Project Title: Sharing Knowledge for Rural Development in the Republic of Georgia

University of California, Davis
M.S. International Agricultural Development
Capstone Report

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Exam Date: July 9, 2018

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1. Executive Summary

In July-August 2017, I worked with a team of three UC Davis D-Lab students to design, implement, teach and evaluate a two-week project-based learning program for graduate students in the Republic of Georgia. Our team worked with the D-Lab director and our partner and in-country host in Georgia to develop material for this project. The immediate goal of our project was to teach technical and project-management skills for rural and sustainable development projects, while facilitating student-faculty, and student-client exchange. The extended goal was to test if collaboration between Georgian universities and UC Davis could lead to wider adoption of project-based learning programs in Georgia. While the training did not immediately lead to wider interest in implementing a similar program in Georgian universities, our project host will be translating and transferring D-Lab's project-based learning curriculum for a new project.

During my final month (August-September 2017) I also worked with our project host and other community members to help inform the planning and community engagement for a new 30-hectare farm that was being established in Bareti, Georgia, by the Bediani Children's Center. The general vision for the farm is to become established as a profitable enterprise that practices sustainable/regenerative agriculture and soil conservation, while also providing farm-based education and being an experimental site for local farmers. In 2018, in addition to engaging in its own herb and wheat production, the farm will be engaging in acquiring and distributing high quality potato seeds for local farmers, training thirty farmers on regenerative agriculture practices and soil conservation, as well as trying to establish a shared potato storage facility; they will continue to host UC Davis students as collaborators for their sustainable agriculture practices and trainings.

2. Background

The Republic of Georgia is a small, mountainous country located in the Caucasus region of Asia. During the Soviet era, Georgia enjoyed high agricultural output through large-scale state-led cooperative farms, called *kolkhoz*. [1] After the dissolution of the Soviet Union in 1989-1990, Georgia underwent several land reform schemes to quickly redistribute land among rural families, with each family being endowed an average of 0.5 hectares of arable land. [1] In 2015, the agriculture share of GDP dropped to just 9 percent, yet 53 percent of the population continued to live in rural areas. [2]. Although nearly half of the population is engaged in

agricultural activities, the process of decollectivizing has led to capital constraints (small landholdings) as well as a breakdown in agricultural knowledge systems, reducing agricultural output and contributing to rural poverty. [2]

This paper analyzes two projects I completed in the Republic of Georgia during summer 2017. The first half of this paper focuses on a project-management training, "D-Lab Training," conducted in Tbilisi, Georgia, while the second half of this paper focuses on extension through "Farm-Based Development" in Bareti, Georgia.

2.1 D-Lab Training

D-Lab promotes a project-based, client-focused, multidisciplinary learning approach to solve problems for international development. Students in this program are paired with an "industry expert," an entrepreneur, or a designer with an idea, and work in multi-disciplinary groups to develop a solution to a given problem (using a given project), thereby gaining both practical and social skills. Student participants in Georgia worked in groups of three on the following projects: the introduction of an electric taxi system in the capital of Georgia, a feasibility study for tea production on a newly established farm in Bareti, and a study of potential social enterprises for communities affected by the development of a new national park. The training took place over two weeks (July 24- Aug. 4) with nine students from three local institutions (the Georgian Institute of Public Affairs, Tbilisi State University, and Rustavi Vocational College), school administrative staff, and three project mentors.

2.2 Farm-Based Development in Bareti

The type of extension approach taken by the Bareti farm can be characterized as a "Project-Based Approach" because it focuses its efforts in the Bareti community and is supported through external grants and resources. [14] To overcome the challenge of making short-term irrelevant changes, I outline a process for long-term community engagement, which begins with conducting a community needs and assets assessment. The objective of the assessment is to identify local interest in the farm, identify general development priorities to inform the farm's long-term planning, identify the needs and available resources in the village, and to identify any direct impact of the farm's planned irrigation. The potential for farm-based education and development in Bareti is analyzed in the second half of the paper.

3. Methodology (D-Lab Training in Georgia)

Analyzing the effectiveness of our educational approach during this training and identifying areas for improvement can help guide future D-Lab satellite training programs. To conduct the analysis, I use materials I helped develop for the training, including course implementation plan, course curriculum, course objectives, the monitoring and evaluation plan (includes student survey, student feedback, instructor and mentor feedback, and student final projects). The overall framework for the analysis is borrowed from G.J. Posner's "*Analyzing the Curriculum*" [3], by characterizing our approach based on: (1) educational style (2) selection of course objectives (3) selection of course content and structure and (4) evaluation of educational progress. For each component, I analyze our activities and offer recommendations for improvement.

4. Literature Review and Analysis (D-Lab Training in Georgia)

4.1 Educational Style

Experiential Learning (EL) encompasses a spectrum of educational approaches; some approaches emphasize cognitive development theory, concluding that learning occurs primarily through transformative experience in the brain while others emphasize social constructivism, where mentorship and feedback is found to play an important role in scaffolding learning. Several cognitive development theorists including Kolb, Piaget, and Lewin emphasize that learning is a cyclical process with several stages: First, a student must be assessed on their existing knowledge and primed to absorb new material by making the subject relevant. Then, concrete experiences or problems can be introduced, followed by reflective observation. Finally, learners can generalize based upon those observations and test its implications in new situations.

One type of EL is problem- or project-based learning (PBL), which recognizes that learning occurs continually along an experiential continuum and the task a good educator is to select experiences that ensure applicability to real-world problems. [4] However, PBL often fixates on concrete experiences, overlooking the importance of other components, particularly reflection. Reflection is essential because it allows a learning cycle to progress and iterate; without meaningful reflection and synthesis of the old and new experiences, learning remains incomplete. [4] While students might still draw conclusions or learn facts, they will not be able to connect their experience to the learning outcomes, yielding experiences of a lesser quality.

