide mixers and applicators that have been trained in termiticide use (including wood treatment) and rodenticide use. Certified professional pesticide applicators may either use pre-baited tamper-resistant traps or may bait tamper-resistant traps. Certified professional pesticide applicators may deploy the rodenticide within 100 feet of existing structures. Rodenticide products deployed outdoors must be labeled for outdoor use. Only certified professional pesticide mixers and applicators that have been trained in termiticide use may handle and apply the termiticides.

It is not feasible to train the general public or to monitor the effectiveness of such training. However, pre-baited tamper-resistant traps are effectively household use pesticides that are designed and

formulated in such a manner as to greatly reduce risk to the user and other non-target organisms. For the termiticides, training is not to be conducted by the IPs, but rather as part of the regional or country-specific certification program of the host country. This Global PERSUAP establishes the minimum requirements for such training and certification programs. Each region- or country-specific Supplement to this PERSUAP must document that the minimum requirements are met by the governing certification program.

The training elements that must be included in certification programs for professional termiticide mixers and applicators are divided into three primary categories:

Worker Safety

- Use, maintenance, disposal and/or re-use of PPE, including:
    - How to don and remove all forms of PPE;
    - How to wash PPE following use but prior to removal;
    - How to dispose of PPE and which items may or may not be re-used;
    - How to inspect PPE for wear and determine whether PPE will provide suitable protection.
- Identification of the various elements in a pesticide label and how to assimilate the information into the selection of a pesticide that will be 1) effective; 2) labeled and registered in the host country for the types of termite and rodent control allowed in this Global PERSUAP; and 3) the least concentrated formulated product that will effectively control termites (use and understanding of signal words, %AI, and formulation type);
- How to recognize the signs of acute (short-term) human exposure to the AIs approved in this Global PERSUAP;
- The basics of human exposure pathways, including, oral, dermal, inhalation, ocular, skin sensitization. Tie this in with the concept that PPE use is critical for worker safety even if PPE may be uncomfortable in warm climates, etc.;
- Basics of differentiating between acute and chronic hazards to humans from the AIs approved in this Global PERSUAP, including the recognition that pesticides that are of lower acute human toxicity may still be toxic to humans on a sub-chronic (several months to several years) and/or chronic (many years) basis. Also, that pesticides that are of lower acute human toxicity may be highly toxic to non-target organisms, including honey bees, freshwater and marine/estuarine fish and invertebrates, mammals, birds, and non-target, crop-beneficial insects; and
- Basic first aid procedures (found on the product label and MSDS) for pesticide overexposure for the most commonly-used pesticides.

Purchasing and Handling Termiticides and Rodenticides

- How to properly handle termiticides and rodenticides, including:
    - Transportation;
    - Storage, including rotating stock to minimize pesticide waste and disposal;
    - How to dispose of unused termiticide, spent termiticide containers and rodent traps.

- Basics of safe purchase of pesticides, including the identification of counterfeit products or products that are not within the %AI levels in this Global PERSAUP. Emphasize the importance of sourcing pesticides from well-managed stores that do not sell illegal products or those containing very highly toxic active ingredients;
- How to differentiate between similar chemicals that are not the same. For example, disodium octaborate and disodium octaborate tetrahydrate (also named as boron sodium oxide and boron sodium oxide tetrahydrate, respectively) are the only borate-related AIs that are approved in this Global PERSUAP. Anhydrous borax (anhydrous sodium borate) is USEPA Acute Toxicity Category I for eye damage and must not be used; and
- How to properly bait rodent traps and ensure that they are tamper-resistant.

Proper Termiticide and Rodenticide Application or Deployment

- Where best to deploy rodent traps to increase trapping effectiveness and reduce the likelihood for human and non-target organism exposure;
- Proper mixing, dissolving and/or diluting of different termiticide formulations;
- Proper technique for trenching, drenching, mixing termiticides with soil, backfilling applying termiticides via rodding and, as appropriate wood treatment with disodium octaborate;
- Spill prevention measures and how to clean up spills;
- How to interpret site plans to ensure termiticides are applied in all appropriate areas and not other areas;
- How to identify coarse and fine-grained soils, as well as drought-cracked soils to determine whether soil conditions are amenable to termiticide application;
- How to identify whether sensitive receptors (e.g., honey bees; aquatic organisms) may be nearby and whether application of termiticides or rodenticides may lead to exposure;
- How to minimize potential exposure to termiticides and rodenticides by non-target organisms;
- How to clean and maintain termiticide application equipment.
- The importance of monitoring for and recognizing pest resistance by noting reduction in efficacy of pesticide products, and rotation among pesticide classes to reduce the build-up of resistance; and
- The importance of using pesticides with low ground water contamination potential where water tables are high or easy to reach.

3.12 PROVISION MADE FOR MONITORING THE USE AND EFFECTIVENESS OF PESTICIDES

Monitoring commences with pest and non-target organism identification and continues throughout the project in areas that include:

- The effectiveness of education to evaluate whether the proper information and instruction is promoting the safe handling of pesticides;
- Pesticide transport, packaging, storage and formulation data (e.g., no counterfeit products or products not registered specifically for termite or rodent control);

- Adherence to pest management procedures, including worker health, local resident health, non-target organism, ecosystem, and natural resources health and vitality, efficacy for target pests, proper maintenance of spent pesticide containers and left-over product;
- Documentation of any adverse effects to human health or ecological receptors due to termiticide or rodenticide use, including frequency and severity;
- Monitoring of fields for pest levels and natural predators; and
- Monitoring for pest resistance and rotating pesticide use as needed.

See Annex A for an outline of material pertinent to this section that must be included in the supplements to this Global PERSUAP.

4.0 GLOBAL SAFER USE ACTION PLAN

This Global Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) supports the procurement and use of pesticide active ingredients (AIs) for termite and rodent control in conjunction with the construction of new permanent structures and the structural improvements or renovation/rehabilitation and maintenance of existing structures.

This section of the PERSUAP reflects a global Safer Use Action Plan (SUAP)[50] that covers general best practice for termite and rodent control. Much of this information overlaps analysis provided within the Pesticide Evaluation Report (PER) of this Global PERSUAP. This SUAP is intended to summarize salient information for ASHA IPs and applicators, as well as help guide ASHA IPs in the development of their project-specific supplement to this Global PERSUAP.

4.1 SUMMARY OF APPROVED AIS AND APPLICATION REQUIREMENTS

This section provides a synthesis of Table 1 and Table 2 of the PER, focusing on the approved AIs, their approved formulations, application methods, and general personal protective equipment necessary.

TABLE 5. SUMMARY OF APPROVED ACTIVE INGREDIENTS AND APPLICATION REQUIREMENTS

ACTIVE INGREDIENT	RESTRICTIONS IN USE	ALLOWED APPLICATION METHOD	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS
Termiticides					
Acetamiprid + Bifenthrin	Only in products that are co-formulations with bifenthrin	Soil trenching and drenching/rodding for new and existing construction; Spot, crack and crevice (outdoor use only) treatments for existing structures	Microemulsion and water-soluble packet; both AIs at similar concentrations; total of both not to exceed 50%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding

[50] Some of the information found in this Global PERSUAP is borrowed from other analyses developed for USAID projects, such as the USAID/DCHA/FFP Njira Project in Malawi.

TABLE 5. SUMMARY OF APPROVED ACTIVE INGREDIENTS AND APPLICATION REQUIREMENTS

ACTIVE INGREDIENT	RESTRICTIONS IN USE	ALLOWED APPLICATION METHOD	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS
Bifenthrin		Soil trenching and drenching/rodding for new and existing construction; Spot, crack and crevice (indoor or outdoor) treatments for existing structures	Emulsifiable concentrate, flowable liquid, microencapsulation and microemulsion; not to exceed 25%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding
Cypermethrin		Soil trenching and drenching/rodding for new and existing construction;	Emulsifiable concentrate, termiticide concentrate and ready-to-use; not to exceed 26%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant boots, gloves, apron Eye protection Respiratory protection if in unventilated space
Deltamethrin		Spot, crack and crevice (indoor or outdoor) treatments for existing structures	Ready-to-use spray and dust; not to exceed 0.05%	Long-sleeved shirt, long pants, and shoes plus socks	None
Fipronil		Soil trenching and drenching/rodding for new and existing construction;	Soluble concentrate; not to exceed 10%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding
Imidacloprid	Do not apply in areas adjacent to flowering vegetation or when honeybees are foraging	Soil trenching and drenching/rodding for new and existing construction;	Water-dispersible granules and flowable liquid; not to exceed 70%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Eye protection if in unventilated space or applying via rodding
Permethrin		Soil trenching and drenching/rodding for new and existing	Flowable liquid; not to exceed 40%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space

