



Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss



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Environmental Mitigation and Monitoring Plan (EMMP)

Bureau/Office:	Bureau for Food Security/Agricultural Research and Policy
Country/Region:	U. S., Bangladesh, Ethiopia, Ghana, and Guatemala
Functional objective 4:	Economic Growth
Program Area:	4.5 Agriculture
Program Elements:	4.5.2 Agricultural Sector Productivity
IEE Prepared by:	Angela Records, BFS/ARP, October 15, 2013
IEE Expires:	November 30, 2018

The list below gives the IEE activities, exclusions, and provides EMMP for those activities that had a negative determination by BFS/ARP

IEE activity 1: Network and capacity building among smallholder farmers, producer cooperatives and agribusiness enterprises with market-based value chains.

IEE activity 2: Institutional or collective capacity building.

BFS/ARP recommendation is that these two activities fall under categorical exclusion 22 CFR 216.2(c)(i), Education, technical assistance, or training.

IEE activity 3: Market-research, value chain assessment, and pilot testing. Categorical exclusion per 22 CFR 216(c)(2)(iii) Analyses, studies, academic or research workshops and meetings.

IEE activity 4iii, iv, v, vi, and vii. Pilot-testing of Hohenheim solar dryer (for drying), USDA-ARS moisture sensor (for moisture measurement), Woods End Lab CO₂ kits (for storability prediction), Romer Lab test strips (for mycotoxin assessment), and USAID Warehouse Receipt System (for market access). Categorical exclusion per 22 CFR 216(c)(2) (iii) Analyses, studies, academic or research workshops and meetings.

IEE activity 4i and 4ii: Pilot-testing efficacy of Purdue Improved Crop Storage (PICS) triple bagging technology and GrainPro Superbags/cocoons or hermetic metal drums/bins (for storage)

IEE Condition(s)	Mitigation Measure(s)	Monitoring Measures(s)	Timing and Responsible Parties
<p>Dissemination of information, market development, and capacity building pertaining to increased use of PICS and Superbags/cocoons shall include instruction on proper disposal of bags once they are no longer effective.</p>	<ol style="list-style-type: none"> 1. Provide instructions on proper use of the PICS (http://www.youtube.com/watch%3Fv%3DRZN-IqukCPw), Superbags (http://www.youtube.com/watch%3Fv%3DejbjuaEU1xl), and cocoons, including a standard operating procedure (SOP) for proper disposal. 2. Check bags after each use for any insect-damaged holes/tears. 3. If possible, repair tiny holes/tears with tape or a sealant. 4. Bags unsuitable for further use shall be collected, and sent to a recycling center (if available) 5. If a recycling center is unavailable, collect and return damaged bags to manufacturer for recycling. 6. Follow local county/country guidelines for disposal. 	<ol style="list-style-type: none"> 1. Identify locations where PICS, Superbags, and cocoons will be used. 2. Create a mechanism to keep track of number of bags procured, used, and number unsuitable for use at each location. <ol style="list-style-type: none"> 2a. Establish a reporting system for 2 above. 2b. Make site visits for auditing purposes. 3. Keep inventory of the number of PICS, Superbags, and cocoons being used at various locations. 4. Keep inventory of PICS, Superbags, and cocoons unsuitable for further use at each location, and how they were disposed. 	<ol style="list-style-type: none"> 1. Make sure the SOP for use and disposal are in place and shared with target recipients prior to use of the bags/cocoons. 2. Site visits and reporting will be performed 2-4 times a year. <p>Responsible Party: Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p>

IEE activity 4viii: Pilot-testing of diatomaceous earth dusts and silica nano-particles.