D-Lab's conceptual educational approach parallels Dewey's on "learning through problem-solving," and faced the following challenges:

- Although student's prior knowledge on relevant topics was assessed in a pre-survey and helped to prime students for course, it was not used to update the curriculum content because the student pre-survey indicated that they were on average "neutral" in the tools we planned to teach (see Appendix I: Pre-Survey Results Q1-5, 8, 9). However, it would have been useful to observe if some students were more proficient than others by doing a simple "raise your hand if you have already used/learned this tool" prior to each topic, and use that to identify advanced students and keep them fully engaged. As we later learned, at least one student was quite familiar with several tools. Accommodating this would require updating the curriculum so that the content is appropriate for different proficiency levels.
- Although the method of instruction for project management tools varied between traditional lectures and student project development through daily discussions, application of new tools, and group presentations, the delivery on technical topics (such as postharvest technology, regenerative agriculture) was purely-lecture based (see Appendix II: Curriculum). Ideally, the technical topics should also create stronger experiences either by bringing prototypes into the classroom, including a short lab, or introducing an outdoor fieldtrip, while emphasizing relevancy between the technical topic and the students' projects.
- There was no formal opportunity for student reflection beyond group discussion on how to practically apply the tools to individual projects, and a final evaluation/survey (see Appendix III: Project and Course Assessment). A problem-solving approach may presume implicit self-reflection and/or group reflection, but instruction can be strengthened by explicitly including post-module reflection questions for students to complete at the individual level prior to application and group-level work.

4.2 Selection of Course Objectives

Course objectives describe an intended result of instruction and play three important roles: (1) communicate to students what the instruction is supposed to accomplish (2) offer a basis for developing and selecting course materials (3) offer a basis for evaluating student performance; pre-analysis justifying the need for instruction to achieve a stated goal must be conducted prior to writing objectives. [5] After establishing the validity of instruction, objectives are defined and

used to design the curriculum, create student evaluations, and implement the course. [5] Educational objectives fall under one of the following six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. [6]

The need for D-Lab's satellite training in Georgia to train graduate students in project-based learning was based generally on a country-level need to spur innovation in rural development, and specifically due to a burgeoning partnership and interest among educators and community members that had developed during a prior training in Georgia (see Appendix IV: Project Implementation Plan).

The objectives were written to capture types of organizational, decision-making, and problem-solving tools that are typically used in business models and project management courses, as well as to emphasize the development of professional relationships through this course. The course objectives were categorized into themes (application of basic technical topics; collaborative, interdisciplinary learning; and applied research and project management) and articulated as measurable outcomes that could be used for evaluating student learning (Appendix V: Course Objectives). While some verbs are clearly stated (e.g. define), several are open to interpretation or immeasurable (e.g. apply, develop, cultivate relationships, understand) and can be improved by rewriting for ease of measurability and clarity. The new, recommended objectives clearly indicate how each might be measured or observed (Appendix V: Course Objectives).

4.3 Curriculum Selection and Design

An authentic curriculum results from a collaborative selection process where not only practitioners, educators, students and alumni offer input, but also industry experts are consulted to ensure real-world applicability of knowledge through tools, analytical skills, and personal skills. While this process can be formalized through a panel survey on curriculum selection, it may also occur more informally through collaboration. Key characteristics of EL curriculum is that it is integrated across disciplines and the content allows students to accommodate changes.

The general framework of D-Lab's Georgia training curriculum (Appendix II: Curriculum) is based on a selection of business and project management tools, combined with technical topics that were selected to match the three projects used for the training. Our project host in Georgia collaborated with schools to select student participants, projects and mentors, as well as to

suggest technical topics to be included in the curriculum. However, this led to frequent change in technical topics prior to the beginning of instruction, ultimately leading to a purely lecture-based delivery of the technical topics. Thus, while it is important to consult and collaborate with different people to build a curriculum that is tailored to student and industry needs, those changes should be made well ahead of time (unless the modules are already all fully prepared and you are merely selecting from them). In addition, when incorporating recommendations from collaborators, effort should be made to emphasize links between different types of content, which can be achieved naturally by incorporating reflective questions.

We also planned to refine the curriculum based on students' responses to an open-ended pre-survey question on their goals and expectations for the course. However, this process was ineffective as nearly half of the students either restated components of the course objectives/ pre-survey questions, or gave shortened responses or "non-answers," likely due to language barriers (see highlighted sections of Appendix VI: Student Expectations). As a result, while we did update the structure of the curriculum based on student performance and pace as well as other contingencies, we did not update the content. One way to overcome this might be to include an oral group discussion on course goals prior to beginning the training.

4.4 Student Assessments and Course Evaluations

An objective third-party observation of student performance can offer an individualized assessment for each student and can be more robust than subjective assessments. [7] In addition, the use of student self-assessments to detect training success can be particularly helpful for large-scale trainings and indicate if there is statistically significant group-level change if the survey tool is validated. [8] For self-assessments, retroactive pre-tests are recommended so that responses are not affected by pre/post response shift bias. [7]

For our student assessment and course evaluation, we used (a) numerically graded and qualitative feedback on student final presentations from a panel of three instructors, (b) student retroactive pre/post self-assessments, (c) student feedback on projects and course content and design. The full monitoring and evaluation plan for the project is included in Appendix VII: Project Monitoring and Evaluation Plan.

4.4.1 Final Presentations:

Student completed group-level final presentations, where they demonstrated their ability to apply relevant tools to analyze their project, identify key problems and solutions for their project and define next steps. The objective assessment of student performance during their final presentation consisted of a numerical grade and written feedback from a panel of three: the lead instructor, project host, and local education administrator (see Appendix VIII: Final Assessment Rubric). This assessment was intended to measure how well the objectives were reached through observation on how well the students applied the tools taught during the training as well as their oral delivery explaining their methodology.