TABLE 5. SUMMARY OF APPROVED ACTIVE INGREDIENTS AND APPLICATION REQUIREMENTS

ACTIVE INGREDIENT	RESTRICTIONS IN USE	ALLOWED APPLICATION METHOD	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS
		construction; Spot, crack and crevice (outdoor use only) treatments for existing structures			Eye protection if in unventilated space or applying via rodding
Wood preservative					
Disodium octaborate*; disodium octaborate, tetrahydrate	Limited to products named as disodium octaborate; disodium octaborate, tetrahydrate; boron sodium oxide; or boron sodium oxide, tetrahydrate. Do not use anhydrous borax (sodium borate) or any other borates.	Submersion, brushing or low-pressure spraying of wood to be used in construction	Powder and granular; typically 95-100%	Long-sleeved shirt, long pants, and shoes plus socks	If treating wood: Chemical resistant gloves Respiratory protection Eye protection If using pre-treated wood: Chemical resistant gloves
Rodenticide					
Diphacinone	Only apply in tamper-resistant pre-baited traps and within 50 feet (general public) or 100 feet (trained, certified professionals) of existing structures. Only products labeled for outdoor use may be deployed outdoors. Do not use diphacinone sodium salt as this is not formulated for bait traps.		Trained, certified professional applicators: blocks and pellets to be applied in tamper-resistant traps within 100 feet of existing structures; not to exceed 0.005% General public: blocks in pre-baited, tamper-resistant traps within 50 feet of existing structures; not to exceed 0.005%	Long-sleeved shirt, long pants, and shoes plus socks	None

4.2 HANDLING, TRANSPORTING, AND STORING PESTICIDES

4.2.1 GENERAL HYGIENIC PROCEDURES (HANDLING)

When pesticides are being mixed and applied, appropriate equipment should be used. Pesticides should be mixed in well ventilated areas and no person or animal that is not needed for the mixing process should be present. Protective clothing should be worn at all times. It is important not to mix too much pesticides that may need to be stored later on.

Precaution should always be taken to avoid spills, but in the case that a spill occurs, an action plan should be in place for containing the spill.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions exist for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched (except as required by directions for use) or heavily contaminated with this product's concentrate. Do not reuse them.

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Pesticides can cause birth defects and developmental delays in children. Therefore, it is particularly important to keep pregnant and nursing women and children away from pesticides at all times. When pesticides are not in use they should be kept safe and locked away.

4.2.2 GENERAL TRANSPORT PROCEDURES

Keep pesticides away from contact with passengers, livestock, and foodstuffs.

Do not carry pesticides in the vehicle's driver compartment.

Do not transport containers that appear damaged or are leaking; containers must be in good condition.

Make sure pesticides are transported under cover and protected from rain and direct sunlight.

4.2.3 GENERAL STORAGE PROCEDURES

All primary pesticide storage facilities will be double-padlocked and guarded on a 24 hour basis.

All the storage facilities will be located away from water courses, domestic wells, markets, schools, hospitals, or other particularly vulnerable natural resources or infrastructure.

Wastewater from pesticide storage facilities must not be drained directly into public drains but should be pretreated on site.

Soap and clean water will be available at all times in all the facilities.

A trained storekeeper will be hired to manage each facility.
Pesticides will be stacked as specified in the FAO Storage and Stock Control Manual[51].

Inventory management will include recording expiration dates of all pesticides and maintaining a "first-in first-out" stocking system.

All the warehouses will have at least two exit access routes in case of fire outbreak.

A non-water-based fire extinguisher will be available in the storage facilities, and all workers will be trained on how to use this device, and how to respond to fire.

Warning notices will be placed outside of the storage center with a skull and crossbones sign to caution against unauthorized entry.

4.2.4 CONTAINER DISPOSAL PROCEDURES

Disposal methods vary on type of container. For plastic and metal containers that are non-aerosol the process includes following the Triple Rinse[52] method. Then, the containers may be recycled, reconditioned, or punctured and buried. For glass containers, the process is similar. For paper and plastic bags, the contents should be fully emptied into the application equipment and then destroyed and buried.

4.3 MEDICAL EMERGENCIES AND BASIC FIRST AID

The most common route of exposure is through the skin. However, pesticides can enter your body also through the eyes, nose, and mouth – i.e. absorbed, swallowed, or inhaled. Acute poisoning can occur when there has been significant exposure to a single dose of a pesticide; whereas, chronic poisoning can occur with repeated exposure to a small and non-lethal dose of a pesticide over time.

There are many symptoms that can vary during both early and late stages of poisoning. These vary from 1) headaches and dizziness, 2) tiredness, 3) weakness or sore joints, 4) muscle spasms or lack of coordination, 5) excessive sweating, 6) nervousness, confusion, or paranoia, 7) nausea or diarrhea, 8) loss of appetite or weight loss, 9) excessive thirst or excessive salivation, 10) stomach cramps, 11) irritability, 12) skin rashes or yellowing of the skin, 13) eye, nose, and throat irritation or blurred vision and coughing, as well as 14) difficulty breathing and rapid heart rate. In severe cases, 14) fever, 15) pinpoint pupils, 16) convulsions, 17) unconsciousness (coma) or even death may occur. If pesticide poisoning is suspected, a doctor should be immediately consulted.

If you expect someone is suffering symptoms of pesticide poisoning, it is important to seek medical advice quickly. Labels of pesticides should contain specific first aid instructions for each product. These labels

[51] http://www.fao.org/docrep/v8966e/v8966e00.htm

[52] https://www.azlca.com/uploads/documents/e4_triple_rinsing_containers.pdf

should be provided to professional medical staff, so that they are fully aware of what active ingredients they are working with.

Before a physician can arrive (or be found), however, it is important to provide basic first aid. Below outlines the basic first aid promoted by USAID,[53] but again, labels should be followed when it comes to specific cases.

For poison on skin:

- Act quickly.
- Remove contaminated clothing and drench skin with water.
- Cleanse skin and hair thoroughly with detergent and water.
- Dry victim and wrap in blanket.
- For chemical burns:
- Remove contaminated clothing.
- Wash with large amounts of running water.
- Cover burned area immediately with loose, clean soft cloth.
- Do not apply ointments, greases, powders or other medications to burn.

Poison in Eye:

- Wash eye quickly but gently.
- Hold eyelid open and wash with gentle stream of clean running water for 15 minutes or more.
- Do not use chemicals or medicines in the water; they may worsen the injury.

Inhaled Poison:

- Carry victim to fresh air immediately.
- Open all windows and doors.
- Loosen tight clothing.
- If available, apply artificial respiration if the victim is not breathing or victim's skin is gray or blue.

Poison in mouth or swallowed:

- Rinse mouth with plenty of water.
- Give victim large amounts (up to 1 liter) of milk or water to drink.

[53] http://pdf.usaid.gov/pdf_docs/PNADK154.pdf

- Induce vomiting only if the label provides instructions to do so.
- To induce vomiting, position victim face down or kneeling forward; do not allow victim to lie on his back, because the vomit could enter the lungs and do additional damage. Next, put a finger or the blunt end of a spoon at the back of victim's throat or give syrup of ipecac.
- Collect some of the vomit for the physician if you do not know what the poison is.
- Do not use salt solutions to induce vomiting.
- Do not induce vomiting if the victim is unconscious or is having convulsions.
- Do not induce vomiting if the victim has swallowed a corrosive poison. A corrosive poison is a strong acid or alkali, and it will burn the throat and mouth as severely coming up as it did going down. It may get into the lungs and burn there also.
- Do not induce vomiting if the victim has swallowed an emulsifiable concentrate or oil solution.

4.4 UNDERSTANDING PESTICIDE LABELS

Labeling of pesticides that are regulated by the USEPA and other governments are under strict compliance requirements. For the USEPA, 40 CFR 156 outlines the requirements. The USEPA provides a free online training program on Pesticide Label Review.[54]

As a general rule, pesticide labels should have the following information on them:

- The brand name and the product type.
- Registration number identifying the pesticide product and establishment number identifying the facility that made the product.
- Manufacturer's name and address. The manufacturer can be contacted to obtain the Material Safety Data Sheet (MSDS) that provides detailed information on toxicity, chemical properties, and special precautions.
- Ingredient information, including both active and inert ingredients and net contents.
- Common name for the chemical, as well as the complex chemical name.
- Signal words and other precautionary statements.
- Information on hazards to humans, domestic animals, and the environment. This also includes physical and chemical hazards (e.g. combustibility)
- First aid information and explicit directions for use. It is a violation to use any pesticide in a manner that is not consistent with its labeling.
- Other specific handling, transport, storage, and or disposal requirements.

