



HAZELNUT PRODUCTION ASSESSMENT AND TRAINING

REPORT

FINAL

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ABSTRACT

The purpose of this report is to assist the USAID/EPI staff that is working under CNFA and Deloitte Consulting LLP with locally grown hazelnuts. By using the experience of growing and processing hazelnuts in the State of Oregon, we will identify ways to implement or add value to the local hazelnut production. While the trees are vastly different in tree structure, there are similar concerns and issues that Georgia and Oregon have in common.

EPI identified some concerns that can be modified to help the grower with better yields, quality, and better returns back to the grower. The principal issues are the understanding of the importance of a balanced nutritional program, a valid IPM program, and orchard floor management. Through the Oregon formal PowerPoint presentation, it was shown how orchards look and are maintained which created interest in the grower group. Interaction continued to develop and discussion followed as to how Georgian growers might make some changes to their operation. At all presentations there were concerns from the growers questioning whether they had enough funds to make changes that would help them.

In the field surveys there was a constant concern regarding surface water management during the wet period. Other concerns were correct nutrients for the plants, bud mite and black fly control, weed and grass management, and some rodent control. While it wasn't popular amongst the growers, I was suggesting that they plant trees closer together to get a higher yield per hectare. Space is needed for ditches that are used for water management, but it seems that there could be trees planted closer together creating a high density type planting, and resulting in higher yields.

The USAID/EPI office will be developing a 12-month calendar that will lay out tasks and suggestions for the timing of different jobs that need to be done in the orchards. This can be distributed in tandem with the training video that is being compiled from our formal presentations.

ABBREVIATIONS

BMP	Best Management Practices
CNFA	Citizen’s Network for Foreign Affairs
EPA	U.S. Environmental Protection Agency
EPI	Economic Prosperity Initiative
IPM	Integrated pest Management
PMP	Pest Management Plan
USAID	United States Agency for International Development

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I. EXECUTIVE SUMMARY

Although the Georgian hazelnut is a large part of the Georgian agricultural economy, there are still many ways in which the Georgian hazelnut farmer can improve their quality and the consistency of their nuts. By observing what hazelnut farmers' current production techniques and methods are, this consultancy was able to recommend and suggest new practices in order to increase the hazelnut's quality and consistency. By performing soil analysis, leaf analysis, controlling pests through IPM methods, controlling grass and weeds, as well as planting trees more closely, the hazelnut yields would be significantly improved in Georgia.

The following are technical recommendations to hazelnut farmers throughout Georgia in order to obtain higher quality and greater yields:

- Perform soil analysis and leaf analysis. These analyses can assist to adjust nutritional inputs (including micronutrients) in accordance with the results of the test. These two elements would aid in maintaining the tree's life, and possibly add weight to the nut itself during harvest time.
- Controlling pests is also a practice that would help increase production. It would be best to include an integrated pest management (IPM) system to monitor insect problems. In orchards that would only be sprayed for the bud mite, their production may increase anywhere from 20-45%. After harvest and early spring would be a great time to apply a copper spray for common blight and it would also help with the health of the tree.
- Grass and weed control is recommended to help with moisture loss in the summer and to remove debris from the orchard floor for harvest time. Removing or controlling the vegetation by flailing or by using chemicals has other benefits as well, such as removing hiding areas for rodents that will girdle the tree or eat nuts. If mechanical harvest is in use, it is almost mandatory to implement an orchard floor program. Growers also occasionally need fall grass to grow for erosion control, due to flowing water concerns.
- Winter water management, as a result of rain periods, is a concern with all of Georgia's hazelnut growers. If trees were planted more closely together, the resulting larger growing area would increase the production per hectare at the same ratio as the increase in tree count. If trees increased by 25%, once the trees are at a mature age, the increase of the yield would be the same with very little additional inputs. This is being implemented at LLC Ferrero and narrow tractors are being utilized for their fields. The same is done in Oregon.

The following are recommendations for EPI beneficiaries:

- Financial institutions and growers: Due to the fact that growers have access to limited funds for any expansions of equipment or even better growing practices, it is recommended that a portion of programming be used to assist growers to purchase

some equipment in a unified way, allowing groups to align themselves with each other to use the system.

