



USAID
FROM THE AMERICAN PEOPLE



Volunteer Name: John O. Hardy

Country: USA

Country project: Ethiopia

Host: Ardaita Agricultural, Technical and Vocational Education and Training (ATVET) College

Venue: Ardaita

Audience: Farm Managers from the College Farm and Ethiopia Seed Farm

Number of people : 6

Date: 12/5/2017 – 12/13/2017



1. Assignment Objectives as in SOW

- Improving harvesting and post-harvest technologies (handling ,storage, management of wheat and stalks/straw, ect.
- Develop and submit simple guidelines on harvesting and post-harvesting management of grain (Wheat)

2. Achievement of the assignment objectives

Toured farm and storage facilities.

Meetings with Farm Managers:

Day 1 with farm managers: Introductions and identified the topics they wanted to address.

Day 2: Grain Storage Checklist and options for controlling pests. (Primary Objective)



2. Achievement of the assignment objectives

- Day 3: Personal Protective Equipment/ Pesticide Safety (Spray crews blood samples had signs of pesticides in last years tests)
- Day 4: Post Harvest Loss: Rodent and other storage issues.
- Day 5: Purdue Improved Crop Storage Technology (PICS bags); Forage alternatives for crop rotations that would benefit the dairy operation. (alfalfa)



3. Recommendations to the host with regards to the assignment

- Observation: Harvesting/Thrashing: I arrived after harvest but the grain samples I looked at had an estimated cracked and broken dockage of about 2-3%. This is actually in the normal range for spring wheat. The harvester machines seem to be doing a good job of cleaning the grain and keeping the small shriveled kernels from being saved as they would only add to the dockage.
- Observation: Just walking on the roads I observed some grain spillage/leakage. Checking the trucks and trailers for cracks that may allow grain to leak out in transit may be something you want to look into. Also if you are not covering the loads on the way back to the farm you might consider tarping them if possible.

3. Recommendations to the host with regards to the assignment (cont)

- Observation: Your farm crews are doing a good job of monitoring moisture of the grain and rapeseed as is being harvested.
- Observation: Bagging Operations: Your work crews are doing a good job of keeping the grain on the tarps, the only grain on the lot is by the road coming into the bagging lot. There's a few bumps there which must shake the grain off the trucks. Again tarping and sealing the trucks would help. My recommendation would be to spray the bagging lot/field with an insecticide right before harvest. Granary Weevils don't fly in, but they could be remaining in the area and surviving on what little spoiled grain that is left on the field from the year before. Cleaning up and hauling away any spoiled grain helps to reduce infestation potential but an insecticide treatment over the entire bagging lot is inexpensive and will help as well.

3. Recommendations to the host with regards to the assignment (cont)

- Observation/Recommendation: The major problem with treating a warehouse filled with bags is getting the insecticide through the bag so it can be effective on the weevils. You may want to consider storing the grain you plan to keep in storage long term in bulk. Bulk/loose grain is easier to treat both preventatively as well as once an infestation has occurred. Bulk grain is also probable, so it's easier to take/probe samples every 3 weeks of the entire warehouse and find areas in the warehouse that may be getting an infestation and need treating. Once the grain is in the bag you are not going to be able to sample a bag on the bottom of the pile. Only bag what you plan to ship in the next 4 months.

3. Recommendations to the host with regards to the assignment (cont)

- Recommendation: Cool your grain down right after it comes in from the field. Weevils do much better in higher temperatures so cooling the grain down fast will slow them down. My recommendation is perforated aeration tubs hooked up to fans which would be turned on at night to circulate cool air through your grain piles. This would be the most inexpensive way of providing aeration to the grain. You would need to make sure you have sufficient electrical power available in the grain bagging lot.
- Warehouse: You are currently doing a fantastic job of cleaning and treating the warehouses before harvest. My understanding is you clean them, fumigate them and then spray inside and outside with Malathion.

3. Recommendations to the host with regards to the assignment (cont)

- Recommendation: Treat the grain as it is going into the bag. You could add a dusting of an insect growth regulator like Diacon-D to the inside right before you fill it up. This would help control the weevils that are entering the warehouse but not weevils that are already in the bag. Another thing to consider would be to space rows into your storage scheme so when you do have to fumigate the chemical could get to the bottom of the pile. It's impossible to aerate a pile of grain in bags effectively. The bottom bag will not receive the same dose as the top bag.

