PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN (PERSUAP) FOR USAID/MOZAMBIQUE

AMENDMENT 1

APPROVAL DOCUMENT

PROGRAM/ACTIVITY DATA:

Program/Activity Title: Agriculture, Environment, and Business Team

Country/Region: Mozambique

Functional Objective: Agriculture

Program Area: Field Crop and Livestock Production Programs, Agriculture Research Programs and Food Security Programs

Program Element(s):

Project/ Funding Begin: September 30, 2012
Project/ Funding End: September 30, 2017

PERSUAP Prepared By:

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PERSUAP time-extension prepared by: Eduardo Langa, MEO USAID/Mozambique

Current Date: May 1, 2015
Expiration Date: May 1, 2016

USAID Contact Person:

PERSUAP Amendment: Yes _X_ No

P:\MISSION ENVIRONMENTAL OFFICER\Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP)\PERSUAP\Final PERSUAP

Other Relevant Environmental Compliance Documentation:

P:\AEB Portfolio IEE\2012 ATB Portfolio IEE.pdf

PURPOSE AND SCOPE OF THE PERSUAP:

The purpose of this PERSUAP, in accordance with 22CFR216, is to address the pesticide safer use and handling issues for field crop production and commodity protection activities of USAID/Mozambique by 1) expanding rural economic opportunities in the agricultural sector by increasing food and cash crop productivity and marketing programs; 2) by increasing economic opportunities for rural
communities in selected regions of Mozambique; 3) by decreasing risk on agriculture research projects; and 4) Title II programs to enhance food security of vulnerable households and transform agriculture.

A **Positive Determination** is recommended for pesticide use pursuant to USAID’s Pesticide Procedures, 22 CFR 216.3 (b)(1)(i)(a - l). As a result, USAID/Mozambique has completed a Programmatic Environmental Assessment in the form of a PERSUAP for pesticide use by Agriculture Production, Research and Title II partners.

On November 14, 2012, the Bureau Environment Officer approved the Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) for the USAID/Mozambique Field Crop and Livestock Production Programs, Agriculture Research Programs and Food Security Programs under the Feed the Future Program (LOP FY12-FY17). The PERSUAP requires that all USAID partners using or preparing to use pesticides are to complete an Environmental Mitigation and Monitoring Plan (EMMP) addressing specific risks of pesticide use in their programs and measures planned to mitigate those risks. This EMMP will include a list of pesticide products currently used by the partner, a narrative of recommendations for pesticide use provided by the partner to beneficiaries and proposed measures to improve pesticide use, handling, operator protection, effectiveness or other risk mitigation measures. This EMMP will be updated every year for which pesticide use, handling or recommendations are part of the partner’s work and this update will be attached to the annual work-plan. For the preparation of this EMMP, partners will follow the Final Action Form Mozambique Agriculture & Food Security Sectors PEA/PERSUAP May 2011 short guidance developed by USAID/Mozambique. The remainder of this Final Action Form and attached PERSUAP provides analysis of pesticides available in Mozambique, pesticides recommended for use; the risks associated with pesticide use and establish the conditions necessary for effective and safe pesticide use.

The purpose of this amendment is extending the validity of the PERSUAP for a period of one year from May 1, 2015 to May 1, 2016. This amendment is to cover the ongoing FTF activities while the Mission takes action to prepare a new PERSUAP update that will cover the Strengthening Agribusiness and Fostering Rural Alimentation (SAFRA) project to be developed in Mozambique, as well as covering other activities utilizing pesticides in the AEB Office. The nature of activities covered by the PERSUAP remains the same and all conditions limitations and the stipulation of revisions established in the original PERSUAP remain in full force throughout the extended life of project. All conditions shall be implemented by the Implementing Partners and reported back to USAID with documented evidence.

**SUMMARY OF POTENTIAL IMPACTS OF THE ACTIVITIES, AND RECOMMENDED MITIGATION ACTIONS:**

All conditions and requirements of the 2012 PERSUAP remain in full force. And as required by ADS 204.5.4, USAID Mozambique designated personnel will actively monitor and evaluate whether the program and its activities remain consistent with the approved environmental compliance requirements. If new or unforeseen consequences arise during implementation, the team will suspend the activity involved and initiate appropriate, further review in accordance with 22 CFR 216. USAID monitoring shall include regular site visits.