IEE Condition(s)	Mitigation Measure(s)	Monitoring Measures(s)	Timing and Responsible Parties
<p>1. Appropriate pesticide use protocols to safeguard the health of research personnel/workers and to protect local ecosystems are developed and implemented, based on toxicological and environmental data for the proposed pesticides.</p> <p>2. Such safeguards will address pesticide storage, handling and application, including the use of Personal Protective Equipment (PPE), clean-up, and disposal.</p>	<p>1a. Only diatomaceous earth dusts registered by U.S. Environmental Protection Agency or those available in the respective Feed the Future countries will be used on stored commodities. Those available locally should have sufficient safety and efficacy information available to qualify their appropriateness for use</p> <p>1b. Guidelines for proper use of the dusts/silica nano-particles will be provided.</p> <p>1c. All those handling the pesticides will be briefed on the safety and environmental impacts of the pesticide, and will be asked to read and understand the Material Safety Data Sheet (MSDS), and sign a form.</p> <p>2a. All diatomaceous earth dusts will be stored in air tight containers in a dry place.</p> <p>2b. Only authorized people are allowed to handle the pesticides.</p> <p>2c. Pesticides will be applied in a manner that minimizes risk of contamination to the environment and personnel, and includes the use of personal protective equipment such as a dust mask. All use will be</p>	<p>1a. Verify manufacturer information and MSDS during project planning phase on pesticides to be used.</p> <p>1b. Pesticide efficacy: monthly monitoring of effectiveness on target species based on collected data.</p> <p>1c. Periodic site visits to ensure proper PPE is being used.</p> <p>2a. Review guidelines/training materials and obtain list of those requiring training.</p> <p>2b. Periodic site visits to ensure pesticides are being stored correctly.</p> <p>2c. Inspect application techniques during initial stages of the project.</p> <p>2d. Maintain records on quantity of pesticide procured and amount used in tests, and date of application, and name of applicator.</p>	<p>1. Annual reporting on pesticide use, PPE, pesticide efficacy and site visits timing should be outlined clearly for each monitoring measure.</p> <p>2. Document site visit by Postharvest Loss Reduction Lab researchers/or by implementing partner. Site visits will be performed 2-4 times a year.</p> <p>3. Annual reporting on efficacy of monitoring and mitigation measures.</p> <p>4. Review training materials during preparation of training materials, and during actual training.</p> <p>Responsible Party: Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p>

<p>3. Pesticide treated crops will not be used for human or animal consumption (If crops are used for consumption, then this activity may be subjected to development of a PERSUAP, suspend activity and consult with REA or BEO)</p>	<p>consistent with label/MSDS requirement</p> <p>2d. People with respiratory issues shall not be handling and apply the dusts/silica nano-particles.</p> <p>3a. Pesticide-treated commodities will be destroyed and not used for human consumption.</p> <p>3b. Development of a PERSUAP prior to treated commodities being made available for consumption by humans/animals; PERSUAP will demonstrate that inert dust treated commodities are environmentally benign and safe.</p> <p>3c. Training in proper cleaning of treated commodity (dust can be easily removed by sifting or by washing).</p> <p>3d. No special requirements for disposal of pesticide containers, as the dusts containing silicon dioxide are Generally Recognized as Safe.</p>	<p>3a. Maintain records on volume of disposed pesticide-treated commodities, and level of efficacy in disposal method.</p> <p>3b. Compare amount of pesticides at hand and what is used, and maintain records in a log book. Records include name of pesticide used, rate used, quantity of commodity treated, date and time of application, amount used, name of applicator, and PPE used.</p> <p>3c. Conduct a pesticide poison decontamination protocol review.</p> <p>3d. Assure that a proper protocol is in place and decontamination facilities exist at each site where pesticides are used.</p> <p>3e. Inspect instructions and training given to end users to remove dusts from treated commodities.</p> <p>3f. Make sure Safer Use Action Plans are in place if treated commodity is destined for consumption by humans/animals.</p>	
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IEE activity 4ix: Pilot-testing efficacy of approved insecticides, or Vestergaard Frandsen insecticide impregnated bags (Zerofly® storage bag for insect control).