3. Recommendations to the host with regards to the assignment (cont)

- Recommendation: Try using hermetic storage bagging technology like PICS (Purdue Improved Crop Storage) which is a simple and effective way to reduce grain loss to insects during postharvest storage. They are more expensive than what you are currently using but if taken care of they can be used for multiple seasons. The PICS bag is a composite airtight triple-layer plastic bag consisting of two high density polyethylene (HDPE, 80 microns thick) inner bags and one polypropylene (PP) woven outer bag. Weevils depend on air to get their water so depriving them of air in these hermetic bags is highly effective. Feeding and growing larvae burn up the oxygen in the airtight



3. Recommendations to the host with regards to the assignment (cont)

- Recommendation: It was brought up in our discussion that you have members of your spray crews test positive for pesticides at the end of the year. Personal Protection Equipment must be worn to keep pesticides from applicators. The farm managers should hold an annual safety training explaining how to use PPE. I'll leave the presentation I gave with the farm managers so they can build off of it.
- Observation: Weed control, your farm crews are doing an excellent job of keeping up with the most advanced chemistry's in your weed control program. If you decide to try minimum-tillage I'd recommend skipping one tillage operation and spraying the weeds with glyphosate. This has been effective to help control those harder to kill perennial weeds. Glyphosate is cheaper than pulling a plow, less diesel and less wear and tear on the tractor.

4. Anticipated Impact

- Using PICS bags for grains stored longer than 2 months makes financial sense. If you have 5 percent damage using conventional bags, you've more than paid for the additional cost of the PICS bag.



4. Anticipated Impact (cont)

- Treating the grain as it is going into the bag with an (IGR like Diacon-D) could maintain weevil damage to the level it was when it went into the bag. (If there was no damage going in, there will be minimal damage coming out)
- Controlling the weevils before damage occurs. Weevils damage 5-20% of the stored grain in Ethiopia . This could be a huge development in being able to save grain past 3 months.



4. Anticipated Impact (cont)

- PPE Training:
 - By doing an annual PPE training with their pesticide applicator crew, they will stress the reason and need for wearing Personal Protection Equipment.
 - The goal is zero pesticide levels in next years blood tests.

4. Anticipated Impact (cont)

- Forage:
 - Adding a 4 year crop of alfalfa will not only provide additional high quality forage for the dairy it will give the farm another crop in its rotation. If inoculated the alfalfa will also build up nitrogen levels in the soil.



Recommended future volunteer Assistance

- A volunteer with no-till / minimum-till experience in dryland farming to work with both farms. This volunteer could advise on ways to adjust crop rotations and start converting to minimum-till using their current machinery. This could possibly set them up to do a no-till conversion as they update their equipment over the next 10 years.

6. Recommendations to other non-host stakeholders

- N/A

Action plan for host recommendations

Recommendation	Specific Action	Responsible person	By when
1. Testing PICS bags to see if they could fit into this large scale operation.	Open of the 3 PICS bags we filled and inspect it for weevil damage in 2 months, wait longer on the other bags and check for signs of infestation.	Yohannes Takele and Mustefa Woticha	Open one bag in 2 months, another in 4 months and the last right before you ship the rest of the seed out.
2. Find out if Dicacn-D is available in Ethiopia	Check with the Agricultural Business Corporation and Seed Supply Co.	Yohannes Takele – Ag Bus John Hardy will contact the manufacture.	Soon, it would be nice to start testing as soon as next season.
3. Aeration of standing grain piles.	Inquire if power could be made available to the bagging yard, if it is begin the process of acquiring tubs and fans.	Yohannes Takele	Early as possible
4. Preparation of the bagging yard before harvest.	Right before next years havest, treat the entire bagging yard with Malathion to kill any weevils	Yohannes Takele and Musefa Woticha	Pre-harvest
5. Personal Protection Equipment training	Conduct annual safety training building on the slide deck I left with the spray crews and mandate PPE	Yohannes Takele and Musefa Woticha	March
6. Forage options for the Dairy	Check with the farm managers to see if including a alfalfa rotation would be possible,	Mohammadnur Teshome and Awizer	After this years harvest is completed.

7. How can CRS improve future volunteer experience

- Provide the contact information of the previous volunteers that worked at this location.



Thank You!