4.5 ENSURING USE OF QUALITY PESTICIDES

There have been documented cases of adulterated pesticides around the world. To reduce the risk of purchasing counterfeit or adulterated products, ASHA IPs must always buy from legally registered manufacturers/distributors. In case some type of fraud is suspected, the only way to be totally sure would be to request a chemical and physical analysis of the product from a specialized laboratory, but this type

[54] https://www.epa.gov/pesticide-labels/pesticide-label-review-training

of service is not easily accessible in many countries where ASHA works and could only be justified for large amounts of the pesticide. In practice, the following steps are recommended to try and guarantee the validity of a given pesticide.

- Take random samples and check state of packaging, particularly of safety seals.
- Check that physical characteristics of the product (take various packages) match those indicated in the table (this will not guarantee the authenticity and quality of the product, but will at least help identify rough counterfeits).
- Check that information on the label is exactly the same that appears in the officially approved label (presumably it should include registration number, date of registration validity, and so forth). If a possible counterfeit is suspected by the national registrant / distributor of the product, discuss with the national authority in charge of pesticide registration and control. If the suspected counterfeit is by some third parties, discuss with the national registrant / distributor of the product.
- Check efficacy of the product, by carrying out targeted trials in collaboration with qualified professionals (e.g. researchers at local universities or research centers) or by closely monitoring the results of applications by the project beneficiaries (this should be done anyway, as part of the monitoring activities of the project). As with point 2 above, this will not guarantee the authenticity of the product, but will at least ensure that it is effective.

4.6 ADDITION MITIGATION MEASURES AND CONDITIONS

- ✓ ASHA IPs are required to develop supplements to this Global PERSUAP. See instructions and template in Annex A.
- ✓ ASHA IPs are required to promote and support IPM to the greatest practicable extent for the control of termites and rodents. Project-specific IPM plans will tier off of the general IPM information provided in Annex B.
- ✓ ASHA IPs must support pesticides with the lowest human and environmental risk profiles, as practical. More information on pesticide toxicity can be found in Annex F.

ASHA IPs will only use pesticide products with approved AIs as outlined in this Global PERSUAP. See Table 1.

- ✓ ASHA IPs will ensure that all contracted applicators are trained in minimum requirements as stated in Section 3.11 in the PER.
- ✓ ASHA IPs, as appropriate, will emphasize pesticide rotation among the classes of pesticides to reduce the development of resistance.

ASHA IPs shall assure that appropriate PPE is used by all applicators, as well as is well maintained and properly utilized. See Table 2 and Table 5, and always follow the label instructions for specific requirements.

- ✓ ASHA IPs shall assure that appropriate pesticide application equipment is used, as well as well maintained and properly used. Always follow the label instructions for specific requirements.
- ✓ ASHA IPs must follow basic first aid for pesticide overexposure and follow recommendations found on pesticide labels and material safety data sheets (MSDSs) for commonly used pesticides.
- ✓ ASHA IPs will ensure proper disposal of empty pesticide containers.
- ✓ ASHA IPs will maintain a 2.5 to 5 km no-spray zone buffer around national parks or other protected areas.
- ✓ ASHA IPs will assure that no spraying or rinsing of equipment takes place in or within 30 meters of ponds, drainage ditches, and surface waters.

4.7 INSTRUCTIONS FOR ASHA PARTNERS WHEN DEVELOPING THE SUPPLEMENTS TO THIS PERSUAP

ASHA IPs are required to complete a supplement to this Global PERSUAP. A template has been provided in Annex A. This supplement may not modify the termiticide or rodenticide AIs that have been advanced for approval in this Global PERSUAP nor may the supplement circumvent the safety measures presented in this Global PERSUAP. Since this PERSUAP applies globally to ASHA projects, this supplement is intended to enhance the knowledge base provided by this Global PERSUAP by providing country- or regionally-specific information for ASHA projects.

As part of this supplement, partners will need to develop and implement project-specific IPM plans that tier off of the generic plans provided in Annex A. Additionally, projects are expected to develop their own set of Pesticide Data Sheets (PDS). Illustrative PDSs are provided for each AI in Annex E.

USAID has also provided additional Annex C on Solicitation Language and Annex D on Contract Language. These templates are recommended for use when contracting pesticide applicators, to ensure that these service providers are certified and will conduct pesticide application in compliance to the requirements of this PERSUAP

ANNEX A: TEMPLATE FOR PERSUAP SUPPLEMENT

This section contains an outline for country- or regionally-specific information that must be contained in the supplements to this Global PERSUAP. A supplement must be submitted by IPs for each project or set of related projects that require termite and/or rodent control as part of ASHA construction activities. This supplement may not modify the termiticide or rodenticide AIs that have been advanced for approval in this Global PERSUAP nor may it circumvent the safety measures presented in this Global PERSUAP.

Since this Global PERSUAP applies globally to ASHA projects, this supplement is intended to enhance the knowledge base provided by this Global PERSUAP by providing country- or regionally-specific information for ASHA projects. Note that the term "regionally" is defined broadly to mean that it pertains to a portion of a country, such as a county, or to a single building site or multiple building sites within a country. The rationale for differentiating between "country" and "region" is that AIs may not be uniformly available across an entire country and thus, multiple supplements might be required to cover multiple projects within a particular country. Conversely, if the AIs are uniformly available throughout the country in question a single country-wide supplement to this Global PERSUAP may be a feasible approach.

TABLE 6. LIST OF USAID APPROVED PESTICIDES FOR TERMITE AND RODENT CONTROL IN VERTICAL BUILD CONSTRUCTION

ACTIVE INGREDIENT	ACUTE TOXICITY CATEGORY[55]	RUP?[56]	APPROVED PESTICIDE?
Termiticides			
Acetamiprid	WHO: Not listed EPA: II	No	**Yes; but only in products that are co-formulations with bifenthrin**
Bifenthrin	WHO: II EPA: II	Some RUPs	**Yes**
Cypermethrin	WHO: II EPA: II	All agricultural formulations; some termiticides	**Yes**
Deltamethrin	WHO: II EPA: II	Emulsifiable concentrate is RUP on cotton only	**Yes**
Fipronil	WHO: II EPA: II	Some RUPs	**Yes**
Imidacloprid	WHO: II EPA: "moderate" is most stringent	No	**Yes; but not adjacent to flowering vegetation or when honeybees are foraging**
Permethrin	WHO: II EPA: III	Not RUP for termite control	**Yes**
Wood preservatives			
Disodium octaborate*; disodium octaborate, tetrahydrate	WHO: III EPA: III	No	**Yes; but limited to products named as disodium octaborate; disodium octaborate, tetrahydrate; boron sodium oxide; or boron sodium oxide, tetrahydrate.** **<u>Do not use</u> anhydrous borax (sodium borate) or any other borates.**
Rodenticide			
Diphacinone	WHO: Ia EPA: I	Some RUPs	**Yes; but only in tamper-resistant pre-baited traps and within 50 feet (general public) or 100 feet (trained, certified professionals) of existing structures. Only products labeled for outdoor use may be deployed outdoors.** **<u>Do not use</u> diphacinone sodium salt as this is not formulated for bait traps.**

[55] Classifications and categories are for Technical Grade pesticide. Formulated products are often of lesser acute toxicity. WHO assigns a single classification (The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 2009. World Health organization, 2010. Available on the Internet at: http://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf). EPA has several toxicity categories for various routes of exposure. Only the most stringent EPA category is given here. EPA categories come from REDs, Pesticide Summaries, Facts Sheets, and Registration Review Documentation..

[56] RUP status obtained from USEPA documentation (e.g., REDs, Summary documents, etc. and the January 19, 2016 RUP Report: https://www.epa.gov/sites/production/files/2016-02/documents/rupreport-sec3-update-jan2016.pdf) where available. Other sources include:

Rhode Island Department of Environmental Management. No date. Federally Restricted and State-Limited Use Pesticides. Available on the Internet at: http://www.dem.ri.gov/programs/bnatres/agricult/pdf/frup.pdf

University of Florida (U.S.) IFAS Extension. 2009. Restricted Use Pesticides, available on the Internet at: http://edis.ifas.ufl.edu/pi073

University of Nebraska. 2003. Federally Registered Restricted Use Pesticides. (U.S.), available on the Internet at: http://www.ag.ndsu.nodak.edu/aginfo/pesticid/pdf/ec2500.pdf

TEMPLATE FOR PERSUAP SUPPLEMENT

Instructions: IPs are required to respond to all questions or statements indicated by yellow highlights below, as well as attach additional supporting evidence as indicated. A USAID approved face sheet and clearance page (like that used for the Initial Environmental Examination) must be appended to the top of this template once completed. The AOR can assist with providing the correct face sheet and clearance page. The USAID Bureau Environmental Officer (BEO) needs to approve of all supplements to the Global PERSUAP before IPs my use or promote pesticides in ASHA activities.

