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REAP | Restoring Efficiency to Agriculture Production
საპარტვილოს სასოფლო-სამეურნეო
წარმოების ეფექტიანობის აღდგენის პროექტი

POSTHARVEST TRAINING DELIVERY REPORT

USAID/GEORGIA RESTORING EFFICIENCY TO
AGRICULTURE PRODUCTION



October 2014

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USAID/GEORGIA RESTORING EFFICIENCY TO
AGRICULTURE PRODUCTION

WORLD FOOD LOGISTICS ORGANIZATION (WFLO)

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I. BACKGROUND

REAP, through its sub-contractor WFLO, conducted a 5-day training course in Batumi and Gori to provide practical training in postharvest, refrigeration basics, facility design, cold storage operations, business and marketing. Participants in the trainings were grant recipients, instructors from educational institutions, and representatives of businesses that specialize in fruit and vegetable production, storage, or distribution. The training course was based on WFLO training resources, and the refrigeration basics, facility design, and cold storage operations were based on current best practices for small cold storage facilities that store fruits and vegetables. As a result of this training, grantees will operate more effective postharvest operations, and educational institutions will provide further training on postharvest, refrigeration basics, facility design and cold storage operation.



Figure 1: WFLO and REAP Training Team

Two separate trainings were held because Batumi and Gori represent two different agroecological zones. Batumi is a tropical ecology, where the main crops produced are herbs, citrus, blueberries, kiwi, and persimmon. In the Gori area, apples, pears, and stone fruits dominate. The SOW for this project is included in Appendix A.

II. ACTIVITY SUMMARY

53 participants were trained in both locations including representatives from 12 REAP- supported businesses and 5 educational institutions that offer agricultural programs in Georgia.

The training program in Batumi was conducted from September 17 through September 21 at the Batumi Shota Rustaveli University. WFLO’s consultants conducted postharvest presentations and several postharvest exercises which allowed students to receive practical experience with several tools (e.g refractometer) and methods used in postharvest. In addition, the consultants presented on refrigeration basics, facility design, and cold storage operations. On Day 3, attendees provided a list of postharvest problems they are currently facing and possible solutions were discussed. Attached in Appendix B is the Batumi Training Outline.



Figure 2: WFLO Consultant in Batumi

A similar five-day training program was conducted in Gori from September 23 through September 27 at the Gantiadi Vocational College. Postharvest presentations and refrigeration basics were demonstrated to participants. On Day 3 attendees developed a list of questions and on Day 4, the questions were all answered.



Figure 3: Class in Batumi



At both trainings, hands-on demonstrations were conducted to provide trainees with direct visual evidence of the effects of temperature management and simple packaging on produce quality. Participants took part in experiments to show the effects of thin plastic bags in controlling water loss at ambient and refrigerated conditions. Maturity indices that are not often used were demonstrated. Mechanical damage during harvest, handling, and during loading procedures were reviewed in detail.



Figure 4: WFLO Consultant in Gori

Below is a general overview of the training courses provided in both Batumi and Gori. Detailed course outlines can be found in Appendix B and C. Appendix D is the list of the attendees for Batumi and Gori.

Training Class Assessment

The goals of the training classes were achieved and we believe the training classes were very successful. Both the Batumi and Gori training classes were well attended by REAP grant recipients, businesses that specialize in fruits and vegetables, and instructors from educational institutions. The information was well received and very timely. The training classes provided much needed information on postharvest and cold storage operations. In addition, the attendees received complete packages and CD's to use as reference material. The workshops allowed the attendees to have hands on experience with postharvest tools that are important for harvesting quality crops.



Figure 5: Class in Gori

Both the Batumi and Gori classes were attended by excellent instructors with strong backgrounds in either postharvest or refrigeration. The presentations provided the outlines and the basics for the instructors to develop further training programs to meet future postharvest and cold storage operation needs. These classes provided an important 1st step in a training process that is critical to future success.

III. RECOMMENDATIONS AND FOLLOW-UP ACTIVITIES

The training course that was delivered featured suggested applications of best practices, tips and technologies that participants (especially REAP grantees), can use in every day operations of their pack house, cold store or commercial farming enterprise.

As the educational, training and research arm of The Global Cold Chain Alliance, all WFLO training programs are designed specifically for application purposes, by businesses and commercial enterprise and cold chain operators. Those who attended the training course and did not represent commercial enterprises, should have gained significant knowledge and acquired resources needed to provide subsequent hands-on training to cold chain operators (from postharvest up through retail).