**PERSUAP FINDINGS** In addition to numerous Integrated Pest Management tactics (IPM), this PERSUAP has evaluated 225 active ingredients (AIs) contained in 576 pesticide or chemical products that have been evaluated and are registered for import and use in Mozambique. Full list of Pesticides evaluated can be found on the following link: P:\MISSION ENVIRONMENTAL OFFICER\Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP)\PERSUAP\Final PERSUAP.
SUMMARY OF GENERAL PROJECT IMPLEMENTATION AND MONITORING REQUIREMENTS

The PERSUAP recommendations shall be incorporated into Implementing Partner’s annual work plans and reporting instruments, and actively monitored. This PERSUAP itself shall be seen as a living document, to be updated as new pesticide products become available, regulations and pesticide registrations change and new best practices are adopted.

Specifically, the conditions are that the risk reduction measures outlined in Section 6 in this document will be followed, per the actions outlined in the Safer Use Action Plan in Section 7.

The full narrative PERSUAP is attached as an annex to this Approval Document (Annex 1).
**Mozambique PERSUAP Extension**

Program/Activity Title:  Pesticide Evaluation Report And Safer Use Action Plan (PERSUAP)

### APPROVAL OF PERSUAP AMENDMENT

**CLEARANCE:** Agriculture Environment and Business Team  
Mission Director: Alex Dickie  
Date: 4/18/15

**CONCURRENCE:**  
AFR Bureau Environmental Officer: Brian Hirsch  
Date: 4/14/15

Approved: ☑  
Disapproved: ☐

**FILE NO.:**

### ADDITIONAL CLEARANCES:

**Mission Environmental Officer:** Edward Xaixo  
Date: 4/18/15

**Agriculture, Environment and Business:** Tim Born  
Date: 4/18/15

**Supervisory Program Officer:** Shelley Young  
Date: 4/18/15

**Resident Legal Officer:** Rick Burns  
Date: 4/18/15

**Regional Environmental Advisor:** Diana Shannon  
Date: 4/18/15

### Distribution List:

- USAID/Mozambique Health Team A/CGs and Activity Managers  
- USAID/Mozambique Contracts Office  
- USAID/Mozambique Program Development and Analysis Office
Annex 1
SUMMARY OF FINDINGS:

This final action form summarizes the findings of the PERSUAP which address the pesticide safer use and handling issues for field crop production and commodity protection activities of USAID/Mozambique by 1) expanding rural economic opportunities in the agricultural sector by increasing food and cash crop productivity and marketing programs; 2) by increasing economic opportunities for rural communities in selected regions of Mozambique; 4) by decreasing risk on agriculture research projects; and 3) Title II programs to enhance food security of vulnerable households and transform agriculture.

A **Negative Determination with conditions** is recommended on the basis of the completion by USAID/Mozambique of a PERSUAP for pesticide use by Agriculture Production, Research and Title II partners, addressing USAID’s Pesticide Procedures, pursuant to 22 CFR 216.3 (b)(1)(i)(a - I). The **conditions** are addressed in the findings and recommendations summarized below.

In addition to numerous IPM tactics, this PERSUAP has evaluated 225 active ingredients (AIs) contained in 576 pesticide or chemical products that have been evaluated and are registered for import and use in Mozambique. The pesticides and chemicals (PERSUAP, Annex 1) list comprises:

- 92 AIs in insecticides/miticides/nematocides,
- 43 AIs in herbicides (weeds),
- 31 AIs in fungicides (fungi),
• 3 Al's in rodenticides (rats, mice),
• 1 AI in a molluscicide (snails, slugs),
• 1 AI in an avicide (birds)
• 2 Al's in fumigants (stored grains & foods),
• 1 AI in a fruit ripening agent,
• 2 Al's in plant growth regulators,
• 14 Al's in disinfectants (for fruit and vegetable processing, animal care, and clean-up)
• 1 Al in a pesticide adjuvant
• 9 Al's in livestock anti-endoparasite chemicals
• 25 Al's in livestock antibiotics.

This study provides recommendations to reduce and mitigate risks, using IPM tactics and thus enhancing the sustainability of project interventions. The recommendations will be incorporated into Implementing Partner's annual work plans and reporting instruments, and actively monitored. This report is a living document, to be improved as new pesticide products become available, regulations and pesticide registrations change and new best practices are adopted.

Specifically, the conditions are that the risk reduction measures outlined in Section 6 in this document will be followed, per the actions outlined in the Safer Use Action Plan in Section 7.