For an objective assessment tool such as a rubric to be useful, it must clearly indicate how it measures the stated objectives and it must offer a consistent scale for a numerical grade so that the results can be aggregated across individuals. [9] The rubric we used is inadequately developed as an open-ended "holistic" questionnaire, but can easily be transformed into an analytical rubric for oral presentations (see Appendix VIII: Revised Final Assessment Rubric). The new rubric defines subcomponents within the categories of clarity, content, style, and 4-lenses to distinguish clearly and objectively between high (4) and low (1) scores. It also adds a component on teamwork because collaborative learning was part of the course objectives/ methodology. [10]

4.4.2 Survey Instrument:

We also used a pre/post self-assessment to gauge cumulative changes in student confidence in using the different tools and topics introduced in the course. (Appendix III) The questions were designed to align with the course objectives. The self-assessment was not correlated with the final assessment, and each was used as a separate indicator of fulfilling course objectives.

Since no existing validated survey instrument corresponds perfectly to D-lab's curriculum and approach, several studies with comparable pedagogical approaches were used to indicate the themes of PBL around which the questions could be grouped. One study on a collaborative, interdisciplinary, project-based, graduate-level business course used a survey instrument to assess students' cross-functional knowledge (CFK), defined as "information and expertise acquired when people with different functional backgrounds work toward a common

goal." [8] Another study on engineering student's perceptions of problem-based learning (PBL) environments conducted an exploratory analysis that defined three factors: facilitator support, student responsibility, and project quality as key dimensions of PBL [11]. The survey instruments used in these studies helped inform the types of questions asked for the overall course/project assessment, as well as to create broader constructs around which the survey questions might be categorized. However the attempt at creating constructs or establishing validity could not be tested.

The survey additionally faces several challenges as a valid instrument for measuring improvement in student learning. The survey consisted of a 10-question self-assessment on confidence level (score range 1-4, with 1= Not confident and 4= Very Confident) on course content prior to (retroactive) and after the training. A retroactive assessment was conducted because pre-post tests can suffer from response-shift bias, where a student's perception of their level of understanding on a subject does not change because of what they learned during the intervention, but because of a change in how they define a subject matter. [7] The results indicated that the retroactive survey was more reliable that the pre-survey. However, a key problem in all the surveys was the rating interval, which, although labelled clearly and included a neutral option, was not uniformly distributed (2=Neutral). Typically, the number of options on a survey ranges from anywhere between 2-7-point scales, usually in an odd number to ensure an equal distribution of the scale-range in responses. The inclusion of a midpoint increases the reliability and validity of ratings. [12]

One challenge in establishing reliability was that the survey was administered in English, while the students were not consistently fluent in English. Although the survey instructions and scale were translated into Georgian, the survey questions were not translated. It is unclear how important of a problem this was because the questions were articulated to refer directly to the particular tools learned during the training. One way to establish reliability would have been to conduct the same test in Georgian with the same students, and to compare results. It is possible for D-Lab to use survey questionnaires if they can test the instrument over a large sample of students and test for reliability.

5. Conclusion and Recommendations (D-Lab Training in Georgia)

Returning to the theoretical background of an educational approach can offer crucial insight on the process of developing, delivering and evaluating an effective curriculum. After conducting this evaluation, I would recommend that the quality of learning experiences provided through D-Lab's satellite training in Georgia could be improved by having a better system for identifying student goals and expectations, as well as by choosing richer experiences for students to engage with the technical content topics. While these methods would increase the amount of time required for instruction, it may allow the process of developing final presentations to move more quickly, as some students struggled to adequately select and apply tools.

Furthermore, during our training, each student group focused on a different project and thus found some of the technical topics to be irrelevant to their project; instead, each of the three instructors could have strategically worked on more applied learning with each of the three groups, rather than delivering presentations to the entire class.

Finally, measuring improvement in student learning can be challenging for project-based courses, but there are several methods, both written and oral that can be used for both student assessment and student reflection. In particular, oral presentations are valuable in that they offer an objective and comprehensive assessment of whether course objectives were met, as well as fulfillment of additional factors such as teamwork, oral skills, etc. Incorporating elements of reflective self-assessment into the final presentation, where students are prompted to explicitly demonstrate their level of understanding of all the tools introduced, as well as to explain why certain tools were selected over others for the final presentations, would be ideal.

6. Literature Review: Farm-Based Development

An economic analysis of land reform in rural Georgia indicates that the critical factors in achieving commercialization in farming (or for farmers to move beyond subsistence agriculture) are to increase farm size and capital endowments. [13] Greater specialization and ease of transferring property deeds or a land rental market, combined with the development of credit markets and labor markets is necessary in order for farmers to access the inputs required for increasing productivity. [13] Often, transfers of land ownership are impossible due to absentee landlords and a stagnation in land reform policies. As a result, efficient producers cannot expand their landholdings and grow into commercial operations.[1]

In interviews with families and village leaders in Bareti and Sabechisi villages, we discovered that many families own 0.75 hectares of land as a result of the original redistribution of land after the dissolution of the Soviet Union. However, many families who migrated to the area between 2006-2012 received land under a different land redistribution scheme and do not have property deeds or the right to develop or to sell the property, due to absentee landlords. The problem of absentee landlords emerged as a result of conflict and several large-scale migrations, and has yet to be resolved. Indeed, many families identified land as one of their primary agricultural limitations. While this key problem cannot be addressed by farm-based development, it may offer an opportunity for farmers to develop niche products or to engage in collective marketing, both of which can increase rural incomes while maintaining some subsistence agriculture.

Furthermore, research on agricultural extension and knowledge systems in post-Soviet countries presents a clear need for both agricultural education and institutional capacity to overcome substantial challenges in the technical and informational aspects of agriculture: [2]

- outdated expertise, including “brain-drains” abroad;
- degrading quality of lands;
- price and quality competitiveness;
- lack of crop diversification;
- poor marketing and packaging of agricultural products;
- low quality of products;
- bureaucracy and corruption in state institutions;
- limited institutional capacity in agricultural sciences;
- outdated agricultural machinery;
- underdeveloped skills in private decision making on the farm level (due to the intrusive administrative-command system).

Although a farm-based development model cannot address all of these challenges (such as corruption or institutional capacity), it can address several of the other challenges, particularly by partnering with educational institutions to facilitate trainings to improve crop quality, promote crop experimentation, soil conservation, improved shared storage facilities, new machinery rentals, access to new clients or markets, and business or marketing training.