IEE Condition(s)	Mitigation Measure(s)	Monitoring Measures(s)	Timing and Responsible Parties
<p>1. Appropriate pesticide use protocols to safeguard the health of research personnel/workers and to protect local ecosystems are developed and implemented, based on toxicological and environmental data for the proposed pesticides.</p>	<p>1a. The manufacturer shall provide information on human health and environmental impact of deltamethrin, which is an insecticide approved by US-EPA.</p> <p>1b. The manufacturer shall provide information to those handling the deltamethrin-treated polypropylene bags on the risks due to dermal exposure.</p> <p>1c. All those handling the bags will read and understand information provided on deltamethrin, including the MSDS, and sign a form.</p> <p>1d. Provide training on safe handling and use of deltamethrin-treated bags and on proper disposal procedures, with</p>	<p>1a. Verify manufacturer information and MSDS during project planning phase on pesticides to be used.</p> <p>1b. Pesticide efficacy: monthly monitoring of effectiveness on target species based on collected data.</p> <p>1c. Periodic site visits to ensure proper PPE are in place.</p>	<p>1a. Annual reporting on pesticide use, PPE, pesticide efficacy and site visits (2-4 site visits a year) timing should be outlined clearly for each monitoring measure.</p> <p>1b. Document site visit by Postharvest Loss Reduction Lab researchers/or by implementing partner.</p> <p>1c. Annual reporting on efficacy of monitoring and mitigation measures.</p> <p>1d. Review training materials during preparation of training materials, and during actual training.</p> <p>1e. Review PERSUAPs for completeness, only if commodity is intended for human/animal consumption.</p> <p>Responsible Party:</p>

<p>2. Such safeguards will address pesticide storage, handling and application, including the use of Personal Protective Equipment (PPE), clean-up, and disposal.</p>	<p>explanation on both process and rationale.</p> <p>1e. Ensure availability and use of PPE.</p> <p>2a. All unused bags shall be handled by wearing gloves (to prevent dermal exposure).</p> <p>2b. All bags shall be stored in a designated pesticide storage shed, and should not be used by the warehouse for storing commodities intended for human consumption.</p> <p>2c. Access to pesticides storage areas will be restricted to authorized personnel only.</p> <p>2d. Bags filled with commodities shall be handled by trained people wearing long-sleeved shirts and gloves to prevent dermal exposure.</p> <p>2e. Avoid carrying bags on the back.</p> <p>2f. Bags shall not be disposed in waterways as</p>	<p>2a. Review guidelines/training materials and obtain list of those requiring training.</p> <p>2b. Obtain list of all sites where the bags are being used.</p> <p>2c. Periodic site visits to ensure deltamethrin-treated new and used bags are being stored in a pesticide storage shed.</p> <p>2d. Inspect how people are handling bags to make sure safety practices are being followed.</p> <p>2e. Maintain records on number of bags stored, number used in tests, date of first and last use, and names of all people handling bags.</p>	<p>Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p>
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<p>3. Pesticide treated crops will not be used for human or animal consumption (If crops are used for consumption, then this activity may be subjected to development of a PERSUAP, suspend activity and consult with REA or BEO)</p>	<p>this compound is toxic to aquatic organisms.</p> <p>2g. Used bags or bags that have lost integrity shall be disposed off according to local city, country regulations.</p> <p>3a. Commodities stored in bags shall be disposed of by burying underground far away from waterways, and not used for animal or human consumption.</p> <p>3b. Commodities stored in bags shall not be used for feeding birds because deltamethrin is toxic to birds.</p> <p>3c. If commodities are intended for human/animal consumption, a PERSUAP will be developed providing rationale for such use, including compliance with tolerance levels established by US-EPA, prior to consumption of commodities.</p> <p>3d. If infested commodities are to be fumigated with phosphine prior to storage in deltamethrin-treated bags, development of</p>	<p>3a. Pesticide-treated bags shall be stored in a designated and secured pesticide storage area, and shall be suitable for pesticide storage (e.g., concrete pads).</p> <p>3b. Compare amount of pesticide-treated bags procured, and what is used, and maintain records in a log book. Records include name of pesticide, rate used, quantity of commodity stored in pesticide-treated bags, date and time of storage, name of person involved in commodity storage in pesticide-treated bags, and PPE used.</p> <p>3c. Conduct a pesticide poison decontamination protocol review.</p> <p>3d. Assure that a proper protocol is in place and decontamination facilities exist at each site where pesticides are used.</p> <p>3e. For disposal of pesticide-treated bags, follow local/US</p>	
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	<p>PERSUAP is necessary <u>prior to</u> phosphine fumigation.</p>	<p>regulations, whichever has higher standards. 3f. Maintain records on volume of disposed pesticide-treated commodities, and level of efficacy in disposal method. 3g. Make sure Safer Use Action Plans are in place if treated commodity is destined for consumption by humans/animals. 3h. Inspect data on residues for compliance with set US-EPA tolerances.</p>	
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IEE activity (newly added): Conducting laboratory and field research in partner countries on mycotoxins, and handling of mycotoxin affected grains.