INFORMATION REQUIRED FOR SECTION 1.0 BACKGROUND

Name of Implementing Partner: _____

Award Number: _____

Country / Region of Implementation: _____

GPS Coordinates of Implementation Sites: _____

This supplement to the Global PERSUAP is for:

- Termite control: Yes or No
- Rodent control: Yes or No

INFORMATION REQUIRED FOR SECTION 2.0 LOCATION DETAILS

Below, IPs are expected to provide an itemization of the locations where termiticides and/or rodenticides are to be applied.

For termiticides, include the following:

- Foundation footprint dimensions for new construction: _____
- Foundation type (wood post with crawl space; wood frame on grade; slab on grade, etc.): _____
- Specific soil types that are located at the sites where pesticide application or use will occur. Critical information includes not just soil types, but any related information such as porosity, degree of water saturation, ability to drain, how they are affected by temperature extremes and/or drought and soil stability (e.g., resistance to erosion). Note that in urban areas, "urban fill," which tends to be of very high porosity due to the presence of larger pieces of broken construction material and cobbles, may be present. Include all that is known about the nature of the soils at the proposed sites of application of termiticides. _____
- Drawn plans for proposed new construction or existing site plans for existing structures. All plans must indicate the locations where termiticides are to be used. Attach.

For the rodenticide, include the following:

- Representative site/structure plans and proposed locations of bait trap deployment. Attach.

INFORMATION REQUIRED FOR SECTION 3.0 SPECIFIC ENVIRONMENTAL AND CLIMATE CONDITIONS

Below, IPs are expected to provide additional environmental and climate information where termiticides and/or rodenticides are to be applied.

- Identify the major ecological zones (e.g., coastal plains, tropical forests, savannahs), including major geological features (e.g., mountain ranges, plateaus, major river valleys, etc.) near the implementation sites. _____
- Provide precipitation data, including annual trends, when rainy seasons exist and typical humidity levels. _____
- Provide temperature data, including highs and lows and periods when/if ground freezing typically occurs. _____
- Describe projections on how climate change may affect temperature and precipitation in the coming years and any known effects on termite or rodent activity/damage related to these changes. _____

For termiticides only, also include the following:

- Identify the local hydrogeological characteristics, including typical depths to ground water and ground water flow direction(s) at the termiticide application site, the proximity and nature of any surface water bodies, the proximity of any wetlands. _____
- The location and construction details (e.g., screening depth, is well cased on uncased? etc.) of any potable water wells within 450 meters (~1,500 feet) of the site of termiticide applications to soil. _____

INFORMATION REQUIRED FOR SECTION 3.0 PESTICIDE PRODUCTS AND HOST COUNTRY REGULATIONS

IPs must document that adequate and sustainable supply-lines of specific formulated products that contain only the AIs approved in the Global PERSUAP have been established. The available products must be from registered manufacturers and/or distributors and must not be counterfeits of registered products. Formulated products must be licensed in-country for termite or rodent control.

- Commercial name of product(s): _____
- Manufacturer information (name, address, telephone numbers, website, etc.): _____
- Distributor information: (name, address, telephone numbers, website, etc.): _____
- Active Ingredient(s), including formulation and concentration: _____
- Provide evidence that the formulated product(s) are currently licensed in-country for termite or rodent control. Attach.

- Provide evidence that the manufacturer and/or distributor are currently licensed in-country. Attach.

In addition to the above, IPs must include an itemization (i.e., identify each relevant regulation by name and number and link it to what process or processes it controls) and description of host country regulations regarding distribution, storage, use and disposal of the AIs that are approved in this Global PERSUAP. The supplements must further identify the regulatory bodies that are responsible for regulating these processes. _____

INFORMATION REQUIRED FOR SECTION 4.0 IPM PLAN

Using the information provided in the Global PERSUAP, IPs are to develop their own site-specific integrated pest management (IPM) plans.

Complete table below.

INTEGRATED PEST MANAGEMENT PLAN			
PEST TYPE: *(Example: Termite Control)*			
DESCRIBE MONITORING METHOD: *(Example: Monthly Inspections on Perimeter of Building)*			
NON-CHEMICAL PREVENTATIVE MEASURE:	NON-CHEMICAL CONTROL MEASURE:	CHEMICAL TREATMENT (INCLUDING PRODUCT AND AI INFORMATION)	THRESHOLD OR TIMING OF CHEMICAL TREATMENT
(Example: Fix Leaking Pipes)	*(Example: Destroy Mounds with Hot Water)*	*(Example: Termidor SC with Fipronil at 9.1%)*	*(Example: Once When Laying the Foundation of Building)*

INFORMATION REQUIRED FOR SECTION 5.0 PROPOSED METHOD OF APPLICATION, INCLUDING SAFETY EQUIPMENT

Allowed methods of pesticide application are presented in Section 3.4 of the Global PERSUAP. This section must include a statement as to the proposed methods of application. Depending on the type of application being performed and the AIs being used, the following Personal Protective Equipment (PPE) is required (see Table 2 in Section 3.4 of the Global PERSUAP for specifics):

- Baseline PPE of long-sleeved shirts, long pants, shoes and socks is required for all pesticide applications or deployments; and
- Chemical-resistant gloves, chemical-resistant boots, eye protection and the equivalent of a Mine Safety and Health Administration (MSHA)/National Institute of Occupational Safety and Health (NIOSH) respirator are required as detailed in this Global PERSUAP.

IPs must describe the method(s) of application. _____

IPs must document the types of application equipment and PPE, as listed above, that are available in the host country or region, including vendors, locations and cost. IPs must document that adequate and sustainable supply-lines of reliable and durable PPE have been established. _____

INFORMATION REQUIRED FOR SECTION 6.0 TRAINING OF USERS AND APPLICATORS

User and applicator information (name, address, telephone numbers, website, etc.): _____

IPs must provide information on how professional pesticide mixers and applicators are trained in the country or region and details regarding the process of certifying and maintaining certification of professional pesticide mixers and applicators, including training curriculum, trainer's experience and academic standing (e.g., academic degrees awarded), and frequency of training and certification renewal. _____

Section 3.11 of the Global PERSUAP contains the minimum training and certification requirements. Supplements must document that the certification and training meets these requirements.

Also, identify the regulatory body that is responsible for the certification and training of pesticide mixers and applicators. _____

INFORMATION REQUIRED FOR SECTION 7.0 ROLES AND RESPONSIBILITIES

Responsibility for safer pesticide use under ASHA lies with the IP. Supplements to this Global PERSUAP must identify the staff members and partners who will ensure that pesticide procurement and use is conducted in accordance with the requirements of this Global PERSUAP.

This includes the staff members and partners responsible for critical monitoring activities as follows:

- Monitoring the effectiveness of education to evaluate whether the proper information and instruction is promoting the safe handling of pesticides;
- Monitoring pesticide transport, packaging, storage and formulation;
- Documentation of adherence to pest management procedures, including worker health, local resident health, non-target organism, ecosystem, and natural resources health and vitality, efficacy on application areas for target pests, proper maintenance of pesticide containers and left-over product;
- Monitoring and review of any documentation of any adverse effects to human health or ecological receptors due to termiticide or rodenticide use, including frequency and severity;
- Monitoring of new construction sites for pest levels and natural predators; and
- Monitoring for pest resistance and rotating pesticide use as needed.

Identify and provide contact information for the staff members and partners, including any specific roles and responsibilities, who will oversee the activities described above: _____

INFORMATION REQUIRED FOR SECTION 8.0 MATERIAL SAFETY DATA SHEET

The Pesticide Data Sheets (PDS) in the Global PERSUAP were prepared, as a necessity, at the AI level. Each supplement to this Global PERSUAP must contain a Material Safety Data Sheet or pesticide label each formulated product, containing only the AIs approved in the Global PERSUAP being proposed for use under the subject supplement. Only products registered for use as termiticides or rodenticides may be used and they must be selected only from the AIs that are approved in the Global PERSUAP.

ANNEX B: SUMMARY OF BEST PRACTICES AND INTEGRATED PEST MANAGEMENT FOR TERMITE AND RODENT CONTROL

Integrated Pest Management takes advantage of all appropriate pest management strategies, and considers pesticide application as a last resort. It is not a single pest control method but rather involves integrating multiple control methods based on site-specific information obtained through inspection, monitoring and reporting. Consequently, every IPM program is designed based on the pest prevention goals and eradication needs of the situation.

