Final Evaluation Report

Your Details	
Full Name	Mateo David León Durán
Project Title	Conservation and soil restoration on forest fires degraded areas in the Tambillo Community Protected Area, Ecuador through native species reforestation
Application ID	35230-1
Date of this Report	12th October 2022

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Develop protocols for the generation of local seedlings *in vitro* and nursery				Members of the Jima Community helped us to select native species with ecological and economic potential. Currently, we have preliminary *in vitro* protocols for the generation of seedlings of *Morella* sp. and *Caesalpinia* sp. and preliminary nursery protocols for *Morella* sp.
Intensify actions involving the Jima Community and the teams of the collaborating universities				It is necessary to divide into two parts: 1) Members of the Jima Community participated in the identification of areas for the selection of seed trees together with members of the Universidad de Cuenca. The latter developed complementary activities, such as seed collection, phenological monitoring, and characterisation of seed trees, among others. 2) Children and teachers from different schools in the Jima parish participated on ecosystem services workshops and environmental education. Members of the Universidad de Cuenca participated in these activities.

2. Describe the three most important outcomes of your project.

a). To generate trust and credibility on the part of the members of Jima parish towards the different teams of the collaborating universities integrated by students, professors, researchers and professionals.

b). To have achieved the development of smaller research projects that will contribute to conservation, soil restoration and sustainable use of resources in the Tambillo Community Protected Area (TCPA) and surrounding forests of the Jima parish.

c). To have created an ecological conscience in different groups of the population, such as children, adults and older adults. Show them the opportunities they have in their surroundings, specifically in private or community forests. The correct use of the

natural resources they possess could generate economic income to improve their quality of life, thus avoiding internal or external migration.

The most significant achievement of the project is based on a set of small results obtained from all the actions carried out. It is important to highlight that we gained the trust and acceptance of the members of the Jima parish. The commitment of the different university teams when executing the different activities. The preliminary results of the thesis projects make us think that in the short or medium term we will achieve a considerable area of degraded soil and take advantage of the natural resources of the TCPA to improve the quality of life of the members of the Cooperativa de Desarrollo de la Comunidad Jima Ltda (CDCJL). We hope to obtain a new small grant from The Rufford Foundation to reinforce the actions undertaken and develop new actions, thus making the Tambillo Forest Initiative a local, national and international reference.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Two unforeseen difficulties arose in the development of the project:

1. Difficulty to travel to studied areas due to political situation: During June-July 2022, a national strike prevented the university teams carrying out work in the field. During that time, communication with the Cooperative members was maintained almost weekly, to ensure that activities were going to be executed once the strikes were lifted. In mid-July 2022, road blockades stopped, and teams were able to continue their work.

2. Members of the Jima parish were initially distrustful with the idea to include some workshops about ecosystem services in the parish schools. This situation is normal in the communities because they have had bad experiences with different professionals, as there is an "extractivism of information". This difficulty was addressed through an exploratory research project, for which the species *Caesalpinia* sp. was considered, with the participation of students and a teacher from the Universidad Politécnica Salesiana, Cuenca. This project is based on the *in vitro* generation of new seedlings for subsequent planting in the Jima parish. In this parish there are two specimens of this tree, and the members of this parish consider them as an emblematic tree.

4. Describe the involvement of local communities and how they have benefitted from the project.

The role of the community was fundamental in the development of the different project activities. First, the members of the CDCJL allowed students and teachers to enter the TCPA for site recognition and subsequent development of activities. In addition, they were the ones who carried out certain actions so that more people could get to know and join the project. In other words, they were the co-authors so that children from the schools received knowledge about ecosystem services. Second, the knowledge of native plants that has been transmitted from generation

to generation and that the members of the Jima parish have, allowed them to obtain a list of forest species that could contribute to the restoration of degraded soils on degraded areas in the TCPA, and for a later use of these natural resources to generate value-added products that contribute to improve the economic situation of each household. Finally, in the exchange of knowledge, the communities have proven that there is scientific knowledge that supports their ancestral knowledge, and this new knowledge acquired in the short or medium term will allow them to propose new projects for the benefit of the community and the environment.

5. Are there any plans to continue this work?

This project has shown potential in different areas, such as: the benefits and opportunities offered by a protected area; the opportunity to improve the quality of life of the local population; the opportunity to teach children about the importance of environment protection and ecosystem services; the opportunity for students, teachers and professionals to interact with new real scenarios, and with members of local communities who are willing to collaborate to the extent of their possibilities. All these arguments make it possible to think of continuing with this work, undertaking new activities and enhancing activities resulting from the present project.

6. How do you plan to share the results of your work with others?

This project is part of a larger project called "Tambillo Forest Initiative", which has its own website tambilloforest.com and its account in social networks, by these means all the activities and achievements of this work are shared. In addition, face-to-face meetings will be held with members of the Jima parish to present the results obtained from the different activities. For the scientific community, it is expected that findings reported in the student's thesis, to be shared in national or international events, and or as research articles if the budget allows to do so.

7. Looking ahead, what do you feel are the important next steps?

According to the specific objectives proposed in this project, the next important steps will be:

- To enhance the protocols for obtaining new seedlings at in vitro and nursery stage of *Morella* sp. and *Caesalpinia* sp. species.
- To develop new protocols for obtaining new seedlings at in vitro and nursery level of *Hedyosmum* sp., *Clusia* sp. and *Weinmannia* sp.
- Set up a nursery at TCPA for acclimatisation of new seedlings.
- Preparation of the area and planting of the new seedlings.
- To begin with essential oil extraction trainings to CDCJL members.

