



TLEF Project – Final Report

Report Completion Date: (2025/03/31)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Exploring Agroforestry Practices to Restore Degraded Soils in Kenya Through a Multimedia Case Study		
Principal Investigator:	Maja Krzic		
Report Submitted By:	Maja Krzic		
Project Initiation Date:	Apr 1, 2022	Project Completion Date:	March 31, 2025
Project Type:	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation <input type="checkbox"/> UDL Fellows Program <input type="checkbox"/> Hybrid and Multi-access Course Redesign Project <input type="checkbox"/> Other: [please specify]		

1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g., learning materials, media)
- Infrastructure development (e.g., management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g., active learning)
- Innovative assessments (e.g., two-stage exams, student peer-assessment)
- Teaching roles and training (e.g., teaching practice development, TA roles)
- Curriculum (e.g., program development/implementation, learning communities)
- Student experience outside the classroom (e.g., wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g., co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]



1.3. Final Project Summary – *What did you do/change with this project? Explain how the project contributed toward the enhancement of teaching and learning for UBC students.*

Based on the success and acclaim of our team on the 2018 TLEF-funded project on forest soils in South Africa, we developed another internationally focused online open access educational resource (see <https://kenya.soilweb.ca/>) that combines a problem-based learning (PBL) case study with immersive interactive media. The resource directly enriches student learning in the APBI402/SOIL502 – Sustainable Soil Management course and indirectly in 7 other UBC courses focused on soil science, forestry, and natural resources. The case study focused on agroforestry research of the International Council for Research in Agroforestry (ICRAF), Nairobi, Kenya also added to the existing collection of international case studies, allowing our students to remotely experience a novel ecosystem type, its socio-ecological history, and how new methods and land uses (e.g. agroforestry practices) are helping to conserve, restore and improve soil quality. Immersive multimedia developed during this project provides background information about the study sites, allowing students to ask critical questions to address learning objectives of the case study.

1.4. Team Members – *Please fill in the following table and include **students**, undergraduate and/or graduate, who participated in your project.*

Name	Title/Affiliation	Responsibilities/Roles
Khalil Walji	Coordinator, SPATIAL – TEAM, International Council for Research in Agroforestry World Agroforestry (ICRAF), Nairobi, Kenya	Content development
Saeed Dyanatkar	Executive Producer, UBC Studios and Emerging Media Lab	Media Production/Post Production
Michael Sider	Producer, UBC Studios and Emerging Media Lab (EML);	Media Production/Post Production

1.5. Courses Reached – *Please fill in the following table with **past** and **current** courses (e.g., HIST 101, 2017/2018) that have been reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).*

Course	Academic Year
APBI 402/SOIL 502	2024/25
APBI 200	2024/25
APBI 401/SOIL 501	2025/26
GEOG 319	2025/26
FRST 439	2025/26
FRST 201	2025/26



2. OUTPUTS AND/OR PRODUCTS

2.1. Please **list** project outputs and/or products (e.g., resources, infrastructure, new courses/programs). Indicate a URL, if applicable.

Output(s)/Product(s):	URL (if applicable):
Multimedia educational resource	https://kenya.soilweb.ca/
PBL case study	https://kenya.soilweb.ca/case-study/

2.2. **Item(s) Not Met** – Please list intended project outputs and/or products that were not completed and the reason(s) for this.

Item(s) Not Met:	Reason:
N/A	

3. PROJECT IMPACT

3.1. **Project Impact Areas** – Please select all the areas where your project made an impact.

- Student learning and knowledge
- Student engagement and attitudes
- Instructional team-satisfaction
- Teaching practices
- Student wellbeing, social inclusion
- Awareness and capacity around strategic areas (Indigenous, equity and diversity)
- Unit operations and processes
- Other: [please specify]



3.2. Please provide details on each of the impact areas you selected in 3.1. – For example, explain in which ways your teaching practices changed; how student wellbeing was impacted; how students wellbeing benefited from your project, etc.

There is a great need for understanding soil science principles across a variety of disciplines including agriculture, forestry, environmental science, ecology, physical geography, and natural resource management.

Short-term benefits to student learning and knowledge:

- 1) Support and enhance students' comprehension of material covered in the APBI 402/SOIL 502 course
- 2) Integrating this online, open-access educational resource provided avenues for direct student engagement with the course material. The PBL study case study allowed students to gain international knowledge, synthesize information and contribute possible solutions to land managers.