Issue 1: Pesticides on POPs and PIC lists might be used by Mozambique farmers

Pesticides Containing Active Ingredients on THE POPs and PIC Lists: Issues and Recommended mitigation Measures

Insecticide Active Ingredient on the POPs list:
DDT (used for IRS anti-malaria work)

Insecticide Active Ingredients on the PIC list:
methamidophos (actively used)
monocrotophos (registered for use)

Mitigation Recommendations for POPs and PIC Products

• USAID/Mozambique and its agriculture beneficiaries should never use products containing these POPs and PIC chemicals listed above. USAID does not recommend or permit the use of internationally banned or restricted pesticide products on USAID-funded projects (except for the highly controlled use of DDT for malaria management).
• If DDT residues above normal MRL baseline levels are found on any produce or food shipments to EU countries, or South Africa, the IRS spray program using DDT will likely be forced to switch to using synthetic pyrethroids, which are not as effective at controlling malaria as DDT. Thus, agriculture projects need to emphasize to their beneficiaries the importance of not purchasing from the informal market or using DDT on farms or farm fields.

Issue 2: Pesticides not registered by EPA

The following AIs were found on the MOA and MOH lists of 576 pesticides, agricultural chemicals and livestock chemicals containing 225 AIs to be not registered by EPA:

**Insecticide AIs not EPA registered**

<table>
<thead>
<tr>
<th>(bio)allethrin</th>
<th>Alpha-cypermethrin</th>
<th>bendiocarb</th>
</tr>
</thead>
<tbody>
<tr>
<td>cadusafos</td>
<td>carbosulfan</td>
<td>diethyltoluamide</td>
</tr>
<tr>
<td>ethion (miticide)</td>
<td>flumethrin (miticide)</td>
<td>mevinphos</td>
</tr>
<tr>
<td>monocrotophos</td>
<td>pine (tar) oil</td>
<td>quinalphos</td>
</tr>
<tr>
<td><em>Salmonella enteriditis</em></td>
<td>thiocyclam</td>
<td>transfluthrin</td>
</tr>
<tr>
<td>tetradifon (miticide)</td>
<td>trichosane</td>
<td>triflumuron</td>
</tr>
</tbody>
</table>

**Herbicide AIs not EPA registered**

<table>
<thead>
<tr>
<th>chlorimuron (ethyl)</th>
<th>cycloxydim</th>
<th>dichlormid</th>
</tr>
</thead>
<tbody>
<tr>
<td>dichlorophen(e)</td>
<td>sulcotrione</td>
<td>terbutryne</td>
</tr>
</tbody>
</table>

**Fungicide AIs not EPA registered**

<table>
<thead>
<tr>
<th>benomyl (benlate)</th>
<th>copper ammonium acetate</th>
<th>copper oxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>dichlorophen(e)</td>
<td>dodemorph</td>
<td>epoxiconazol</td>
</tr>
<tr>
<td>hexaconazole</td>
<td>pencycuron</td>
<td>propineb</td>
</tr>
</tbody>
</table>

**Rodenticide AIs not EPA registered**

Coumatetralyl

**Disinfectant AIs not EPA registered**

Crystal (gentian) violet

**Mitigation Recommendations for Non-EPA Registered Products**

- USAID/Mozambique and its beneficiaries should not use products containing these above non-(EPA)-registered active ingredients, and instead use one of the many alternate products. USAID does not permit the use of non-EPA registered pesticide products on USAID-funded projects.

Issue 3: Very high acute toxicity and human health issues: Issues and Recommended Mitigation Measures
Several of the pesticides found with distributors and in distributors and farm stores in Mozambique, and included in the USAID/Mozambique Program Pesticides Decision Matrix (Table 1, with WHO and EPA acute toxicities of only Ia or Ib and I, respectively as well as some products banned or targeted strongly by environmental groups in several countries) contain active ingredients, with the possible exception of copper compounds, that are too toxic for farmers to use, as follows:

Almost all Class I pesticides are insecticides and fumigants (like those presently-available in retail sector: methamidophos,
endosulfan,
aluminum phosphide,
brodifacoum;

As well as those not yet readily available, but registered by MOA for import and use:
aldicarb (Temik),
cadusafos,
carbofuran,
chlorfenvinphos,
dichlovos (DDVP),
mevinphos,
methomyl,
methidathion,
methiocarb,
monocrotophos,
proptamphos,
terbufos,
oxamyl

If the condition that less toxic formulations (Classes II—yellow-banded label and III or IV—green-banded label) of the above chemicals, especially rodenticides, are made available, then use by untrained small-scale farmers could be considered.