7. Methods and Analysis (Farm-Based Development)

The analytical framework to guide my discussion on farm-based extension consists of five factors: (1) Audience and Needs, (2) Solution, (3) Key Message, (4) Message Form and Delivery, and (5) Evaluation, acronymized as the "ASK ME" framework. [14] While some steps have already been initiated (such as conducting a community needs and assets assessment), other steps remain theoretical. For each component, I evaluate our activities and provide recommendations, or suggest next steps based on preliminary results from our activities.

7.1 Audience and Needs

There are many tools for conducting community assessments (e.g. participatory rural appraisals, community mapping, and transect walks) but not all are relevant or useful for conducting an assessment for a business or organization that is becoming established in the area and does not have a prior relationship within the community. For the newly established Bareti farm, community engagement will be a long-term process that will require establishing trust. I selected to conduct a community needs and assets assessment as a first step to identify if there was any interest in the farm, identify needs and available resources in the villages, identify any direct impact of the farm's irrigation plan, and to identify developmental needs and priorities of the village.

I worked with two students, our project host, and the head of the organization managing this farm to develop the interview questions and translate them into Georgian. I used census data and other factors such as household location relative to the Bareti farm to stratify the overall population. We first contacted the village head, who then facilitated our interviews with families from four different ethnic groups with varying occupations, gender majority in household, and farm sizes, based on our stratification. We interviewed 12 households (8 in Bareti and 4 in Sabechisi) with 34 adults (16 females and 18 males), as well as two village heads. After

collecting the information, I developed maps, conducted follow-up interviews with village leaders, and developed a community assessment report, providing recommendations on next steps the farm should take to build their community relationships.

One limitation of extension through a "Project Based Approach" is a lack of partnership with the local government or a local development agency, and the lack of a community space or mechanism for families to learn about and further contribute to development plans of the farm. In the immediate future, a follow-up meeting with villagers and farm managers can create a mechanism for feedback and communicate the farm's development and plans, as well as identify individuals interested in working with the farm on advocating for local development needs. In the long term, building local partnerships will be essential for establishing trust and demonstrating long-term commitment.

Preliminary results from our interviews indicated that the primary challenges households face are bad roads and access to drinking water. When asked about agricultural challenges, the primary problems identified were old machinery and inadequate access to land (see Appendix X: Tables 1 & 2). All of the families interviewed indicated some interest in the development of a large farm in Bareti, even while some expressed skepticism that the farm could provide tangible benefits to the community (see Appendix X: Table 3). Much of the interest from farmers was for testing new crops as well as for employment; there may be interest in agricultural trainings on new types of crops if there are proven successes on the farm.

7.2 Solution

For long-term development, the farm should identify village leaders or individuals who have previously been involved in local development to work together to set priorities, perhaps through a working group with local villagers, farm employees, and village leaders. This working group might consist of periodic meetings between the farm manager and interested residents who can provide feedback to the farm on changes in needs and priorities, as well as potential topics for village-level workshops, or events. Some of the most important challenges identified by families (roads, land, household water) might require advocacy at the local government level and cannot be pursued without local partnership. In addition, promoting alternative agricultural methods such as regenerative agriculture will require building relationships with the local community. A working group can help inform and refine the process for identifying which particular problems

the farm should focus on, and thus which solutions to promote. Potential extension related solutions include the following:

- The farm can play a strong role in improving agricultural productivity in the region by facilitating farmer-led testing of new crops to diversify the types of marketable crops in the region, as well as introduce localized solutions for improving productivity of existing crops.
- The farm can also build relationships with new markets for farmers to supply current crops (potatoes and milk) or for newly introduced crops, as well as investigate if producing crops for cattle feed is a feasible enterprise. Improved productivity and access to markets will build the capacity of all farmers but especially for those who manage larger farms (> 4ha).
- For other families who are interested in leveraging their land to build local infrastructure, there may be opportunity to build a shared enterprise based on the need and economic viability.
- The farm may try to identify and promote best practices for regenerative/sustainable agriculture in the region, particularly for potato farming, after assessing existing cultivation practices.

7.3 Key Message

The key message is important to articulate but it can only be developed after the solution has been selected. If the farm continues to promote regenerative/sustainable agriculture, it should create informational material distilling the solution selected as a best practice for regenerative/sustainable agriculture for potato farmers.

7.4 Message Form and Delivery

Several platforms can be used to deliver information and provide education. Given the farm's land resources and close proximity to local farmers, it may try to emphasize on-farm trials and demonstrations over other approaches such as radio or creating pamphlets. Nonetheless, information communication technology can be combined with any platform to extend the reach of the message. For example, creating videos to capture field demonstrations can allow the farm to reach farmers beyond its immediate area and over a longer period of time.

7.5 Evaluation

Evaluation is another important component of successful extension projects. Developing an evaluation plan should occur at the outset, once a particular problem/solution has been selected. Evaluation methods can include observations, survey questionnaires, pre/post tests, or qualitative responses from participants.

8. Conclusion and Recommendations (Farm-Based Development in Georgia)

In the immediate future, a follow-up meeting with villagers and BCC members can demonstrate the long-term interest of the farm as well as identify individuals interested in working with the farm on advocating for local development needs. In the long term, since the general vision of the farm is to be both a productive farm as well as an educational site, it will be necessary to prepare a foundation for future trainings in regenerative and sustainable agriculture by building a relationship with the local community. Furthermore, farmers will be more receptive to new ideas if they have already seen successes on the farm and are aware of the farm's interest in local development, so the farm should demonstrate regenerative agriculture practices through successful projects on the farm, record any trials or results, and communicate and share them through additional channels.

To strengthen their capacity, the farm should also seek to build strong partnerships with local educational institutions. There are many examples of farm collaborations with educational institutions in the United States as well as in other countries; successful partnerships should be identified and used as models.