- To expand the workshops to other schools in the areas surrounding the protected area, workshops will include ecosystem services in the framework of environmental education.

- Continue with the intensification of actions involving members of the Jima parish with collaborating university teams.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used in the production of printed material related to ecosystem services in the framework of Environmental Education, MSc María Elisa Durán and undergraduate students from the Universidad de Cuenca developed this material.

The Rufford Foundation logo was placed on the tambilloforest.com web page, in the funding institutions section. In addition, it was placed in the pre-substantiation of the undergraduate thesis of the students at the Technical University of Manabí and in the presentation of a project derived from project ID 35230-1 to the members of the Universidad Politécnica Salesiana, Cuenca.

It is important to mention that the Rufford Foundation logo will be present in all presentations of undergraduate theses and conference presentations.

9. Provide a full list of all the members of your team and their role in the project.

Name	**Function**
José Rubén Zhunio	CDCJL legal representative assisted in logistics for local travel to TCPA, coordination with CDCJL members for guidance at TCPA, pre-conversation with Jima Parish school teachers, pre-conversation with Jima Parish members.
Albert Rojas María Domínguez	They participated in the development of the proposal and the execution of the first collaborative workshop between CDCJL members and members at the Universidad de Cuenca.
Juan Pablo Iñamagua Uyaguari	Researcher and lecturer at the Universidad de Cuenca, he participated in the selection and characterization of seed trees, seed collection, and phenological monitoring. He is also the director of two undergraduate theses.
María Elisa Durán López	Researcher and lecture at the Universidad de Cuenca helped undergraduate students in the development of printed material about

	ecosystem services. In addition, she accompanied the teaching of this topic in the different schools of the Jima parish.
Liliana Corozo Quiñonez Miryan Angélica Pinoargote Chang	Researchers and lecturers at the Universidad Técnica de Manabí were the director and co-director of the undergraduate thesis.
Fátima Consuelo Macías Ponce	Researcher at the Universidad de Técnica de Manabí taught undergraduate students about in vitro cultures.
Myriam Ximena Mancheno Cárdenas	Researcher and lecturer at the Universidad Politécnica Salesiana, Cuenca, she will be the director of two undergraduate theses.
Jessica Sigua Patricio Llangari Cesar Pérez	Undergraduate thesis student at the Universidad de Cuenca
Laleska Cevallos Jailene Loor	Undergraduate thesis student at the Universidad Técnica de Manabí
Santiago Rojas José Solórzano Tatiana Muñoz Fernanda Álvarez	Undergraduate thesis students at the Universidad Politécnica Salesiana, Cuenca
Verónica Tenelema Jonathan Pinos Adriana Pisco Priscila Cajas Ana Criollo Oscar Durazno Fabián Morocho Paola González Keyla Serpa	Agronomy Engineering students at the Universidad de Cuenca participated as surveyors for the participatory selection of native species, selection and characterization of seed trees, seed collection, and phenological monitoring
Pamela Abad Fátima Pulgarin Samantha Ramírez Juan Parra Bernarda Quinde Janela Tapia Jhon Sinchi Joseph Chuñir Joffre Méndez	Environmental Engineering students from the Universidad de Cuenca participated in the preparation of printed material about ecosystem services, and also taught children and teachers from the schools of the Jima parish about this topic

10. Any other comments?

With the resources received from the first small grant from The Rufford Foundation, different thesis projects were established, which reinforce the specific objectives of the project, as described below:

Undergraduate thesis 1.- Title: Seed germination and in vitro establishment of Morella sp. (Myricaceae) from the Tambillo Community Protected Area. Students: Laleska Cevallos and Jailene Loor. Director: Ph.D. Liliana Corozo, Co-director: Ph.D. (c) Miryan Pinoargote. Institution: Universidad Técnica de Manabí. Status: completed - awaiting submission date.

Undergraduate thesis 2.- Title: Evaluation of the production of essential oils of Morella sp. in three stages of development, from the Tambillo community protected area. Student: Jessica Sigua. Director: Ph.D. Juan Pablo Iñamagua, Co-director: M.Sc. Mateo León. Institution: Universidad de Cuenca. Status: execution - with an advance of 50%.

Undergraduate thesis 3.- Tentative title: Production of participatively selected native plants for the reforestation of degraded areas in the Tambillo Community Protected Area. Students: Patricio Llangari and Cesar Perez. Director: Ph.D. Juan Pablo Iñamagua. Institution: Universidad de Cuenca. Status: awaiting approval to execute.

Undergraduate thesis 4.- Tentative title: Evaluation of the relationship of the bioregulators auxins - gibberellins in the in vitro development of Caesalpinia sp. seedlings from seeds at two stages. Students: Santiago Rojas and José Solórzano. Director: Mg. Myriam Mancheno. Institution: Universidad Politécnica Salesiana, Cuenca. Status: awaiting approval to execute.

Undergraduate thesis 5.- Tentative title: Determination and optimization of the bioregulator 6-Benzylaminopurine in the induction of Caesalpinia sp. shoots at in vitro level. Students: Tatiana Muñoz and Fernanda Álvarez. Director: Mg. Myriam Mancheno. Institution: Universidad Politécnica Salesiana, Cuenca. Status: awaiting approval to execute.

The Research Council of the Universidad Politécnica Salesiana, Cuenca, on 6th October 2022, approved the research project Title: Establishment of a protocol for micropropagation of Caesalpinia sp. with the purpose of using it for a future ecosystem restoration and conservation plan. Project leaders: Mg. Myriam Mancheno and M.Sc. Mateo León. Duration: 6 months. Amount: USD 15,000. Status: to be executed.