- Collaboration with larger hazelnut growers/processors: It might be a good idea to check out some of the Italian cultivars to see how they grow and produce. With LLC Ferrero already having Italian hazelnut cultivars growing, it might be wise to see what they are willing to share.
- Hazelnut growers: It is suggested that a 12-month calendar be designed that would show the tasks that need to be implemented in any given month or period of time. This might be very useful as long as growers know that it is only a guideline and that things change. It would be especially helpful for new or young growers that might not have the experience. Also, this might be useful if implemented with the training videos that are already being developed. The 12-month calendar guide and the training videos might go hand in hand.
- Equipment dealers/providers: While the equipment that was viewed was relatively new, they were built primarily out of mild steel with very little stainless steel utilized in the construction. It is recommended that they have a written program that would help them keep their product safe from bacteria concerns. It is unclear as to what steps have been taken for daily sanitation concerns.
- Processors/dryers of hazelnuts: There is a need for more drying capacity for inbound nuts that arrive from the growers. It is recommended that processors look into temporary drying systems that tend to be somewhat portable. In the U.S., grain drying systems are sometimes used for large surges of product that need to be attended to. Another basic system that helps in high volume times is using fans and just piling nuts 30 to 60 cm in depth. This system will take some hand raking to stir the nuts and mix them up for uniformed drying.
- Hazelnut growers/EPI team/MoA Georgia: It is recommended that growers understand and know what their options for treatment of their nuts will be based on location of processors surrounding their locale. Conducting a survey of growers might also be a favorable outcome of support for processors.

II. APPENDICES

A. BACKGROUND

B. FINDINGS & RECOMMENDATIONS

A. BACKGROUND

The purpose of this document is to report the findings of the Republic of Georgia Hazelnut production and provide ideas on how growers and packers might improve their practices to increase their production, yielding greater returns. The presentation was given at FSC-CNFA facilities, regional district chamber meeting rooms, and at private business facilities that were located in each region and rayon (district). A slide presentation was shown demonstrating how the Oregon hazelnut industry practices have helped to increase the production of the state's hazelnut crop. The presentation promoted the need for good orchard floor management, nutritional inputs through the result of soil and leaf analysis, using IPM to control pests, and pruning techniques. Under the guidance of the USAID Georgia EPI program, a publication was handed to each attendee. The publication was titled "Better Management for Higher Yields and Increased Profits." The publication was printed in English and in native Georgian language.

Attendees were encouraged to ask questions and give their thoughts/input during the presentations. As a result, the presentations had good interaction between the presenter and the attendees. The slide presentation itself lasted approximately 50 minutes, while the overall meetings lasted from 90 to 120 minutes. Questions were asked from the floor with a variety of topics during the presentation and continued after the meeting was over.

Each hazelnut production presentation was followed by a local field survey. The walking survey was limited in some of the regions due to extremely wet conditions. Each field visit lasted from 90-120 minutes and generally multiple fields were visited. The fields visited had various differences from orchard layout design to pest issues. If there was one common concern among most regions, it would be surface water and how it influenced the layout for proper drainage.

There were a total of six formal presentations given that represented approximately 155 growers, seven regional field visits with multiple stops, and two packing facilities.

It should also be noted that the first four days of presentations and hazelnut field surveys were video recorded for future grower training sessions. USAID/EPI personnel will make these training video sessions available in the future.

B. FINDINGS & RECOMMENDATIONS

REGIONS AND RAYON (DISTRICTS)

REGION: IMERETI | RAYON: SAMTREDIA

- **Presentation:** Presented the PowerPoint of the Oregon productions program which seems to have wide interests. There was good audience participation with interaction regarding tree spacing and weed management. Many growers in this rayon are small growers with only two to three hectares; a few growers are larger with 10-20 hectares in production. Growers felt that they were limited due to the lack of funds to buy chemicals, fertilizers, or equipment. We discussed the idea of working together to share the costs of purchasing equipment or creating a cooperative to purchase equipment as a larger group. Production seems to be limited due to the cultivar that is grown in Georgia and the orchard floor drainage for the winter rains. We talked about using subsurface drainage systems, but that option seems to be next to impossible to acquire due to the costs of the project.
- **Field survey:** Arrived at the field and found cattle grazing in it. Hazelnuts were around 25 years old and were typical Georgian cultivar with multiple trunks. Leaves looked light in color and appeared to be lacking efficient nutrients to the plant. The current practices that growers were using were discussed. They did not use many pesticide inputs; nevertheless neither bud mites nor black flies were visible. No fungicides had been used or are planned to be used. Pruning had not been done for multiple years and the regrowth for new production was very limited. It is suggested that the most important thing this grower could do is to increase their nutritional program and base it on soil samples and leaf analysis test results. However, it has been made clear that funds were not available for such programs. The need for pruning and how the pruning will promote new growth, which will provide new wood for buds and better production, was made clear. It was also encouraged that if they could add herbicide or a mowing/flailing program to their orchard, they would have less grass and weeds to contend with. The reply that was received was that the cattle needed something to eat and they were not hurting the hazelnut bushes. Lack of the grower's funds and resources hampered the growers' options.