9. Works Cited

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Appendix I: Pre-Survey Results

Pre-Survey Results (n= 12)

Question:	1	2	3	4	5	6	7	8	9	10
S1	1	1	2	2	2	4	3	3	4	4
S2	3	3	3	2	0	3	3	3	3	4
S3	2	3	2	2	2	3	3	1	2	2
S4	2	1	2	1	1	3	2	1	2	2
S5	1	1	2	1	3	3	2	1	2	3
S6	2	2	2	1	1	3	1	4	2	1
S7	1	1	2	2	1	2	2	2	2	3
S8	2	3	3	3	2	3	4	2	3	4
S9	2	3	3	2	2	3	2	2	3	3
S10	2	3	2	2	2	3	3	2	2	2
S11	2	1	3	1	1	4	3	2	4	4
S12	1	2	3	3	3	3	4	1	2	4
Mean	2	2	2	2	2	3	3	2	3	3

Appendix II: Curriculum

UC Davis D-Lab Seed Training Summer 2017 Curriculum

WEEK ONE: Environmental Lens + Financial Lens

Day 1 (7/24)
Pre-Survey(BB)

10am-1pm
- Introductions
- D-Lab approach*
- Project framing-4 Lenses* (SM)
- Overview of deliverables and objectives* (SM)

1pm-2pm Activity: Maize Raise (SM)

Day 2 (7/25)
10am-11am Customer Development (BB)
11am-12pm Value proposition (BB)
12pm-1pm Post harvest (BB)
1pm-2pm Mentoring

Day 3 (7/26)
10am-11am Strategic planning (SM)
11am-1pm Regenerative agriculture (SM)
1pm-2pm Mentoring

Day 4 (7/27)
10am-12pm Budgeting (SM)
12pm-1pm Market analysis (BB)
1pm-2pm Mentoring

Day 5 (7/28)
10am-12pm
4 Lenses Recap, Introduce Presentation, Elevator Pitch (SM, BB)
12pm-2pm Mentoring on Final Presentations

End Deliverable: Completed handouts for Project Framing A, B, and C.

WEEK TWO: Technical Lens + Social Lens

Day 1 (7/31)
2pm-3pm Introductions, D-Lab recap: starting, current projects, etc.*(KK)
3pm-5pm Basic Energy Economics (KK)
5pm-6pm Mentoring

Day 2 (8/1)
10am-11am Stakeholders (LB)
11am-12pm Activity: Wheelchairs of the World (KK)
12pm-1pm Energy pre-lab, solar/renewables (KK)
1pm-2pm Mentoring

Day 3 (8/2)
10am--12pm ZNE at UC Davis (KK)
12pm-2pm Mentoring

Day 4 (8/3)
10am-12p Water Policy (LB)
12pm-2pm Mentoring

Day 5 (8/4)
10am-2pm Group presentations + critiques

End Deliverable: Group Presentation slides

Appendix III: Student Assessment and Project/Course Evaluation

Post/ Retroactive Survey

How confident are you in each topic <u>now</u>, compared to <u>before</u> taking this class? *Please rate each statement using a scale of 4 (Very Confident) to 1 (Not Confident).*		Very Confident	Confident	Neutral	Not Confident
		4 ☺	3	2	1 ☹
I can assess appropriate technologies in a development context	*Now*				
	Before				
I know how to apply the design process to a project	*Now*				
	Before				
I know how to use Excel for strategic planning and budgeting	*Now*				
	Before				
I know how to conduct a market assessment study	*Now*				
	Before				
I can use an evaluative matrix for decision-making	*Now*				
	Before				
I feel confident communicating a project idea or proposal to different audiences	*Now*				
	Before				
I know how to collect primary and secondary data	*Now*				
	Before				
I can apply basic technical knowledge on energy, agriculture, and environment to develop a project	*Now*				
	Before				
I am confident analyzing a project using different perspectives (social, environmental, economic, technical)	*Now*				
	Before				
I understand the benefit of working with a multidisciplinary team	*Now*				
	Before				

Course Evaluation

1. Please indicate if you agree or disagree with the following statements:	Agree	Not Sure	Disagree
The project description was easy to understand and explained the project well			
The project was relevant and interesting for me			
The project reading material was useful			
There was enough class time to speak with project mentors			
The project mentors provided helpful feedback			
The course provided me with the skills needed to develop my project			
My project analysis (final presentation) lead to practical next steps			
I would like to continue working on the project I was assigned (*If not, please explain):			

_____

_____

_____

2. Which project did you work on? ____ Ajara ____ E-taxi ____Kona

3. How many **hours/week** can you continue to work on your project over the **next month**?

____0 ____ 1-5 ____6-10 ____11-20 ____ 20+

4. What 3 tools were **most** helpful? *Please rank [1, 2, 3]*
What 3 tools were **least** helpful? *Please mark [X]*

___ 4 Lenses Approach ___ Evaluative Matrix ___ SMART Goals

___ Problem/Solution Tree ___ Empathy Map ___ Stakeholder Analysis

___ Elevator Pitch ___ SWOT Analysis ___ Impact Statement

___ Gantt Chart ___ Cost/Benefit Analysis ___ Policy ID Flowchart

___Other (please specify) _____

_____

How useful did you find each topic?	Very Useful	Useful	Neutral	Not Useful	**Comments for Improvement:**
Customer Development & Value Proposition					
Postharvest					
Strategic Planning					
Climate change & Agriculture					
Market Analysis					
Budgeting					
Stakeholder Analysis					
Smart Light Case Study					
Community Mapping					
Policy					
How useful did you find each activity?					
Cup Design Activity					
Wheelchairs Activity					

How effective were the instructors in communicating the material?	Very Effective	Effective	Mixed Feelings	Not Effective	**Comments for improvement:**
Sean					
Bilkis					
Leanne					
Kurt					
Please rate your overall course experience:	Strongly Agree	Agree	Mixed Feelings	Disagree	**Comments for improvement:**
I was comfortable with the language of instruction					
There was enough time to understand the course material					
The course met my expectations					
The classroom was comfortable (noise level, space configuration, break times)					
The training adequately prepared me for the project presentation and report					
This course was valuable and I would recommend it					
How well did this course meet your expectations?					