Mitigation Recommendations for Highly Toxic Products

- With the exception of processing facility chemicals and copper compounds, the project should not use WHO Class Ia or Ib and/or EPA Class I and other risk-prone products containing these above active ingredients on USAID/Mozambique beneficiary farms, due to increased and inordinately high risk to farmers, their families, bystanders, and produce consumers. Mozambique project farmers should use PPE and provide it to the laborers who work for them, and should receive sufficient training to set BMP usage behavior patterns.

- Less acutely toxic pesticide products are registered by the MOA, though few are readily available in Mozambique. As production and input usage expands in the near future, the market for some of these less acutely toxic products should be used in place of products containing the active ingredients listed above.
Fumigation of stored agricultural products, using aluminum or zinc phosphide requires highly trained and certified workers—the average farmer should not attempt this. Very high-tech breathing apparatus and strict training are required, neither of which are currently available or used in Mozambique.

Effective processing facility chemical choices, for which there are few alternatives, are almost all EPA Class I toxins, which are highly corrosive to eyes, skin, and mucous membranes. Therefore, they should only be used by personnel wearing gum rubber boots, gloves and goggles especially for pouring and mixing, and a carbon-filter respirator for volatile chemicals like chlorine.

**Issue 4: Some pesticides are Restricted Use Pesticides (RUPs)**

The following pesticides are designated by EPA to be RUPs:

Insecticides: aldicarb (Temik), aluminum phosphide (fumigant), methomyl, monocrotophos, profenofos, alpha-cypermethrin, carbofuran, beta-cyfluthrin, fenamiphos, methamidophos, oxamyl (nematocide), permethrin, terbufos;

Herbicides: alachlor, paraquat;

Disinfectant: sulfuric acid

**Mitigation of RUP risks in Mozambique**

- **Training/Repeated Message Enforcement:** For RUPs that pose a risk to the environment and natural resources, training is the best method for enforcing the message that certain targeted pesticides need to be used with care, especially near aquatic environments.

- **Paid, Subsidized, or Free Applicator Certification:** This measure would not likely work well until the Mozambique has pesticide applicator certification systems set up, for reasons of scale. Mozambique farming systems are very small in scale compared with American farming systems, and farmers do not (yet) have the resources or motivation to encourage such a certification system.

- **EA:** If any pesticide active ingredients are specified to be RUPs based on the criterion “human hazard” and Mozambique implementing partners beneficiaries wish to use them (except aluminum phosphide risk which can be mitigated with training and PPE), a specific EA is required to assess and mitigate such hazards.

**Issue 5: Farmers and project staff have not had sufficient IPM and pesticide safety training and information**
Many people in the agriculture and food security sectors in Mozambique will require baseline and refresher training in GAPs, IPM and pesticides safety.

**Mitigation of lack of training and information**

- For beneficiary farmers to use the IPM and accepted (allowable) pesticide products in the short term, users will require training and refresher training in IPM, pesticide choice and safe use, if this has not yet occurred—emphasizing which products are recommended and which should not be used, and why.

- Mozambique implementing partners assist beneficiary farmers and extension workers with the production of crop and pest-specific Pest Management Plans—PMPs—organized by crop phenology or seasonality that emphasize IPM with (least toxic) pesticide use as the last choice.

- Beneficiary agronomists should obtain from pesticide importers/distributors Material Safety Data Sheets (MSDSs) for pesticide products that will be used extensively on project crops, and recommend that their farmers use pesticides with low human and environmental risk profiles (see decision matrix in the Table in Annex 1, MSDSs, and Labels). Beneficiary partner agronomists share this information with farmers and laborers they serve.

- Beneficiary project agronomists produce a quick reference guide for all of the anticipated major or primary pests/production constraints of each crop, GAPs, and IPM measures that can be used to strengthen and protect the crop, soil and water, and pesticides to be used for each anticipated pest and condition, with use rates. In addition, project agronomists can emphasize that farmers practice pesticide-specific safety measures, regular pesticide rotation, environmental concerns, REI, pre-harvest interval, and minimum/maximum residue levels/limits for export and local consumption.

- During IPM and pesticide safety training of farmers, include additional pesticide selection factors such as environmental and human safety in the discussion; information and materials in this PERSUAP, material found in MSDSs and pesticide labels, and material found on pest management websites can be used to emphasize the importance of these additional pesticide selection factors.