IEE Condition(s)	Mitigation Measure(s)	Monitoring Measures(s)	Timing and Responsible Parties
<p>1. Ensuring all PIs are operating under the PHLIL SOPs for laboratory-based activities</p>	<p>1a. Provide copies of PHLIL SOPs (in English and appropriate local language(s)) for laboratory-based activities involving mycotoxins to all PIs. 1b. Post PHLIL SOPs in laboratories.</p>	<p>1a. Receive confirmation from PIs on receipt and posting of SOPs 1b. Inspection of laboratories for posted SOPs and operations during routine visits to countries.</p>	<p>1a. Provide copies of PHLIL SOPs in English by end of 2014 1b. Provide copies of PHLIL SOPs in appropriate local language(s) by fourth quarter of 2015. 1c. Inspections as per scheduled country visits by monitoring and evaluation (ME) staff.</p> <p>Responsible Party:</p>

<p>2. For any harvested material for mycotoxin measurements, the materials would be disposed via incineration and/or provided to an approved hazardous waste management entity, or buried under the ground. No sampled materials would be allowed to enter the food/feed/fodder chain. All sampled materials would be discarded as per above.</p> <p>3. All materials must be disposed of following best management practices. If available and appropriate, contaminated materials should be disposed of via incineration, consistent with the guidance from</p>	<p>2a. Proper handling of materials harvested for mycotoxin measurements described in the PHLIL SOPs. 2b. Disposal by incineration, approved hazardous waste management entity, burial, and/or approved decontamination method of materials as described in the PHLIL SOPs. 2c. SOPs to include stipulation that no known mycotoxin containing material be allowed to enter food/feed/fodder chain, including grains sampled for mycotoxin research.</p> <p>3a. All contaminated materials containing more than 20 ppb aflatoxin will be disposed of in</p>	<p>2a. Inspection of material handling procedures to be done during routine visits to countries. 2b. Records kept by laboratory of all materials sampled and disposed.</p> <p>3a. In-country personnel will provide annual documentation of the level (quantity) of contaminated product and</p>	<p>Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p> <p>2a. Copies of SOP provided as per above. 2b. Inspections, including sample records, as per scheduled country visits by ME staff. Responsible Party: Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p> <p>3a. All in-country personnel will be trained in proper handling and</p>
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<p>ICRISAT, specifically for aflatoxin affected grains (www.icrisat.org/aflatoxin/anamika_detoxification.asp)</p>	<p>accordance to ICRISAT procedures and guidelines.</p>	<p>how this material was disposed. 3b. Visual inspection to confirm that proper procedures are being followed.</p>	<p>disposal procedures prior to the start of the in-country activities. 3b. Site visits will be conducted at least once during each growing cycle.</p> <p>Responsible Party: Bangladesh: Ayub Ali, Abdul Awal Ethiopia: Ibrahim Fitiwy, Dereje Ayalew Ghana: Josephine Mends Guatemala: Walfer Martinez Other: Bhadriraju Subramanyam, cognizant USAID AOR/AM.</p>
<p>4. This IEE does NOT authorize the handling, storage, or manual introduction of mycotoxins to subject research material (grains). All contamination is expected to occur through naturally either in the field or in storage.</p>	<p>4a. No mycotoxins will be introduced to research materials in this project.</p>	<p>Not applicable.</p>	<p>Not applicable</p>

Prepared by: Bhadriraju Subramanyam, Professor; Kansas State University; sbhadrir@ksu.edu; Work: 785-532-4092; Cell: 785-313-7178 (Version 2, December 11, 2014; Version 3, September 18, 2015; Version 4, December 22, 2015).

NOTE: Please follow standard operating procedures developed by Dr. Andrea Bianchini for Guatemala when conducting mold/mycotoxin analyses in Bangladesh, Ghana, and Ethiopia PHLIL research projects.