Successful IPM programs use this four-tiered implementation approach:

- Identifying pests and monitoring progress:
- Set action thresholds
- Prevent
- Control

Climate risk management is an important component to consider when designing project-specific IPM plans. And although these potential issues may be minor, given the small area on which pesticides are applied for termite and rodent control, there may be cumulative impacts to consider given the pesticide application patterns within the target area outside of ASHA-funded projects.

The following table provides an illustrative list of potential climate stressors and risks that may be faced by ASHA projects for pesticide use:

TABLE 7. ILLUSTRATIVE CLIMATE STRESSORS AND RISKS[57]

CLIMATE STRESSORS	CLIMATE RISKS
More intense rainfall	Increased surface runoff
	Increased percolation/groundwater infiltration
Longer dry periods	Increased threat from current pests/introduction of new pests
	Reduced effectiveness of pesticides applied topically
Increased temperatures	Stored pesticide leakage
	Reduced effectiveness of pesticides that are activated/distributed by water
	Increased threat from current pests/introduction of new pests

[57] Adapted from: USAID Climate Risk Profiles (2017): Climate Risks in FFP Geographies – DRC: https://www.climatelinks.org/sites/default/files/asset/document/20170222_USAID%20ATLAS_DRC%20Food%20Security%20Climate%20Screening.pdf

The following section details protective, non-pesticidal measures for each pesticide approved in this PERSUAP:

A. IPM for termite control:

Some best practices that may discourage termites include:

During construction:

- Reduce the amount of cellulose-containing materials before casting the ground floor slab of the building.
- Use concrete for foundations where feasible;
- Minimize the amount of wood that contacts the soil surface and/or seal the wood or cover with metal barrier
- Keep a 12-inch barrier of smooth concrete, coarse sand, or other inorganic material between the soil surface and structural wood beneath a building.
- Choose termite-resistant wood or use concrete footers for fences or structures that must contact soil.
- Keep soil around foundation dry through proper drainage and grading practices;
- If wood is to be stored on-site, sore it remotely from on-site structures; however, this may encourage rodent infestation.

Post-construction

- Regular inspection of the building after the guaranteed period posted by the professional pest control program is also advised, preferably on an annual basis.
- Repair openings in the structure that allow termites access using cement, caulk or grout;

General measures:

- Do not plant trees and plants too near the structure such that they grow against wooden features of the structure; and
- Dig out all the termites' mounds/hills next to the premises. In this process, the reproductive queens in the mound must all be dug out and killed.
- Apply dry domestic-animals' dung (e.g. goats' or sheep's dung) on identified and dug termite mounds (sometimes known as 'ant hills').
- Install protein- and sugar- based baits (e.g. carcasses and sugarcane husks respectively) to attract ant populations, thereby reducing termite colonies through habitat competition or predation. This method has been used successfully by farmers Sub-Saharan Africa.
- Dug mounds may be burned, but only if all the other options cannot be implemented, or have failed.
    - This method is not the preferred non-chemical pest control method from an environmental point of view due to the following reasons: (i) fire could easily spread to surrounding environment especially during high winds, causing destruction of property, (ii) fire could kill non-target soil organisms and plant roots and; (iii) this method requires a fuel source - and mainly fuel wood is used - and thus contributes to deforestation as well as emits gases and smoke that would cause air pollution within the area of use.

B. Approved chemical termite control

This Global PERSUAP allows the following types of termiticide application. Those AIs that are approved in this Global PERSUAP are listed for each type of application; however, the products that are used must have labeled uses that correspond to these types of application (**e.g., products that are registered for agricultural uses only must not be used**). Application of termiticides is limited to soil at new construction sites, existing foundations/footings and immediately adjacent soil, wood treatment and spot/crack/crevices in existing structures. No application of termiticides directly to termite colonies is allowed and subsequent or annual re-treatment of soil is not allowed unless infestation is documented.

- Soil trenching and drenching for new construction – this process involves digging a narrow, shallow trench along the perimeter of where the new foundation is to be constructed. The trench is then filled with termiticide solution and the solution is allowed to percolate into the native soil. The excavated soil from the trench should also be carefully mixed with termiticide solution and then backfilled into the trench.

  Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

- Soil trenching and rodding for new construction – this process is similar to trenching and drenching; however, the termiticide is applied to the unexcavated soil by driving a rod several inches into the soil and the termiticide is introduced via gravity through the rod.

  Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

- Submersion, brushing or low-pressure spraying of wood to be used in construction with and only with disodium octaborate (boron sodium oxide) or disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate) – this process involves the pretreatment of wood that will be used for construction.

  Allowed AIs: **disodium octaborate (boron sodium oxide)** and **disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate)** products that are registered and labeled for wood treatment as part of termite control.

- Spot, crack and crevice (indoor or outdoor – use only products specifically labeled for the intended indoor or outdoor application) treatments for existing structures – this process serves as long-term prevention of reinfestation. Certain products are registered for indoor use while others are registered for outdoor use. Some may be registered for both. No indoor broadcast spraying is allowed (household low-pressure spraying of spots, cracks and crevices with deltamethrin ready-to-use spray formulations is allowed in this Global PERSUAP) and products must only be used on building structural elements such as foundations, wall voids, joists, etc. Do not apply to carpeting, drapery or other porous fabrics or in food preparation or storage areas. Treatment of impervious surfaces exterior to structures, such as concrete or asphalt walls and walkways is not to be performed.

Allowed AIs: **acetamiprid** with **bifenthrin (outdoor use only)**; **bifenthrin**; **deltamethrin**; **permethrin (outdoor use only)** products that are registered and labeled for household spot, crack and crevice use as part of termite control

- Soil trenching and rodding for existing structures – this process is conducted as described above for "soil trenching and drenching for new construction" but is used to protect existing structures at sites that were not treated for termite control or structures where infestation is observed and documented. The trench must not be dug to a depth below existing footings. Due to the potential for sub-surface migration to potable wells or surface water bodies, sub-slab injection is not allowed for existing structures; only passive introduction of the termiticide via rodding may be performed.

  Allowed AIs: **acetamiprid** with **bifenthrin**; **bifenthrin**; **cypermethrin**; **fipronil**; **imidacloprid (not in immediate area of blooming vegetation of if bees are foraging)**; and **permethrin** products that are registered and labeled for soil amendments as part of termite control.

Termiticides must not be applied to soil that is frozen or already completely saturated with water. Do not apply termiticides if run-off is likely. No indoor or outdoor fogging or fogging/misting is allowed. The only AIs for that may be applied via spraying are disodium octaborate (boron sodium oxide) or disodium octaborate tetrahydrate (boron sodium oxide tetrahydrate) for wood treatment.

Note that not all termiticide AIs that are approved in this Global PERSUAP may be used for all of the uses listed above. Use only products that are labeled for termite control. The termiticide AIs that are approved in this Global PERSUAP also have agricultural uses. Products containing the termiticide AIs must be specifically labeled for termite control and they must be registered for this use in the host country.

C. IPM for rodent control:

Non-chemical rodent control methods include habitat modification, exclusion, keeping exterior trash handling areas clean, and removing or trimming any vegetation that may serve as rodent borrowing or pathways. These measures include:

a. Exclusion and Sanitation Rodent Management Measures

- Seal any openings greater than ¼ inch in diameter in foundations, walls, fascia, and roofs. Screen vents and install door sweeps to prevent access. If rats are entering through floor drains, seal these with hardware cloth with mesh smaller than ½ inch. Install heavy-gauge kick plates at the base of any doors with evidence of rodent gnawing.

- Remove or trim ground cover and other landscape plants to expose ground and discourage rodent travel ways and rat burrowing. Avoid landscaping that creates ideal habitat for burrows including stone walls with unsealed gaps. Remove mulch from building foundations to reduce harborage. Do not allow grass clippings or leaf litter to accumulate adjacent to buildings.

- Clear rubbish and garbage from areas adjacent to buildings. Place exterior trash cans and dumpsters away from building entrances to avoid attracting rodents to building. Use exterior trash receptacles with tight-fitting or spring-loaded lids. Use self-contained, leak-proof compactors instead of Dumpsters, or at least use Dumpsters with tight-fitting lids. Empty exterior trash receptacles daily at the end of each day.