- Beneficiary project agronomists and farmers in associations should identify a responsible person who will ensure the proper storage, use, and maintenance of PPE. This involves making sure that the equipment is cleaned and checked for damage regularly, that the equipment is not taken away from the farm, and that workers are correctly using the equipment.

**Issue 6: IPM methods and Pesticide safety information is not widespread**

Many farmers and others in the pesticide sector do not have access to sufficient information on IPM and pesticide safety measures and standards

**Mitigation of lack of information**

- Beneficiary project farmers source inputs from farm stores that have received and utilize best practices training, and source pesticides from the most reputable and reliable pesticide companies.
• Beneficiary project agronomists should perform basic simple economic analyses comparing pesticides to determine the most effective choice while simultaneously selecting pesticides with low health and environmental impact potential.

• As far as practical, promote the use of more green-label microbial, botanical and naturally-derived pesticides (mineral and vegetable oils, sulfur, copper compounds, kaolin clay, *Bacillus thuringiensis*-BT, bacterial extract-based pesticides spinosad and abamectin, *Metarhizium* species, *Beauveria bassiana*, *Trichoderma* species, and oil extracts of neem, chili pepper, and garlic).

• Beneficiary project farm associations, managers, and farmers ensure that protective clothing (carbon-filter respirator mask, gloves, long-sleeved shirt and pants or Tyvek outfit, boots, and goggles if indicated on the label) is used by any and all pesticide applicators, *as a condition of employment*. This clothing should be carefully selected to provide an optimum balance of worker comfort and protection.

• Mozambique implementing partners agronomists set out a schedule for continuous training of farmers they work with in IPM, the safe handling and use of pesticides, including aspects such as types and classes of pesticides, human and environmental risk associated with pesticides, use and maintenance of PPE, monitoring for the development of pesticide resistance, understanding information on labels, proper collection and disposal of rinsate and packaging, the importance of keeping children away from the field while spraying is occurring and kept out after spraying has occurred, avoiding using pesticides in or near national parks where endangered species are known to exist and head waters leading to any of the Mozambique’s rivers, ensuring pesticide applicators continue to respect laws associated for notification of beekeepers about spray activities, and utilizing pesticides with low ground water contamination potential (see Annex 1) where water tables are high or easy to reach.

• Beneficiary project agronomists and farm managers should begin to develop a record-keeping system on GAPS/IPM measures tried; the South African and EU-permitted pesticides; a training record; a pesticide checklist with types and use rates; PPE on hand, maintained, and used; pest monitoring reports; environmental conditions and any incidences of resistance development; poisonings of people, fish, birds, honeybees, livestock; and water pollution, which is also a requirement for GlobalGAP certification and agriculture best management practices. This record-keeping should be taught to farmers who supply beneficiarys with produce.

### Issue 7: IPM and pesticide legislation can be improved

Legislation on pesticide safety and IPM needs continuous improvement, and could use assistance from donors.

#### Mitigation of legislation issues

• Encourage the Mozambique MOA to update its list of evaluated pesticides and reduce it from over 500 products to 300-400 modern internationally-accepted products, especially those used by produce exporters.
• For all farms supported by Mozambique implementing partners, encourage and support the use of GlobalGAP best practices with pesticide storage, use and disposal, \textit{whether or not certification is sought}. This is especially important for the traditional and oriental vegetables and the pineapple sectors.

• If a Southern African pesticide container recycling facility is brought on-line during the life of the project, Mozambique implementing partners should encourage its use.

\textbf{Issue 8: IPM and pesticide safety are not part and parcel of project design}

Most implementing partners do not include GAPs, IPM and pesticide safety in annual work plans, action plans or annual reports.

\textbf{Mitigation of project inclusion of IPM and pesticide safety}

• Mozambique implementing partners regularly and at minimum annually, update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary. Mozambique implementing partners Project Managers will need to report changes to less toxic products on the list of pesticides recommended to USAID as this PERSUAP is amended over the life of project.

• Mozambique implementing partners project staff members write PERSUAP issues and mitigation into all work plans, especially annual work plans, on intentions to monitor progress of each in implementing Safe Use Recommendations, any outstanding pesticide risk issues, any use of IPM tactics, any farm certification issues, and other risk mitigation measures to be taken.

• Mozambique implementing partners project staff keeps records on the implementation of the recommendations found in this PERSUAP, and report on them in quarterly, biannual, and annual reports, under a heading titled “Environmental Compliance and Best Management Practices for Agriculture”.