Based on discussions with grant recipients, representatives of fruit and vegetable businesses, and our site visits, we believe that grantees lacked a depth of knowledge in the following areas:

- Proper use and applications of pesticides and fertilizers to maintain post-harvest quality
- Drip irrigation and proper use
- High density apple orchard technology usage
- Preparation of fruits and vegetables for market
- The specifications requested by buyers (such as EU and Russian markets) and executing them
- The importance of packages, packing materials and packaging different produce grades in different package sizes
- The cost and benefits of cooling

Consequently, we recommend additional training in the following areas:

- Postharvest handling of immature fruits/vegetables (harvest indices, washing, cleaning, trimming, waxing, sorting, and pest management)
- Harvesting practices and tools specific for crops of interest
- Follow up training focused specifically on cold storage operations and maintenance with grantees. Emphasis to be:
 - Storage and inventory management of fresh produce
 - How to properly palletize product
 - Fork lift operations
- Cold Chain Management Training, with an emphasis on refrigerated transportation and improving the transportation of fruits and vegetables to market
- Produce GAP as related to food safety including field operation and harvesting checklist and postharvest operations checklist

The topics above are all listed because grantees demonstrated weak knowledge and skillsets in these areas. The REAP project should consider these recommendations in light of forthcoming project initiatives and activities. Topics for further skills-building can be chosen to coordinate with other planned REAP programs.



ANNEX A: SCOPE OF WORK

1. BACKGROUND:

In April, 2014 REAP, through its sub-contractor WFLO, conducted a Postharvest and Cold Chain Training Needs Assessment to determine existing challenges and assess training needs of REAP's grant recipients engaged in postharvest handling and refrigeration operations as well as evaluate capacity of VETs/universities offering agricultural programs. As a result, REAP designed a five-day training course to address the identified needs and demands of REAP's grant recipients and beneficiaries at large. The training course is based on WFLO and USDA training resources and includes the following two modules: 1) postharvest best practices with an emphasis on stone fruits, citrus, pome fruits, culinary herbs, persimmons, and blueberries; and 2) refrigeration basics and cold storage design.

REAP plans to offer this training course to at least 13 companies engaged in postharvest handling and refrigeration operations (i.e. REAP's Round I grant recipients and Round II candidates) and instructors from Akaki Tsereteli Kutaisi State University, Shota Rustaveli State University, Agrarian University, Georgian Technical University, VET Gantiadi, and VET Aisi. The training course may be attended by REAP's grant program failed applicants as well.

REAP anticipates delivering this training course in mid-September in Gori and Batumi and will organize training participants into two groups in accordance with their crops of interest. The project will engage its sub-contractor WFLO that is known worldwide as a leading provider of education, training, and consultancy programs to conduct this training course. REAP anticipates covering accommodation and catering costs grant recipients, potential grantees, and university/VET instructors who plan to attend the training program. The attached budget provides a summary of associated costs.

2. OBJECTIVES:

The purpose of this assignment is to conduct two 5-day classroom and practical training courses in Batumi and Gori to REAP's grant recipients and beneficiaries as well as instructors of the above educational institutions that will house this training program and act as trainers. In addition, the consultants will provide follow-up individual consultations to REAP's grant recipients to address their specific needs and challenges if and when needed.

3. PRINCIPAL DUTIES AND RESPONSIBILITIES:

- ✧ Conduct two 5-day classroom and practical training courses in Batumi and Gori to REAP's grant recipients and beneficiaries as well as instructors of the above educational institutions, namely Richard Dowdell will conduct refrigeration and cold storage design in Batumi and Gori; Kerstin Hell – Gori and Hala Chahine-Batumi
- ✧ Provide recommendations to REAP's grant recipients engaged in postharvest handling and refrigeration operations if and when required;



- ✦ Provide follow-up consultations to university/VET instructors who take part in the training program as required;
- ✦ Deliver a lecture as a guest speaker on the best practices in postharvest handling and refrigeration in at least one educational institution;
- ✦ Debrief REAP and REAP COTR on findings and next steps to increase capacity of the relevant businesses and educational institutions.

4. Meetings Related to Understanding and Performing the Work.

The consultants shall meet, but is not limited to, the following individuals or groups of individuals in order to fully understand and perform the work specified under this Consultancy:

- ✦ Nino Kumsishvili COR REAP
- ✦ Lou Faoro, COP REAP
- ✦ Louisa Namicheishvili, DCOP REAP
- ✦ Konstantine Kobakhidze, REAP Component 2 Leader
- ✦ Irine Salukvadze, REAP Workforce Development Specialist
- ✦ Malkhaz Bregadze, REAP Agriculture Technology Specialist
- ✦ Zaal Khomeriki REAP Component 1 Leader
- ✦ Other staff members of the REAP
- ✦ Vocational colleges, universities,
- ✦ REAP's grant recipients

5. DELIVERABLES:

- ✦ Trip report providing overview and initial evaluation of the conducted training courses and the relevant recommendations on which future technical assistance in this area should be focused.