- Fix plumbing leaks and improve drainage to prevent water accumulation near the building. Clean gutters to prevent water retention.
- Remove debris, clutter, or stored materials from the building exterior and adjacent areas to reduce harborage and permit proper cleaning and inspection. Remove clutter and items stored on floors in interior entryways, storage, and other areas to reduce harborage and permit proper cleaning and inspection.
- Visually inspect vulnerable areas often (e.g., food service, custodial closets, laundry rooms, vending areas, garages, under sinks, sill plates, crawlspaces) for droppings or grease marks. Place glue boards, snap traps, shock traps, or live traps in nonvisible, inaccessible areas to trap rodents. Clean up droppings, grease marks, and urine promptly using water and district-approved disinfectants. Wear proper personal protective equipment during cleanup.
- Fill in inactive burrows with appropriate filler such as mortar for burrows in or under concrete and soil.
- Store food, seeds, garbage and other refuse in covered containers;
- Clean up livestock and pet droppings daily;

b. Tips for Successful Baiting and Trapping

- Rats tend to be leery of new things in their environment, so traps should be in place for several days before being set.
- After being set, traps should remain in place for a week before being moved to a new location.
- Traps should be set along rodent runways to be most effective.
- The trigger side of the trap should be on the wall side.
- Large rodents may move traps so all traps should be secured, even if traps are set on weekends or during holidays.
- Bait traps according to the observed food preferences of rodents, and use multiple baits to provide a variety of choices.
- Bait some traps with cotton balls or a ball of string. Pregnant females will scavenge for these items to make a nest.

c. Clean-up Precautions

The risk of contact with rodent-associated pathogens and allergens increases when cleaning areas that have been infested with rodents.

- Maintain good ventilation and avoid stirring up dust.
- Wetting down the site with a 10 percent bleach solution is recommended for hantavirus prevention.
    - CAUTION: Never use bleach if bird droppings are present because a toxic gas will be produced. Wear the appropriate protective equipment including full-face masks with HEPA filters.

D. Approved chemical rodent control

For construction workers and the general public, the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. Construction workers and the general public may only deploy pre-baited, tamper-resistant rodent traps within 50 feet of existing structures. Trained, certified professional pesticide applicators may deploy baited, tamper-resistant rodent traps within 100 feet of existing structures. Rodenticide products deployed outdoors must be labeled for outdoor use.

E. Personal Protection Equipment for Pesticide Application

Due to the relatively high toxicity of most termiticides, only certified professional pesticide mixers and applicators that have been trained in termiticide use (including wood treatment) may handle, mix and apply termiticides. For construction workers and the general public, the approved rodenticide may only be purchased and deployed in pre-baited, tamper-resistant bait traps, which greatly reduces the potential for exposure; thus, only baseline Personal Protective Equipment (PPE; baseline consists of long-sleeved shirt, long pants, shoes plus socks) is required for construction workers and the general public. Trained, certified professional pesticide applicators may purchase the approved rodenticide outside of these traps and bait the traps themselves; however, deployment of the rodenticide must be within tamper-resistant bait traps. It is required that trained, certified professional pesticide applicators will have access to and will always use appropriate PPE as specified in this PERSUAP.

Additional items of PPE that are needed when using the various termiticides include chemical resistant gloves, chemical resistant gloves, chemical resistant aprons, eye protection and Mine Safety and Health Administration (MSHA)/National Institute of Occupational Safety and Health (NIOSH) equivalent respirators. The following table summarizes the PPE and AI requirements associated with pesticide application.

TABLE 8. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS

ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
Termiticides				
Acetamiprid [+ Bifenthrin]	Microemulsion and water-soluble packet; both AIs at similar concentrations; total of both not to exceed 50%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Acetamiprid must be co-formulated with bifenthrin and labeled for termite control
Bifenthrin	Emulsifiable concentrate, flowable liquid, microencapsulation and microemulsion; not to exceed 25%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control

TABLE 8. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS

ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
Cypermethrin	Emulsifiable concentrate, termiticide concentrate and ready-to-use; not to exceed 26%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant boots, gloves, apron Eye protection Respiratory protection if in unventilated space	Must be labeled for termite control
Deltamethrin	Ready-to-use spray and dust; not to exceed 0.05%	Long-sleeved shirt, long pants, and shoes plus socks	None	Only household products for spot, crack, crevice termite control may be used
Fipronil	Soluble concentrate; not to exceed 10%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Imidacloprid	Water-dispersible granules and flowable liquid; not to exceed 70%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Permethrin	Flowable liquid; not to exceed 40%	Long-sleeved shirt, long pants, and shoes plus socks	Chemical resistant gloves Respiratory protection if in unventilated space Eye protection if in unventilated space or applying via rodding	Must be labeled for termite control
Wood preservative				
Disodium octaborate; disodium octaborate, tetrahydrate	Powder and granular; typically 95-100%	Long-sleeved shirt, long pants, and shoes plus socks	<u>If treating wood:</u> Chemical resistant gloves Respiratory protection Eye protection <u>If using pre-treated wood:</u> Chemical resistant gloves	Must be labeled for wood treatment for termite control
Rodenticide				
Diphacinone	<u>Trained, certified professional applicators</u>: blocks and pellets to be applied in tamper-	Long-sleeved shirt, long pants, and shoes plus socks	None	Only trained, certified professional applicators

TABLE 8. PERSONAL PROTECTIVE EQUIPMENT, FORMULATION AND %AI REQUIREMENTS

ACTIVE INGREDIENT	ALLOWED FORMULATIONS AND % AI COMPOSITION	BASELINE PPE REQUIREMENTS	ADDITIONAL PPE REQUIREMENTS	NOTES
	resistant traps within 100 feet of existing structures; not to exceed 0.005% General public: blocks in pre-baited, tamper-resistant traps within 50 feet of existing structures; not to exceed 0.005%			may bait traps; all others must procure and use only pre-baited, tamper-resistant traps. Only products labeled for outdoor use may be deployed outdoors.

ANNEX C: SOLICITATION LANGUAGE

The following template provides language to be used when soliciting quotations for pesticide application for ASHA-funded construction activities. The implementing partner is recommended to use this language, in order to ensure that contracted certified pesticide applicators are aware of and will be in compliance with USAID environmental requirements for termiticide or rodenticide application.

NOTE: Attach the Global SUAP (Section 4.0) as well as the project-specific PERSUAP supplement (Annex A) as modified for your program to this quotation request.

_____

Date

Dear Sir/Madam:
[Organization Name] requests a quotation for the application of [name of termiticide and/or rodenticide] for pest control. Except for specifically agreed exception, pesticide application must be conducted in a manner conforming to the attached **Global SUAP as well as the project-specific PERSUAP supplement.**

Termite control (Please check):

_____ This will be a termiticide application using [name of product and active ingredient %] for soil trenching and drenching for a new construction.

_____ This will be a termiticide application using [name of product and active ingredient %] for soil trenching and rodding for a new construction.

_____ This will be a termiticide/wood preservative application using [name of product and active ingredient %] for submersion, brushing or low-pressure spraying of wood for a new construction.

_____ This will be a termiticide application using [name of product and active ingredient %] for spot, crack and crevice treatment [indoors/outdoors] of an existing structure,

_____ This will be a termiticide application using [name of product and active ingredient %] for soil trenching and rodding for an existing structure.

_____ This will be a termiticide application using [name of product and active ingredient %] for soil trenching and drenching for a new construction

Rodent control (Please check):

_____ This will be a rodenticide application using [name of product and active ingredient %] as pre-baited, tamper-resistant traps

_____ This will be a rodenticide application using [name of product and active ingredient %] as baited tamper-resistant traps

The location(s) of performance is/are [Name(s) of building to be treated, city/village, district/parish etc.].

The expected dates of performance are [insert dates]. If this is for recurring pesticide application, state how often pesticide application is expected to be conducted):

Other requirements:

Please submit the names of the key certified pesticide applicators, and the types and dates of termite and/or rodent control training that they have received in the last five years (If this is for recurring pesticide application, request this information for the first application; updates can be requested at a later date.). Training curriculum should include:

Identification of termites and other wood-damaging pests that commonly infest buildings;

Proper procedure for inspecting infestations;

Pesticides used for wood-damaging pests: Quality, types, classes and acute toxicities of common pesticides;

Pesticide application equipment;

Types of foundation structures

See Section 3.11 for additional details on training requirements.

Please note that except as specifically negotiated, you must provide all equipment necessary to undertake the pesticide application, including all necessary personal protective equipment according to active ingredient being used, and other equipment otherwise required by the attached IPM. All equipment must meet specifications as established in the attached IPM.

a) No waste, including pesticide containers and rodenticide packaging, shall be left on-site unless prior arrangements have been made with our office to safely dispose of the items.

Please quote your price and provide the above-requested information for the above pesticide application services. Please also specifically state any requested exceptions to the specified application requirements, along with the reason for the requested exception.

ANNEX D: CONTRACT LANGUAGE

The following template provides language to be used when contracting a pesticide applicator for ASHA-funded construction activities. The implementing partner is recommended to use this language, in order to ensure that contracted certified pesticide applicators are aware of and will be in compliance with USAID environmental requirements for termiticide or rodenticide application.

