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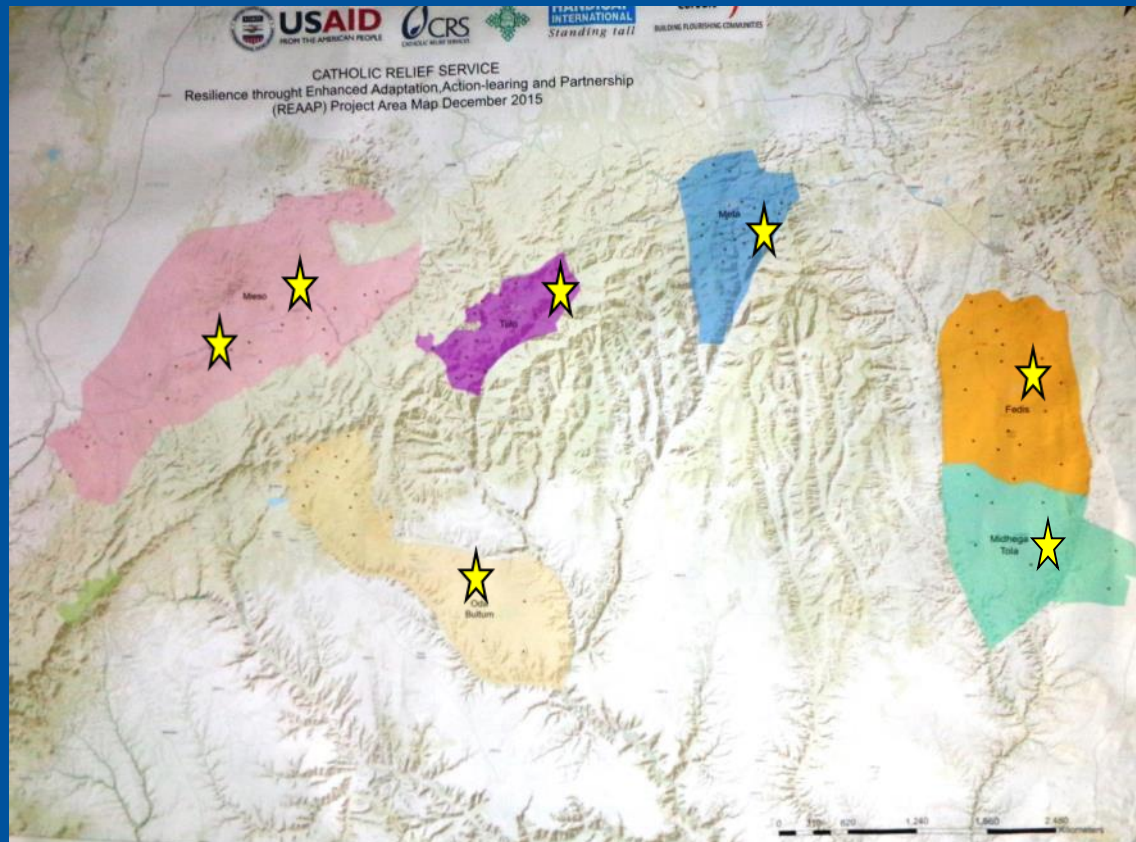
- **Volunteer Name: Hans Kandel (PhD)**
Country: Ethiopia
Country project: Grain Crops Production
Host: Hararghe Catholic Secretariat
Venue: REAAP Project districts of HCS'
Dere Dawa and Chiro Branch Office
Audience: Smallholder farmers and
project staff
Date: July 8- July 26, 2016

1. Assignment Objectives as in SOW

- The objective of this assignment was to train and technically assist on modern crop technologies and practices for sorghum, corn and dry bean.
- Target groups:
 - 70 small holder farmers
 - 10 staff (REAAP, CDWs, DAs)

2. Achievement of the assignment objectives

- Seven Kebeles were visited and training provided to 124 farmers and 14 staff (REAAP, CDW's and DA's)





Field Training



From left top
clockwise
Wednesday,
Thursday
Thursday
Friday July 13-
15 East
Hararghie
Zone of
Oromia

Field Training



Top Monday
July 18
Bottom
Tuesday
July 19
West
Hararghie
Zone of
Oromia

Resources

- Provided field staff with pdf's on how to grow dry bean, soybean, rhizobia inoculation and provided teaching materials on soil conservation methods and crops production.

3. Recommendations to the host with regards to the assignment



A. Provide farmers with tools to improve weeding and marking planting lines

Line
Marker



B. Teach farmers about using N-fixing bacteria and provide inoculum



Beans growing in nitrogen free system. Left two pots inoculated with N-fixing bacteria. Right pot un-inoculated

B. Teach farmers about using N-fixing bacteria and provide inoculum



Left plant with good nodulation. Plant on right no nodulation, yellow leaves and fewer pods

Testing rhizobium strains in the field



Source: P Woc

Selected cross-inoculation groups of rhizobia

Rhizobial group	Subgroup and hosts
Bean rhizobia	Bush bean, climbing bean, runner bean
Clover rhizobia	Clovers
Pea rhizobia	Peas, faba bean, vetches, lentils
Alfalfa rhizobia	Alfalfa, melilotus, fenugreek (masala)
Chickpea rhizobia	Chickpea (garbonzo bean)
Leucaena rhizobia	Leuceana, calliandra, gliricidea, prosopis
Soybean rhizobia	Soybeans
Cowpea rhizobia	<p><i>Cowpea subgroup</i>: cowpea, green gram, pigeon pea, crotolaria, bambara nut, siratro</p> <p><i>Lima subgroup</i>: lima bean (butter bean), tepary bean, canavala</p> <p><i>Groundnut subgroup</i>: groundnut, guar</p> <p><i>Centro subgroup</i>: Centrosema</p>

C. Improve farming practices



- Use natural resources better:
 - Manure, soak up animal urine, compost, ash, mulching, cover crop, legumes.

C. Improve farming practices



- Better planting techniques:
 - Even distribution of plants, proper seeding depth, and plant population.
 - Do not use the plow after plant establishment.

C. Improve farming practices



- Use intercropping with complementary plant species.
- Rest 1/6th of the land with cover crop / legume cover.



C. Improve farming practices



Proper weed control:

- Control weeds when they are small.
- Remove weeds from field edges and near terraces.
- Replace weeds with useful plant like grass to prevent weeds.



C. Improve farming practices

Crop rotation is limited. Essential not to grow continuous maize and sorghum.



4. Anticipated Impact

- With more attention to the details of farming and increase utilization of nutrients and biological fixing of nitrogen, there will be an incremental increase in productivity as well and increased nutritional value of the grain produced.

5. Action plan for host recommendations

Recommendation	Specific Action	Responsible person	By when
1. Provide field staff with resources	Distribute training materials provided	HCS leadership team	Mid August 2016
2. Train all field project staff	Use training materials provided to share info with all field staff	REEAP coordinators	End August 2016
3. Evaluate the manufacturing and testing of hand tools	Find black smith to make tools and test tools	HCS leadership team can assign a person	Mid August 2016
4. Increase efficiency of legumes	Provide inoculant to farmers next time they plant beans	HCS leadership team. Biruk (CRS farmer to farmer program)	Start dialogue and planning asap

6. Recommendations to other non-host stakeholders

- Ethiopia has high population density.
- Many animals (over grazing).
- Use waste areas to grow animal fodder.
- Great shortage of Nitrogen. Consider all human and animal nutrient cycles.



Thank You!