Appendix IV: Project Implementation Plan

"Sharing Knowledge for Rural Development in the Republic of Georgia"

1. Abstract

D-Lab at UC Davis will establish a partnership with the Georgian Institute of Public Affairs (GIPA) and Tbilisi State University (TSU) to promote research, innovation, and entrepreneurship in the energy, agriculture, and environmental sectors. D-Lab faculty and graduate students will work on-site in Tbilisi to develop and deliver new project-based curriculum. A local NGO, Environment & Development will collaborate with community members to frame specific projects and support student teams in the field. Outcomes include delivering a pilot course at GIPA/TSU, drafting a research plan to understand the effectiveness of this educational approach, and identifying local and international support for future research and educational exchange.

2. Background

The Republic of Georgia has experienced a decline in its agriculture sector since the collapse of the Soviet Union and its subsequent effect on land use. In order for Georgia to meet its goals for rural development, there is a need for practical education and research that promotes innovation and entrepreneurship in energy, agriculture, and environment. To address this, Dr. Kurt Kornbluth Director of the UC Davis D-Lab worked with Kakhaber Bakhtadze, former UC Davis Humphrey fellow to identify Georgian institutions and regions where UC Davis could offer assistance in these sectors.

This project builds upon a 2016 UC Davis D-Lab scoping mission to Georgia that included a short project-based course taught in Bediani Village, which enabled students to design their own projects in agricultural/rural development. The resulting interest from educators and partnerships developed with the Georgian Institute of Public Affairs (GIPA), Tbilisi State University, and Georgian ministers of Education and Agriculture during this trip led to the development of a second D-lab satellite course in Georgia, to be developed in 2017.

In summer 2017, D-Lab faculty and graduate students will work with Kakhaber and Georgian university partners to develop and deliver new curriculum on-site in Tbilisi and work with community members to frame specific projects and support student teams in the field. A Global Affairs Seed Grant will support the UC Davis D-Lab staff and students to travel to Georgia and conduct the training. This project aims to establish a partnership with the Georgian Institute of Public Affairs to promote student and faculty exchange and develop appropriate project-based curriculum and research.

Appendix V: Course Objectives

	Original Course Objectives
1	*Apply a business model (customer development, value proposition, strategic planning, budgeting and stakeholder analysis) to frame and develop projects.*
2	*Define key problems and proposed solutions to projects using the design-thinking approach*
3	*Apply D-Lab's 4 lenses of sustainability framework to analyze projects (using different perspectives)*
4	*Apply technical knowledge in agriculture, environmental policy, and renewable energy to develop projects*
5	*Develop professional interpersonal communication skills for project management*
6	*Understand Client Needs*
7	*Cultivate professional relationships with existing community-based organizations and businesses in Georgia*
	Modified Course Objectives
1	*Frame (in writing) a project using a business model (customer development, value proposition, strategic planning, budgeting and stakeholder analysis)*
2	*Define (orally and in writing) key problems and proposed solutions to projects using the design-thinking approach and D-Lab's 4 lenses of sustainability framework*
3	*Define (orally and in writing)) problem/solutions for a given project using relevant technical knowledge in agriculture, environmental policy, and renewable energy*
4	*Demonstrate (orally and in writing) an understanding of client needs using a problem/solution tree*
5	*Communicate professionally through discussion with project mentors to cultivate professional relationships with existing community-based organizations and businesses in Georgia.*

Appendix VI: Student Expectations

(Responses to Pre-Survey Q12)

Q12. What are your expectations for this class? What specific resources and tools would you like to obtain by the end of the course?

S1	My expectation is to work during the training with Kona team on a feasibility project and at the end of the course come up with a concrete project plan
S2	To learn about feasibility assessment approaches based on specific case studies. I would like to learn about rural development and biodiversity conservation tools
S3	More information about technical knowledge on energy, agriculture and environment to develop a project.
S4	My expectation for this class is to get information about planning tools for business and the knowledge of how to manage the risks
S5	I expect to learn technical aspects of agriculture development and gaining practical experience solving a problem. I would like to gain a better understanding on all the areas that I lack confidence.
S6	I expect everything good from the class.
S7	I expect everything good from the class. I hope I'll get knowledge of important technologies
S8	I expect to know about rural agriculture and environment
S9	I hope I will study and learn new basic useful skills in agriculture, energy and environmental development which would help me and my country get new opportunities
S10	I expect to improve my understanding about the subjects discussed in the program and to become confident in fields where I am neutral or not confident now
S11	I expect that I'll get knowledge about planning, budgeting and technological information about the agricultural field
S12	I'd like to find out more about rural development in certain ways to help my family business. I'd like to learn more about the structure and designs used internationally

Appendix VII: Project Monitoring and Evaluation Plan

Course and Student Assessment Tools	
1	Student Self -Evaluation (Pre/Post Survey)
2	Student Course/ Instructor Evaluation
3	Instructor Project Continuity Evaluation (after 1 month)
4	Final Project Evaluations
5	Mentor Feedback

	Reporting	Indicators	Measurement Tool
E	How well did the course meet student expectations?	1. Discussion on how well student expectations were met 2. Student self-reporting on if and how well the course met expectations	Pre- Assessment Q12 Course Evaluation Q17, Q20, Q21
E	How well did the course meet each of the stated course objectives?	1. Cumulative increase in confidence level on each topic	Pre/Post Assessment Q1-Q10, Post-Eval Q18
		2. Group-level indicators on how well final project met objectives	Final Project Evaluations
M	How well did the curriculum support students in project development (usefulness)?	1. Cumulative results on usefulness of each topic 2. Identification of top 3 most useful topics	Course Evaluation Q1-Q10; Q19 Post-Assessment Q20
M	How well designed was the course? (pacing, language, student assessments, classroom configuration)	1. Cumulative results on overall course evaluation 2. Observation on expected and actual time required for each module	Course Evaluation Q15-Q17; Pre Assessment Q11 Syllabus and in-class observation
E	How effective was the content delivery?	1. Cumulative responses on instructors	Course Evaluation Q11-14
E	How well did students engage with projects both during and after the class?	1. Cumulative responses on project development 2. Reporting described under Project Continuity Evaluation	Post-Assessment Q12-Q19 Project Continuity Evaluation (all)

Appendix VIII: Final Assessment Rubric

D-Lab I 2017 Final Presentation Scoring Sheet (total possible score 15)

Team

_____

Clarity (5) _____

Was problem framed clearly, context relevant and not too broad or overstated?
Did they express what the client wants/needs?