Sustainable benefits to students:

- 1) Building the existing collection of PBL cases in the APBI402/SOIL502 course, especially through additional of international cases which are currently represented in a limited number, provides students with an opportunity to participate in inquiry and review of research data in diverse ecosystems. This online resource helps students to integrate and build upon various concepts and skills they have learned in 1st year science courses as well as in APBI 200: Introduction to Soil Science and FRST 201: Forest Ecology courses.

3.3. How do you know that the impacts listed in 3.1/3.2 occurred? – Describe how you evaluated changes/impacts (e.g., collected survey data, conducted focus groups/interviews, learning analytics, etc.) and what was learned about your project from the evaluation. You are encouraged to include graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.

Evaluation was according quality check-list (shown below) based on eCampus Alberta & UBC's quality rubrics.

Writing

- √ The level of language used is appropriate for the intended audience.
- √ The writing is free of bias relative to age, culture or ethnicity, gender, and sexual preference.

Technical Standards

- √ The learning resource multimedia has been optimized for size and use with standard computer systems.
- √ Multimedia elements do not exceed minimum hardware/software requirements.

Layout (Visual Design) Standards

- √ The content in a clear, concise, easy to navigate.
- √ A simple, consistent, and accessible structure for navigation is provided.
- √ Learning resource provides learners the opportunity to proceed at their own pace.

Instructional Design and Pedagogy Standards

- √ The learning resource is academically rigorous, relevant, current and has open access.
- √ A variety of instructional strategies are used to ensure compatibility with learners' learning styles.



- √ The learning resource meets universal design principles.
- √ Information presented in the learning resource is accurate.
- √ Content is presented in a logical sequence based on the learning objectives.

Assessment Standards

- √ Content activates prior knowledge of the learner.
- √ The learning resource provides opportunities for practice and transfer of learning in a variety of ways.
- √ The learning resource provides background information required by the learner for successful understanding of the material covered.

4. TEACHING PRACTICES – *Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways. Do you see these changes as sustainable over time? Why or why not?*

The overall goal of this project was to enhance student engagement with course materials and their comprehension of a complex subject that builds on the basic soil science principles. This project is part of an ongoing national initiative on innovations of the soil science curriculum, instigated in 2004 with the establishment of the Virtual Soil Science Learning Resources (VSSLR) group (www.soilweb.ca) under Dr. Maja Krzic's leadership. This program has become a focal point for collaborative teaching efforts among scientists, students, and multimedia experts from 15 universities and 4 research institutes across Canada resulting in the development of 22 web-based open access educational tools, 2 online courses, 1 multi-institutional soil classification field course, 1 cross-disciplinary graduate training program, and 23 national and international educational awards.

5. PROJECT SUSTAINMENT – *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g., over the next five years). What challenges do you foresee for project sustainment?*

We hope that our ongoing dissemination efforts may inspire similar teaching and learning initiatives, leading to an even greater number of students who would benefit from this project in the long term. In 2014, Dr. Krzic initiated Soil Science Education Committee within the Canadian Society of Soil Science, which is one of very few such committees in the world. That committee and CSSS conference sessions that our team will organize in July 2025, will provide platforms for sharing our findings and will further solidify our team and UBC as leaders in innovations in soil science education.

This project provides a model for best practices in use of media technologies in similar educational contexts. Students' access to immersive environment and their interaction with land/location based immersive media and material enables them to understand the content better and make informed decisions for PBL case assignments. This is even more important in a post COVID-19 learning environment where field-based education programs have been cut or drastically reduced.



- 6. DISSEMINATION** – *Please provide a list of scholarly activities (e.g., publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project. Be sure to include author names, presentation title, date, and presentation forum (e.g., journal, conference name, event). These will be included on the TLEF scholarly output page.*

This project will create a foundation of evidence for future innovation; and our team will share these findings via seminars, workshops, conference presentations, and scientific and outreach publications. Our team has an excellent record in sharing findings of our educational projects; in last 11 years, we published 18 scientific papers and 35 outreach articles, gave 80 presentations at scientific conferences and workshops, and organized 13 national and international conference sessions focused on soil science education. Our most recent TLEF funded project from 2018/19, which developed a PBL case focused on the forest soils of South Africa, has won the following two international and national awards: IUFRO Science Award (2020) and the CNIE-RCIA Awards of Excellence and Innovation Results - Integration of Technology in a Partnership or Collaborative Educational Opportunity (2021).