REGION: GURIA | RAYON: OZURGETI

- **Presentation:** Presented the PowerPoint of the Oregon productions program which created great interest in Oregon tree type cultivars. There was good audience participation with questions regarding orchard layout, tree type, cultivars, and production from the Oregon trees. Growers in this rayon seemed to have a balance of small growers with only two to three hectares and growers being larger with 10-20 hectares in production. Growers felt that they were limited due to the lack of funds to buy chemicals, fertilizers, or equipment. The idea of working together to share the costs of purchasing equipment or creating a cooperative to purchase equipment as a larger group was discussed. It was indicated that the local Ag Development Center had helped the growers with lining out chemicals and fertilizers, if they had the funds. Also the Development Center had some gas powered backpack sprayers for local growers to purchase. It was indicated that surface water management was a problem. Overall the presentation went well and the consultant was approached after the meeting about sourcing some information.
- **Field survey:** Hazelnuts were around 12 years old and were typical Georgian cultivar with multiple trunks. Leaves looked light in color and appeared to be lacking efficient nutrients to the plant. They were encouraged to use a fertilizer that the Ag Development Center could help them with. It was suggested that they use soil and leaf analysis to maximize their nutrient to the tree. They didn't seem too responsive to the idea. They did not use much pesticide and we did see a high level of bud mite damage. It appeared that there was as much as 25-30% damage due to the mite. Had spraying been completed, the chemical costs might have been directly covered by the resulting increase in production. Pruning had not been done for some time and the regrowth for new production was very limited. A pruning demonstration was done to show that there were too many suckers and that they should have been removed. A single trunk type tree was discussed as an option. The powered backpack sprayer using nothing but clean water was used to illustrate the coverage that such a machine can provide. Growers seemed to understand that modern equipment can bring them a better return. A discussion about working together with other growers to acquire equipment was held, and if there was a large enough group that could work together, it was suggested that the group might use a cooperative-type agreement to purchase equipment. If someone designs a program, they might work together to do a joint purchase.

Photos of the pruning demonstration and PowerPoint presentation are shown below.



REGION: SAMEGRELO | RAYON: KHOBI

- Presentation: The presentation was given at the FSC facility where the regional director provided a welcome and introductions speech. During the consultant's PowerPoint presentation, there was high audience participation with questions about orchard layout, tree type, cultivars and production from the Oregon trees.

This rayon seemed to have a better balance of smaller and larger growers. The local Ag Development Center which had agronomists at the presentation had also helped these growers with lining out chemicals and fertilizers. There was interest in our management style and what equipment in the U.S. might be used in Georgia. Orchard floor management was discussed by using mowers/flails and ways to improve their applications of pesticides. It was suggested that they might work together to acquire equipment and if there was a large enough group that could work together, they might use a cooperative-type agreement to purchase equipment. Overall the presentation went well and the consultant was approached after the meeting about sourcing some information.

- Field survey: Hazelnuts were around 15 years old and were typical Georgian cultivar. Leaves again looked light in color and appeared to be lacking efficient nutrients to the plant. They were encouraged to use a fertilizer that the Ag Development Center could help them with. They did not use much pesticide and a high level of bud mite damage was visible. It appeared that there was as much as 20-25% damage due to the winter bud mite. Representatives of the Ag Development Center talked to the grower and encouraged him to work with them and control their pest problem. The grower was glad we had stopped by their field. It was suggested that he increase his planting by adding trees between his present rows. He felt that he couldn't because he had water issues and needed the space for the surface water management system. There was enough space to do both.



REGION: SAMEGRELO | RAYON: ZUGDIDI

- Presentation: The presentation was at LLC Agro (Hazelnut Processor) in their conference room. There were processors and growers attending the meeting with questions about production costs. Nut quality and drying problems were discussed. Most of the attendees did not feel that the drying of nuts was much of a problem and that the quality was affected too much. They did have great interaction with the presentation and wanted to know more about the single trunk hazelnut tree.

- Field survey: Traveled to two fields and found that there was bud mite damage. In this area black fly was a concern and black flies were found on branches that were damaged by the fly. Again pesticides are available to help control both pests. Grass and weeds needed to be controlled, but apparently, the rain had put them behind. Again at this visit, it was suggested that more trees be planted due to the wide spacing for the size of the trees. They were concerned about water management should they plant too close. Their production per hectare would increase and their returns would help them achieve higher income levels.