Content (5) _____

What work has been done?
Methodology clearly stated and followed.
Results clearly expressed.

Style (5) _____

Did their point come across well?
How was the message communicated?
Organized? Readable graphics? Demonstration or examples?

Overall, was there consideration of 4 Lenses of Sustainability?

Technical – available resources, performance metrics
Social – cultural context, stakeholders, development indicators
Economic – business model, dissemination, costs
Environmental - land use, impact, pollution, life cycle analysis

Was one of these a weak link and did they address how to deal with the weak link?

Are there barriers to sustainability that must be addressed?

Revised Final Assessment Rubric

	4	3	2	1
Clarity	Succinctly summarizes the client's needs and the problem addressed by their project; offers sufficient context for the problem;	Succinctly summarizes the client's needs and the problem addressed by their project; does not offer context for the problem	States the client's needs clearly but borrows from the project proposal; problem is not contextualized or is unwieldy	Is not succinct; presents the entire problem tree; does not identify client's needs; restates the project proposal
Composition	Demonstrates analysis and development within the project; clearly explains the methodology used for analysis, the selection of methods; offers an actionable plan for next steps	Demonstrates analysis of project with limited development; methodology and results are presented without explaining the selection process; offers a theoretical plan for next steps	Demonstrates superficial analysis of project; methodology and next steps are not presented, are invalid, or stated as questions	Re-states the project summary, problem/solution statement, and other tools developed in class. Methodology, results and next steps are not explained, invalid, or stated as questions
Style	Strong eye contact, delivery, pitch, hand gestures, and professional demeanor. Smooth delivery and adequate use of graphics, organization of content, and use of examples	Fulfills most, but not all the characteristics of a '4' presentation	Fulfils some but not all the characteristics of a '1' presentation.	Difficult to understand, no eye contact, directly reads from notes, unprofessional. Delivery has long pauses, presentation is disorganized, not easy to follow.
4-Lenses	Clearly incorporates all 4-lenses of Sustainability; identifies potential challenges or weaknesses when applying some lenses, and how to overcome them	Incorporates 2-3-lenses of sustainability; identifies potential challenges or weaknesses when applying some lenses, and how to overcome them	Incorporates 2-3 lenses of sustainability; does not identify potential challenges or how to overcome them	Incorporates 0-2 lenses of sustainability; does not identify potential challenges or how to overcome them
Teamwork	All members are present and all members participate effectively	All members are present and participate with varying effectiveness	Not all members are present or participate	Not all members are present or participate; the team is unclear who is supposed to present

Appendix IX: Survey Responses

P=Pre	R= Retroactive	S=Post	D= Post-Retroactive Difference							
			1	2	3	4	5	6	7	8
P1	I can assess appropriate technologies in a development context		2	1	2	2	2	2	2	1
R1			1	3	1	2	3	2	2	2
S1			2	4	2	4	4	3	3	3
D1			1	1	1	2	1	1	1	1
P2	I know how to apply the design process to a project		1	1	2	3	3	3	1	2
R2			1	2	2	4	3	2	3	2
S2			3	3	3	4	4	3	4	3
D2			2	1	1	0	1	1	1	1
P3	I know how to use Excel for strategic planning and budgeting		2	2	2	3	3	2	3	3
R3			2	3	1	2	4	3	4	3
S3			3	4	3	4	4	3	4	4
D3			1	1	2	2	0	0	0	1
P3	I know how to conduct a market assessment study		1	1	1	3	2	2	1	3
R3			1	3	2	2	3	2	3	3
S4			2	3	3	3	3	3	3	4
D4			1	0	1	1	0	1	0	1
P5	I can use an evaluative matrix for decision making		1	3	1	2	2	2	1	3
R5			1	2	1	3	2	3	1	1
S5			4	4	3	4	4	4	4	4
D5			3	2	2	1	2	1	3	3
P6	I feel confident communicating a project idea or proposal to different audiences		3	3	3	3	3	3	4	3
R6			1	3	1	3	4	3	3	2
S6			3	3	3	4	4	4	4	4
D6			2	0	2	1	0	1	1	2
P7	I know how to collect primary and secondary data		2	2	1	4	2	3	3	4
R7			1	2	1	4	4	2	3	3
S7			3	3	3	4	4	3	4	4
D7			2	1	2	0	0	1	1	1
P8	I can apply basic technical knowledge on energy, agriculture, and environment to develop a project		1	1	4	2	2	2	2	1
R8			1	1	2	2	1	3	2	1

S8		3	2	3	4	3	3	3	3
D8		2	1	1	2	2	0	1	2
P9	I am confident analyzing ideas using different perspectives (social, environmental, economic, technical)	2	2	2	3	3	2	4	2
R9		1	3	2	3	4	3	2	2
S9		4	3	3	4	4	3	4	4
D9		3	0	1	1	0	0	2	2
P10	I understand the benefit of working with a multidisciplinary team	2	3	1	4	3	2	4	4
R10		2	3	1	4	4	2	4	4
S10		4	3	3	4	4	3	4	4
D10		2	0	2	0	0	1	0	0