NOTE: Attach the Global SUAP (Section 4.0) as well as the project-specific PERSUAP supplement (Annex A) as modified for your program to this quotation request.

CONTRACT FOR CONSTRUCTION PESTICIDE APPLICATION SERVICES

Between

[Name of IP Organization, location of organization]

And

[Name of Certified Pesticide Applicator, Location]

Both parties hereby enter into an agreement which states the following:

This agreement covers pesticide application services to be rendered by [Name of Certified Pesticide Applicator/contractor] at the following location(s):

Name of building to be treated, location, size

If during the period of this contract, the number of building locations will be revised (increased or decreased), [IP Organization] will notify contractor by letter. The floor area/capacity of each building is an estimate, and the contractor is encouraged to visit each site, prior to pesticide application, to investigate specific situations.

Expected Date(s) of Services: [insert dates]

GENERAL PROVISIONS

[IP Organization] will impose a penalty of [amount of penalty in local currency/day] if the contractor fails to perform the requested services in a timely manner, if due to the contractor's negligence (i.e., workers unavailable, pesticide unavailable, etc)

(1) The contractor shall be responsible for re-applying pesticide at no cost to [IP Organization] should [IP Organization] deem the work was not done properly. Payment will be made only after satisfactory service has been rendered. This determination will be made by an authorized individual from [IP Organization].

[IP Organization] will/will not provide transport and accommodation of contractor's personnel from point of origin to building(s) and return.

PESTICIDE APPLICATION PROCESS REQUIREMENTS

Based on a written request from [IP Organization], the contractor will conduct the application of a pre-approved termiticide or rodenticide according to pre-approved application methods (see the IPM Plan). [IP Organization] will notify contractor of the desired date of services, and the size and scale of the building to be treated.

Except as specifically agreed in a signed addendum to this agreement, the contractor must conduct pesticide application in a manner conforming to the attached **Global SUAP (Section 4.0) as well as the project-specific PERSUAP supplement.**

(1) The contractor shall abide by all local and national regulations regarding use of pesticides, including termiticides and rodenticides.

Except as specifically agreed in a signed addendum to this agreement, the contractor must provide all equipment necessary to undertake the pesticide application, including all necessary personal protective equipment according to active ingredient being used, and other equipment otherwise required by the attached IPM. All equipment must meet specifications as established in the attached Global SUAP and PERSUAP Supplement.

ANNEX E: PESTICIDE DATA SHEETS

This Annex presents Pesticide Data Sheets that document regulatory information and proper handling procedures for each pesticide in Table 1 that is designated as "Requesting USAID Approval." All of the pesticides requested for approval are registered for use in the U.S. For some of the AIs for which USAID approval is being requested, there are some products that are classified as RUPs. For other AIs, only agricultural uses confer RUP classification and there are no agricultural components to this PERSUAP. For the remaining AIs, there are no formulated products that are classified as RUPs (see Table 1). Given the distribution of non-RUP and RUP products, this PERSUAP establishes limitations on how the approved termiticides and rodenticide may be applied, as described in Sections 2.2 and 3.2 of the PERSUAP.

The pesticide profiles of the active ingredients used in this PERSUAP are available in a separate document, and summarize the primary concerns with each pesticide for which USAID approval is being sought; however, complete information is not always readily available in USEPA documentation for certain pesticides (e.g., particularly those currently under registration review). Pesticides that were first registered with USEPA after 1984 are not subject to the reregistration process, which includes the preparation of a comprehensive Reregistration Eligibility Document (RED), but the pesticide is subject to registration review. In many cases, on-going registration review indicates data gaps for information on human and ecological toxicity; thus a complete listing of mitigating measure for the protection of human health and ecological receptors is not possible at this time. Pesticide product labels are thus the most up-to-date source for mitigative measures.

In all cases, the pesticide product label and other accompanying documentation (e.g., Material Safety Data Sheet – MSDS) must be consulted for more detailed information regarding protection of human health, protection of ecological resources, and the proper application, storage and disposal of pesticide-containing products.

The PDSs are designed as single-page summaries of important information for each AI. Detailed measures for worker safety and the protection of natural resources and ecological receptors are included in Section 3.4 and 3.5 of the PER portion of this Global PERSUAP and in the SUAP portion of this Global PERSUAP.

Note that the EPA registration dates that are listed in the header rows of the PDSs are often associated with some uncertainty. Where possible, initial registration years or dates are taken from written USEPA documentation (e.g., REDs, IREDs, TREDs, Fact Sheets, Summary Reports, Work Plans or other USEPA documents). If not available, from these documents, registration dates are taken from USEPA's Pesticide Chemical Search website[58]. Unfortunately, the dates provided by USEPA's Pesticide Chemical Search website often do not match the registration dates provided in the Ds, IREDs, TREDs, Fact Sheets, Summary Reports, Work Plans or other USEPA documents.

[58] https://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:1:

ANNEX F: AIS REJECTED FOR USE IN THIS GLOBAL PERSUAP OR RECOMMENDED FOR FURTHER STUDY, AND WHO/USEPA TOXICITY CLASSIFICATIONS

SPECIFIC AIS REJECTED IN THIS GLOBAL PERSUAP THAT MAY NOT BE USED FOR TERMITE OR RODENT CONTROL IN ASHA CONSTRUCTION PROJECTS

Several AIs were considered for approval in this Global PERSUAP but were rejected for a variety of reasons.

***Bacillus thuringiensis* (*B.t.*)** – *B.t.* was suggested as a potential candidate for rodent control; however, it is registered by USEPA for control of Lepidoptera (e.g., moths, caterpillars, borers), coleopteran (e.g., beetles) and dipteran (e.g., flies) insects. It is not registered by USEPA for rodent control and is rejected in this Global PERSUAP.

***Beauveria bassiana* (*B.b.*)** – There are four strains of *B.b.* registered by USEPA: 447, 74040, GHA and HF23.[59] There is some evidence to suggest that *B.b.* was, at one time, registered in the U.S. for termite control. Rath (2010)[60] indicates that there was one commercial product for termite control in the U.S. at that time. However, a review of USEPA pesticides labels at USEPA's Pesticide Product and Label System[61] website did not indicate any *B.b.*-containing products that are currently registered for termite control. Further, documented research[62] suggests that field studies typically focused on the use of *B.b.* on termite colonies (a use which is not allowed by this Global PERSUAP) as opposed to barrier treatments for new construction or spot/crack/crevice treatments to maintain control in existing structures (two practices that are allowed by this Global PERSUAP). Further, Chouvenc, Su and Grace (2011)[63] concluded that after approximately 50 years of research regarding termite control using pathogens (including *B.b.*), effective termite control has not been demonstrated. They further conclude that although use of pathogens such as *B.b.* may be suitable for termite control at some point in time, a better understanding of termite biology, especially their defense mechanisms, is needed for pathogens such as *B.b.* to demonstrate cost-effective control. Thus, *B.b.* is not a feasible AI for termite control in the near term and is rejected in this Global PERSUAP.

Chlorpyrifos and cypermethrin (co-formulation) – This mixture has been proposed for termite control for other ASHA projects in the past. Although both AIs are registered by USEPA for termite control, chlorpyrifos products are considered to be RUP unless they are a formulation other than an

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[59] USEPA. 2010. *Beauveria bassiana* Preliminary Work Plan, https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0564-0003

[60] Rath, A.C. 2010. The Use of Entomopathogenic Fungi for Control of Termites. Biocontrol Science and Technology, Vol. 10, Issue 5, pp. 563-581.

[61] https://oaspub.epa.gov/apex/pesticides/f?p=PPLS:1

[62] Rath, A.C., ibid.

Lenz, M. 2005. Biological Control in Termite Management: The Potential of Nematodes and Fungal Pathogens. Proceedings of the Fifth International Conference on Urban Pests. Lee and Robinson, Eds. http://www.icup.org.uk/reports%5Cicup008.pdf

[63] Chouvenc, T., N.Y Su and J.K. Grace. 2011. Fifty years of attempted biological control of termites – Analysis of a failure. Journal of Biological Control, 59, pp. 69-82.

emulsifiable concentrate (EC) packaged in a container no smaller than 15 gallons for liquid formulations or 25 pounds for solid formulations. In addition, chlorpyrifos has been detected in groundwater wells

within 100 feet of application sites for termite control and is highly to very highly toxic to bees, birds and aquatic life.[64] In aggregate, the risks posed by chlorpyrifos, in consideration of the other termite control options that are approved in this Global PERSUAP, are too great to justify its approval and products containing chlorpyrifos and cypermethrin are rejected in this Global PERSUAP. Note that products that contain cypermethrin as the sole AI in termiticides are approved in this Global PERSUAP.