6. PERIOD OF PERFORMANCE

This assignment is planned to take place between 14 September and 5, October, 2014.



ANNEX B: BATUMI TRAINING OUTLINE

Outline of training program Batumi: Postharvest Section (delivered by Hala Chahine)				Refrigeration Basics & Facility Design (delivered by Dick Dowdell)					
Time	17-Sep	Time	18-Sep	Time	19-Sep	Time	20-Sep	Time	21-Sep
10:00-10:15	Opening of the training course	10:00-11:00	PPT: Harvest, harvesting tools and field packaging	10:00-11:00	Postharvest of Persimmon	10:00-11:45	Refrigeration Basics	11:00:00 - 12:30	Visit to packinghouse (Visit to Agropexport, Batumi)
10:15-10:50	Introduction of training team and each participant			11:00-11:45	PPT: Postharvest of Kiwi				
10:50-11:00	tea break	11:00-11:45	Postharvest of blueberries	11:45-12:00	tea break	11:45-12:00	tea break		
11:00-12:00	PPT: Postharvest Overview	11:45-12:00	tea break	12:00-12:45	PPT: Postharvest of herbs	12:00-14:00	Facility Design	12:30 - 14:00	Kobuleti Concentrate Factory
12:00-13:30	Exercise in sorting and grading - here citrus	12:00-12:45	Postharvest of citrus	12:45-14:00	Decay and Insect control				
13:30-14:30	Lunch	12:45-14:00	Group discussion - problem analysis of postharvest value chain in Georgia - brainstorming 3-5 groups depending on no. of participants Do the ranking of top 10 priorities	14:00-15:00	Lunch	14:00-15:00	Lunch	14:00 - 15:30	Lunch + Closing ceremony
14:30-15:30	PPT: Packaging operations: Effects on postharvest shelf life	14:00-15:00	lunch	15:00-16:00	Demonstration of packing trial	15:00-16:45	Operations	14:00 - 15:30	Lunch + Closing ceremony
15:30-16:30	PPT: Fresh product quality parameters	15:00-16:00	Presentation of group discussion be each group	16:00-18:00	Visit to orchard OR Discussion with industry	16:45-18:00	Business and Marketing		
		16:00-18:00	Visit to packinghouse						



ANNEX C: GORI TRAINING OUTLINE

Outline of training program Gori: Postharvest Section (delivered by Kerstin Hell)				Refrigeration Basics & Facility Design (delivered by Dick Dowdell)					
Time	23-Sep	Time	24-Sep	Time	25-Sep	Time	26-Sep	Time	27-Sep
10:00-10:15	Opening of the training course	10:00-11:15	PPT: Harvest, harvesting tools and field packaging	10:00-11:00	PPT: Postharvest of Pears	10:00-11:30	Refrigeration Basics	11:00:00 - 12:30	Visit to packinghouse (Visit to Berbuki packinghouse)
10:15-10:30	Introduction of training team and each participant			11:00-11:45	Demonstration of starch-iodine test				
10:30 - 12:00	PPT: Postharvest Overview	11:15 - 12:30	PPT: Postharvest of apples	11:45-13:30	PPT: Postharvest of stone fruits	11:30 - 13:30	Facility Design	12:30 - 14:00	maybe visit to http://www.kula.ge/aboutus.php?lang=en&id=3 OR http://georgianfruit.com/en/apples.php
12:30 - 13:00	Group discussion - problem analysis of postharvest value chain in Georgia - brainstorming 3-5 groups depending on no. of participants Do the ranking of top 10 priorities	12:30-13:00	Exercise in sorting and grading						
13:00 - 14:00	Lunch	13:00 - 14:00	Lunch	13:30 - 14:30	Lunch	13:30-14:30	Lunch	12:30 - 14:00	
14:00 - 15:00	Presentation of group discussion by each group	14:00 - 15:00	PPT: Packaging operations: Effects on postharvest shelf life	14:30 - 15:30	PPT: Decay and Insect control	14:30 - 16:15	Operations		
15:00 - 16:00	PPT: Fresh product quality parameters	15:00 - 17:00	Demonstration of packaging trial	15:30 - 16:30	Discussion with industry rep on quality of fruits needed for factory / Test for training participants	16:15-17:30	Business and Marketing	14:00 - 15:30	Lunch + Closing ceremony
16:00 - 17:00	Exercise			16:30 - 17:30					
	How to use refractometer								
	How to use penetrometer								