Appendix X: Development & Challenges

Table 1: Agricultural Limitations and Challenges

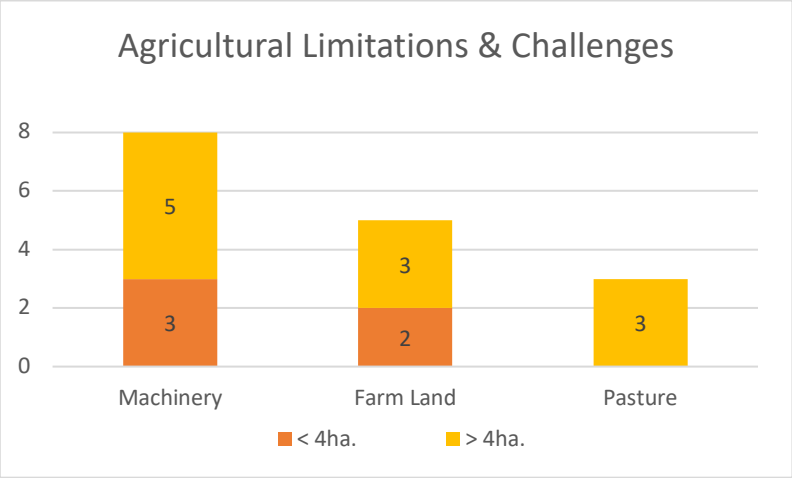
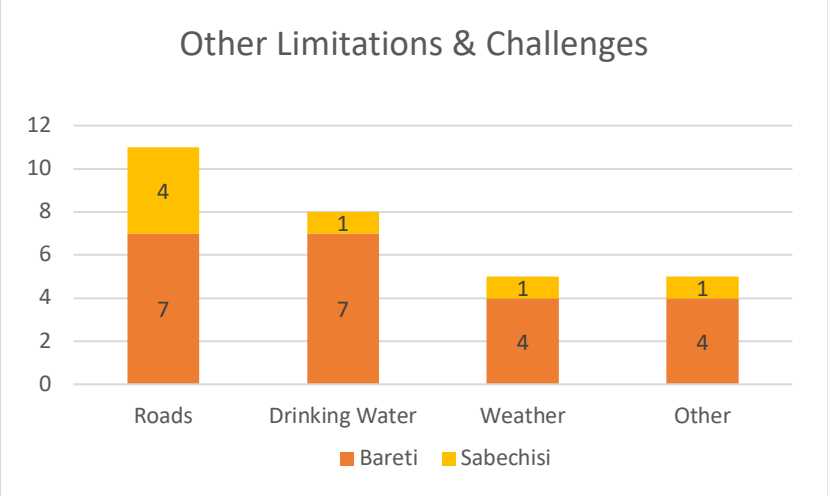


Table 2: Other Limitations and Challenges



Roads: The primary problem identified by almost all families (n=11) in both villages was the lack of a paved road. The lack of a paved road increases the amount of time required in traveling for work or to markets in Tbilisi, accessing foods (via the mobile market) and limits accessibility to farms that might be located far from their house, among other things. During the winter, the village can become completely inaccessible. While the lack of a road affects both men and women, the drivers of machinery, buses, and vehicles are male. The lack of economic activity in the village may be a disincentive for the development of roads.

Land: Limited quantity and quality of farm land, as well as limited pasture land was a key problem for most families (n=7), and was especially important to families who already had 4 or more hectares. This may be due to greater interest in expansion from families with larger farms, as well as a greater dependence on land for income. The heads of the village indicated that land

insecurity in some families who do not have titles to their land (due to a combined lack of interest from original owners to sell, and a lack of financial capability by residents to purchase) is a disincentive for families to build or invest in their land. The government has attempted to buy back land for households with no titles but it remains challenging. The lack of roads also limits how far villagers can travel to farm land in neighboring places.

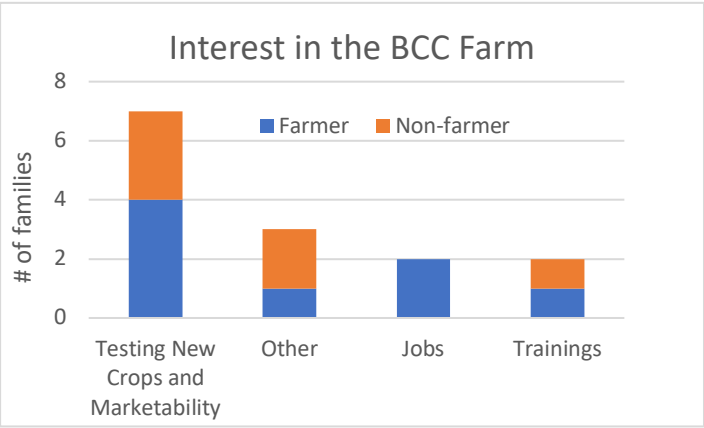
Machinery: Lack of access to different types of machinery is an important problem, in particular for families who managed 4 or more hectares of land. Tractors and combine harvesters were cited as the most needed machinery (n=8), with a few families suggesting that a hay baler and potato planter are also needed. Many farmers are dissatisfied with the quality of the machines that are available and technical capacity of the local tractors (e.g. they are small-toothed). Interestingly, even a family that owned a tractor said that more tractors are needed because their tractor often breaks and they also need to rent one. Machinery is owned and managed by males.

Drinking water: While most problems were common to both villages, drinking water was a particular problem in Bareti. Most families cannot access running water in their homes and must collect it from the communal village pipe because the village plumbing does not carry water to all families. Families located further away from the communal water pipe and families who live uphill have the greatest challenges in accessing water.

Weather: In general, families were satisfied with the climate and found it suitable for potato production; however, they cited annual droughts, seasonal hailstorms, extended winters, and extreme fluctuations in weather as particular challenges for agriculture. They do not use any forecasting tools and are not able to protect crops from hailstorms which occur during the growing season, between March-October.

Other: Other challenges identified were lack of sufficient electricity, lack of irrigation channels for farms, the prevalence of potato diseases and insects, and lack of local firewood.

Table 3: Interest in BCC Farm



The following suggestions were made for testing new crops on the farm: growing triticale, hay, or white beets (for cow feed); motsvi (*sambucus nigra);* diversified fruits and vegetables; and generally to test the marketability of new crops and seeds and conduct demonstrations for farmers to learn and expand their opportunities.