REGION: SAMEGRELO | RAYON: ZUGDUDI

- Visited LLC Ferrero International Georgian hazelnut field production. This operation was set up on a three meter by six meter spacing. They had both Italian and Georgian cultivars planted. They indicated that they had approximately 2,700 to 2,800 hectares of hazelnuts in the ground in Georgia. The fields were three and four years old and seemed of decent quality. Even though it was not as bad as seen in previous fields, they also had grass and weed problems, but had a large fleet of tractors to work their fields. When asked what their yield was averaging, they indicated that they were hoping to pick five plus kilo per tree. The average from what was told in Georgia was around two to four kilos. They had all the necessary equipment to do the job well with well-maintained fences and gates for their fields. The infrastructure of a new office, buildings, and maintenance shop was in place for working on equipment. With

five to six new narrow orchard model tractors lined up in their yard, they had the means to work their fields once the ground dried out. Their fields look very well cared for as the summer progresses.



REGION: KAKHETI | RAYON: TELAVI

- Presentation: Presentation was held at the FSC facility and went very well, and growers were quite engaged in the presentation. Their interest in Oregon hazelnut production was high and they were especially interested in orchard weed management. This region seemed to be further advanced in soil sampling but no indication that leaf analysis is taken seriously. The FSC facility has a soil test kit that costs around \$30 per test. FSC has on-staff personnel that can do the soil testing and give results in a few minutes, which seemed to be a very positive service. This service gives the grower an advantage in making decisions on nutritional inputs. A larger percentage of growers also seemed to be applying pesticides compared to the other regions we had visited. They seemed to be better informed about chemical and fertilizer options. It appeared that the growers were linked better than most of the regions we had previously visited. It was thought that perhaps they relied on each other more than the other regions

did. The grounds and the warehouse were toured before leaving the premises. They had a supply of fertilizer and chemical that seemed to cover most needs. They also offered equipment for rent for ground preparation and planting.

- Field survey: Due to heavy rains and flooding in the area, all fields were observed from the road. The first stop was at a four-year-old hazelnut planting. The grower stated that he gave the recommended fertilizer rate and his hazelnut leaves had a darker green than most orchards we had seen at other field visits. Weed management was needed, but because of the wet conditions that grower said he had not been able to mow or work the grass and weeds. Trees looked healthy and in good shape.

The second stop was at a farm that had started around 14,000–18,000 hazelnut cuttings in approximately two-liter plastic grow bags. Cuttings were starting to bud break with around 98-99 % survival rate. It was suggested that the grower give the plants a small application of fertilizer in the next two to four weeks. They used bamboo to provide shade to the baby plants.



REGION: KAKHETI | RAYON: AKHMETA

- Service center visit: No presentation or field survey was given in this area due to extreme wet and rainy/stormy conditions. The service that had been funded in part by the Millennium Challenge Georgia Fund/Millennium Challenge Corporations overseen by the CNFA was visited. Most of the equipment purchases were 50/50 matching funds, 50% from the Millennium Fund and 50% from the private operator. Some private contributions were provided by in-kind and by use of U.S. funded grants. At this location there were two tractors and a variety of equipment such as plows, sub-soilers, planters, tillers, cultivators, and ditch makers available for growers to rent. The facility was very clean and well organized with all equipment undercover to guard against the weather.



HAZELNUT PACKING FACILITIES

REGION: SAMEGRELO | RAYON: ZUGDIDI

- **Agro-plus hazelnut processing facility:** This packer was a smaller private operation that provided full service hazelnut processing. This company dried, shelled, chopped, diced, inline roaster, and vacuumed packed the hazelnuts both in small retail packs, also in larger commercial cases (20 kilo). While the operation used mild steel for much of its operation, the buildings and the grounds were clean and free of debris. The organization and cleanliness was impressive. They had a kernel-chopping machine along with a screening line to separate the different sizes. There was also a form and fill machine to sell to the retail outlets. Some of the equipment was part of the Millennium Project. There was also a tasting of kernels that were a variety of sizes and cultivars.



REGION: KAHETI | RAYON: AKHMETA

- Giorgi Zirakashvili hazelnut processing facility: This is going to be the facility's first year of operation. This facility had drying systems (40 ton capacity), shelling equipment, kernel cleaning equipment, and what appeared to be blanching machines. This operation, like the previous, used mild steel for most of its process. It also used hazelnut shells to burn in its furnace, to help dry the green product that is delivered to them. The kernel room was nicely done with a clean environment and sanitary look. Buildings were well kept even though not new or spacious. This also was part of the Millennium Project. The project was funded around \$150,000 toward the processing facility.



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