ANNEX D: LIST OF MEETINGS, TRAINING GLASSES AND VISITS MADE DURING THE PROJECT

Organization	Date	Topic	Participants	Comments
REAP Office	15/9/14	Meetings to Review SOW, Objectives, Duties and responsibilities, Related Meetings, and deliverables	Namicheishvili Kobakhidze Salukvadze Bregadze Mitsituridze Chahine Dowdell	Meeting to plan for the equipment and fresh fruit and vegetable requirements for the Batumi presentations
Tbilisi Fruit and Vegetable Market	16/9/14	Take pictures of fruit and vegetables in the Tbilisi market place	Bregadze Chahine Dowdell	Pictures to be used in presentations
Travel from Tbilisi to Batumi	16/9/14	Travel	Bregadze Adamia Chahine Dowdell	Travel by car to Batumi
Batumi Shota Rustaveli University	16/9/14	Meeting to set up rooms for presentations and demonstrations	Kobakhidze Salukvadze Bregadze Noselidze Chahine Dowdell	
Batumi Shota Rustaveli University	17/9/14	Presentations – see Outline of Presentations for Batumi in Appendix B	Kobakhidze Salukvadze Bregadze Noselidze Adamia Chahine Dowdell	Day 1 of presentations
Batumi Shota Rustaveli University	18/9/14	Presentations – see Outline of Presentations for Batumi in Appendix B	Kobakhidze Salukvadze Bregadze Noselidze Adamia Chahine Dowdell	Day 2 of presentations
Batumi Shota Rustaveli University	19/9/14	Presentations – see Outline of Presentations for Batumi in Appendix B	Kobakhidze Salukvadze Bregadze Noselidze Adamia Chahine Dowdell	Day 3 of presentations
Batumi Shota Rustaveli University	20/9/14	Presentations – see Outline of Presentations for Batumi in Appendix B	Kobakhidze Salukvadze Bregadze Adamia	Day 4 of presentations



			Chahine Dowdell	
Agroexporti, Ltd.	21/9/14	Visited processing and cold storage facility	Kobakhidze Salukvadze Bregadze Adamia Chahine Dowdell Participants	Saw 2 cold storage rooms – one had just been turned off until the start of the season and the other was storing blueberries
Batumi Shota Rustaveli University	21/9/14	Certificates were presented to all the participants in the training classes	Namicheishvili Kobakhidze Salukvadze Bregadze Adamia Chahine Dowdell	Luiza Namicheishvili presented certificates to all of the participants
Travel from Batumi to Tbilisi	21/9/14	Travel	Bregadze Adamia Chahine Dowdell	Travel by car to Tbilisi
Meeting	21/9/14	Coordination meeting	Chahine Hell Dowdell	Briefing and coordination meeting on presentations
REAP Office	22/9/14	REAP office meetings and discussions	Kobakhidze Bregadze Mitsituridze Hell Dowdell	Reviewed plans for the equipment and fresh fruit requirements for the Gori presentations
Gantiadi Vocational College	23/9/14	Presentations – see Outline of Presentations for Gori in Appendix C	Kobakhidze Salukvadze Bregadze Noselidze Adamia Hell Dowdell	Day 1 of presentations
Gantiadi Vocational College	24/9/14	Presentations – see Outline of Presentations for Gori in Appendix C	Kobakhidze Bregadze Adamia Hell Dowdell	Day 2 of presentations
Gantiadi Vocational College	25/9/14	Presentations – see Outline of Presentations for Gori in Appendix C	Kobakhidze Bregadze Adamia Hell Dowdell	Day 3 of presentations
Gantiadi Vocational College	26/9/14	Presentations – see Outline of Presentations for Gori in Appendix C	Tevdoradze Adamia Hell Dowdell	Day 4 of presentations
Visit Ltd. Georgian Fruit Cold Storage	27/9/14	Visit cold storage facility with 4 Controlled Atmosphere (CA) Rooms and processing room	Namicheishvili Bregadze Noselidze	Reviewed the refrigeration basics with the participants



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			Adamia Hell Dowdell Participants	and saw apple sorting and grading equipment
Visit Georgian Fruit Company orchard	27/9/14	Visited apple orchard	Namicheishvili Bregadze Noselidze Adamia Hell Dowdell Participants	Visited a modern orchard that utilizes high density apple orchard technology and drip irrigation
Gantiadi Vocational College	27/9/14	Certificates were presented to all the participants in the training classes	Namicheishvili Bregadze Noselidze Adamia Hell Dowdell Participants	Luiza Namicheishvili presented certificates to all of the participants