Chromated copper arsenate (CCA) – Although USEPA has maintained the U.S. registration of CCA, in 2003, the registrant voluntarily cancelled the production of CCA-treated wood products for residential/homeowner use. Industrial and commercial uses of these treated wood products are still in effect.65 Although construction could be viewed as an industrial or commercial undertaking, given that the construction is related to schools and hospitals, sensitive receptors including developing adolescents and the ill and infirmed are anticipated to be present post-construction. Thus, CCA is rejected in this Global PERSUAP.

Cyfluthrin – There is inadequate documentation of the registered uses for termite control (e.g., can it be used in soil amendments, which is a primary use in this Global PERSUAP). Given that many other termite control options are approved in this Global PERSUAP, cyfluthrin is rejected in this Global PERSUAP.

Potassium dichromate – This According to USEPA's Pesticide Chemical Search website[65], potassium dichromate was first registered by USEPA in 1986, but its registration is no longer active. Thus, products containing potassium dichromate are rejected in this Global PERSUAP.

Thiacloprid and benzyl alcohol – This mixture has been proposed for termite control for other ASHA projects in the past. The neonicotinoid thiacloprid has had all registrations cancelled by USEPA in November 2014 at the voluntary request of the registrant.[66] The reason for the voluntary cancellation was not specified, but it followed EPA's generic data call-in as part of their Registration Review process and the announcement that the American Bird Conservancy was planning a review of the toxicity of thiacloprid and other neonicotinoids to birds.[67] According to USEPA's Pesticide Chemical Search website, benzyl alcohol was first registered by USEPA in 1986, but its registration is no longer active. Thus, products containing thiacloprid and benzyl alcohol are rejected in this Global PERSUAP.

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[64] USEPA. 2006. Reregistration Eligibility Decision for Chlorpyrifos: https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-059101_1-Jul-06.pdf

[65] https://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:1:

[66] https://www.epa.gov/pollinator-protection/schedule-review-neonicotinoid-pesticides

[67] Thiacloprid Notice of Registration Review Case Closure November 2014: https://www.regulations.gov/document?D=EPA-HQ-OPP-2012-0218-0018

These rejected AIs are tabulated in Table 9.

TABLE 9. USEPA REGISTRATION STATUS, ACUTE TOXICITY CATEGORIZATION, RUP DESIGNATION, AND REQUEST FOR APPROVAL STATUS

ACTIVE INGREDIENT	USEPA REGISTRATION STATUS/NOTES	ACUTE TOXICITY CATEGORY[68]	RUP?[69]	REQUESTING USAID APPROVAL?/NOTES
Termiticides				
Bacillus thuringiensis	Registered in U.S.	WHO: III EPA: IV	No	**No; not registered as rodenticide**
Beauveria bassiana	Registered in U.S.	WHO: Not listed EPA: III	No	**No; not registered as termiticide; effectiveness in termite control not demonstrated**
Chlorpyrifos and cypermethrin (co-formulation)	Both registered in U.S.	Chlorpyrifos, WHO: II EPA: II Cypermethrin, WHO: II EPA: II	Chlorpyrifos: many RUPs Cypermethrin: agricultural products are RUP	**No; aggregate risk of chlorpyrifos too great**
Cyfluthrin	Registered in U.S.	WHO: Ib EPA: I-II depending on vehicle of administration	All agricultural formulations	**No; insufficient evidence of registration as termiticide; WHO Class 1b, can be USEPA Category I**
Potassium dichromate	No longer registered in U.S.	WHO: Not listed EPA: data not available	Unknown	**No; no longer registered**
Thiacloprid and benzyl alcohol (co-formulation)	Thiacloprid and benzyl alcohol no longer registered in U.S.	Thiacloprid, WHO: II EPA: II Benzyl alcohol, data not available	No	**No; thiacloprid and benzyl alcohol are no longer registered**

[68] Classifications and categories are for Technical Grade pesticide. Formulated products are often of lesser acute toxicity. WHO assigns a single classification (The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 2009. World Health organization, 2010. Available on the Internet at: http://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf). EPA has several toxicity categories for various routes of exposure. Only the most stringent EPA category is given here. EPA categories come from REDs, Pesticide Summaries, Facts Sheets, and Registration Review Documentation.

[69] RUP status obtained from USEPA documentation (e.g., REDs, Summary documents, etc. and the January 19, 2016 RUP Report: https://www.epa.gov/sites/production/files/2016-02/documents/rupreport-sec3-update-jan2016.pdf) where available. Other sources include:

Rhode Island Department of Environmental Management. No date. Federally Restricted and State-Limited Use Pesticides. Available on the Internet at: http://www.dem.ri.gov/programs/bnatres/agricult/pdf/frup.pdf

University of Florida (U.S.) IFAS Extension. 2009. Restricted Use Pesticides, available on the Internet at: http://edis.ifas.ufl.edu/pi073

University of Nebraska. 2003. Federally Registered Restricted Use Pesticides. (U.S.), available on the Internet at: http://www.ag.ndsu.nodak.edu/aginfo/pesticid/pdf/ec2500.pdf

PESTICIDES RECOMMENDED FOR FURTHER STUDY:

Contrapest: This is a liquid fertility control bait for rodents developed by the US company Senestech, that targets the reproductive capacity of both male and female rats, rendering them infertile[70]. The bait has a high water, fat and content which makes rats return to ingesting it even in the presence of high value foods. Consumption of this bait causes a decline in rat litter size as early as 15 days after ingestion, thus continuous use would gradually decrease rat populations to a lower, sustainable level. he liquid bait is delivered in two 550ml tanks with attached feeder trays in tamper-resistant JT Eaton bait stations that are weather proof, pet proof and most importantly, child proof. This is a relatively product new in the US market, not to speak of internationally. Therefore, it is recommended that further studies and analyses be conducted on the efficiency of Contrapest for rodent control.

WHO ACUTE TOXICITY CLASSIFICATIONS AND USEPA ACUTE TOXICITY CATEGORIES

Table 10 and Table 11 outline the WHO Acute Toxicity Classifications and USEPA Acute Toxicity Categories which are the basis for the selection of approved active ingredients and safety requirements outlined in this PERSUAP:

TABLE 10. WHO – THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING OF CHEMICALS (GHS) [71]

WHO CLASS (NOTE: FOR TECHNICAL GRADES)		RAT LD_{50} (MG/KG BODY WEIGHT)	
		ORAL	DERMAL
Ia	Extremely Hazardous	<5	<50
Ib	Highly hazardous	5-50	50-200
II	Moderately hazardous	50-2,000	200-2,000
III	Slightly hazardous	Over 2,000	
U	Unlikely to present acute hazard	5,000 or higher	

TABLE 11. EPA ACUTE TOXICITY CATEGORIES[72]

STUDY	CATEGORY I	CATEGORY II	CATEGORY III	CATEGORY IV
Acute Oral	Up to and including 50 mg/kg	>50 through 500 mg/kg	>500 through 5000 mg/kg	>5000 mg/kg

[70] https://senestech.com/contrapest/

[71] WHO. 2009. The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 2009. World Health organization, 2010. Available on the Internet at: http://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf

[72] USEPA. 2002. Health Effects Test Guidelines OPPTS 870.1000 Acute Toxicity Testing— Background. EPA 712–C–02–189, Office of Prevention, Pesticides and Toxic Substances, December 2002. Available on the Internet at: https://ntp.niehs.nih.gov/iccvam/suppdocs/feddocs/epa/epa_870r_1000.pdf

USEPA. 2017. Label Review Training, Module 2: Parts of the Label, website: https://www.epa.gov/pesticide-labels/label-review-training-module-2-parts-label-page-1

TABLE 11. EPA ACUTE TOXICITY CATEGORIES[72]				
STUDY	CATEGORY I	CATEGORY II	CATEGORY III	CATEGORY IV
Acute Dermal	Up to and including 200 mg/kg	>200 through 2000 mg/kg	>2000 through 5000 mg/kg	>5000 mg/kg
Acute Inhalation	Up to and including 0.05 mg/liter	>0.05 through 0.5 mg/liter	>0.5 through 2 mg/liter	>2 mg/liter
Eye Irritation	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or irritation clearing in 8-21 days	Corneal involvement or irritation clearing in 7 days or less	Minimal effects clearing in less than 24 hours
Skin irritation	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	Mild or slight irritation (no irritation or slight erythema)
Signal Word for Product Labeling	DANGER	WARNING	CAUTION	none required
Study	Study results		Study results	
Dermal Sensitization	Product is a sensitizer or is positive for sensitization		Product is not a sensitizer or is negative for sensitization	