ServiceLearning
SL-ICP University empowering society

Co-funded by the Erasmus+ Programme of the European Union

TEMPLATE FOR THE DESIGN OF A SERVICE-LEARNING PROJECT*

1.- PROJECT TITLE

Renaturalization of an area affected by a forest fire.

2. PROJECT SUMMARY *(brief description 300 to 500 words)*

Forest fires are an important problem that causes loss of diversity, natural heritage and affects the economy of areas dedicated to agriculture and livestock all around the world. Furthermore, due to the climate change, the annual number of uncontrolled forest fires are quickly increasing in southern Europe and have started affecting regions in central and northern Europe. Once a territory has suffered a forest fire, it takes years for the previous ecosystem to emerge again. After a forest fire there is a secondary succession that takes years to renovate the forest that has been burnt. But, with help, this time can be decreased if a good renaturalization plan is in order.

In view of this I propose a service-learning project in which 4th year biology, science and chemistry students (in the areas of ecology, botany and biochemistry) analyse the short-term consequences of a forest fire in the soil and the biodiversity. Between the activities to be carried out, students will help cleaning an area devastated by a forest-fire, analyse from a biochemical, ecological and botanical point of view the damage that the fire has caused to the soil and the biodiversity of the affected area, raise awareness between scholars on the detrimental effects of the forest fires and steps to follow to prevent them, and design a renaturalization plan and a prevention program for the area to be carried out by the competent authority. This teaching project will have a duration of one academic year divided in the following activities:

- October: visit an area that have been affected by a forest fire during the summer. Extraction of soil samples and analysis of biodiversity. Cleaning of the burnt area.
- November-December: Analysis of the soil in the laboratory
- January-February: Visit to high schools to raise awareness on the deleterious effects of fire and ways to prevent them.
- March: visit of the same area to take new samples and reanalyse the biodiversity.
- April: Analysis of the samples and discussion of the results
- May: Development of renaturalization and prevention plans for the area

3.- TECHNICAL DATA

Higher Education Institution or responsible entity:	Autonomous University of Madrid / University of Bucharest
Person in charge of the project in the HE Institution:	Álvaro Llorente Berzal and Marina

	García Llorente at UAM Irina Zarafu at UniBuc
Number of students participating in the project:	15-20 students working in small groups of 4-5 people
Course/age/gender of the participating students:	4th year in Biology, Chemistry, Science and Environmental Science
Number of final beneficiaries of the service:	- Local Community - Schools - Shepherds / Farmers - Firefighters
Project type: (face-to-face, virtual, mixed and/or international):	Face-to-face
Do the students work with social entities or with final beneficiaries of the service?	Yes. Environmental societies and neighbours' associations

4.- BACKGROUND (context in which it arises, if it has been carried out previously, if it is part of a project that already exists or the previous experience from the people involved)

In recent years, forest fires that have coincided with droughts and record heat waves, have become more frequent in southern Europe and have started affecting regions in central and northern Europe that are not usually prone to fires.
An expansion of fire-prone areas and longer fire seasons are expected in most European regions, especially in high-emission scenarios, so we need additional adaptation measures.
Most fires are caused by people (both intentionally and unintentionally). All it takes for a fire is a spark. For instance:

- Randomly thrown garbage not only pollutes nature but can be a starting point for these devastating fires. The bottles can act as a magnifying glass under the sun's rays. At the right angle, they can focus a beam of light that easily sets dry vegetation on fire.
- During summer storms, lightning is responsible for igniting dry trees, which can start a fire favoured by air currents and strong winds.
- In some cases, the vegetation can also catch fire from the strong sun. This situation has worsened in areas where livestock is not grazing anymore, and the forest grows without control due to a loss of the primary sector.
- A very important cause of fires is climate change, which is a growing risk factor primarily for ecosystems.

Best way to avoid this is by preventing fires, but when the prevention fails, we should renaturalize the burnt area. Renaturalization refers to a set of actions and attitudes aimed at producing compensatory effects derived from the current ecological crisis, in this case, a forest fire.

This is a new idea to be designed without previous background or SL experience on this field.

5.- GENERAL SOCIAL NEED FOR THE PROJECT (S-L addresses real needs in the community, it is significant and relevant for both students and community partners. Relevant topics related to civic, cultural, economic and political society are explored through the project.)

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This project encompasses a social and environmental need that can be listed as:

- An area devastated by fire requires a profound environmental and damage analysis to renaturalize it.
- These areas cease their productivity for a long time, affecting local economy and work. There is a need to renaturalize the area as soon as possible to restart its productivity so local economy is not affected for a long period of time.
- Shepherds and farmers require to continue their productivity, so it is a need to find new areas to be exploited.
- Some fire-affected areas depend on tourism, and it is important that these areas recover their landscape with ecological values as soon as possible, so the economy and the cultural value of the area is not affected.

6.- SERVICE OBJECTIVES (what is the purpose of the project, what service will be provided to address the social need)

The main service object is to renaturalize a forest burnt area. However, to carry this project out there are some smaller objectives that must be done:

- To analyse the damage done by the forest fire in the soil and biodiversity
- To design a plan to renaturalize the area and prevent new forest fires.
- To raise awareness on forest fires
- To recover the economy and cultural values of the affected surrounding area

7.- LEARNING OBJECTIVES (Specific contents and competences of academic subjects or academic degree, and/or transversal (generic) competences.

- To learn about Fire Ecology
- To get trained on sample extraction and physical and (bio)chemical analysis in a laboratory.
- To learn how to do a biodiversity study through vegetation transects.
- To design a renaturalization and prevention plan
- To get engaged with a worldwide environmental problem that is going to worsen due to climate change
- To learn the consequences of fire in a natural environment and critically discuss the implication of climate change and human activities.
- To get awareness on the social, economic and cultural effects of a forest fire in the community

8.- SUBJECTS/CURRICULAR AREAS INVOLVED (curricular subjects/courses?, a specific S-L course?, program?, etc.)

- Ecology
- Biochemistry
- Botanics.
- Ecological restoration
- Environmental studies
- Edaphology

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9.- ACTIVITIES TO BE CARRIED OUT IN ORDER TO ACHIEVE THE PROJECT OBJECTIVES (both inside and outside the classroom. Activities that deal with the preparation, implementation, closing and evaluation of the project.)

- Reading literature on the impact of forest fires and restoration
- Visiting a fire-affected area to extract samples
- Supporting the cleaning of a fire-affected area
- Contacting and interviewing stakeholders of the area
- Analysing in the laboratory soil samples. Physical and (bio)chemical analyses.
- Raising awareness on forest fires in medium and high schools
- Reanalysing fresh soil samples from cleaned areas to check the evolution of the soil and the biodiversity
- Designing a plan to renaturalize the area and prevent new forest fires

10.- LINK TO THE SUSTAINABLE DEVELOPMENT GOALS AND TARGETS (Go to: http://sdg.humanrights.dk/es/goals-and-targets)

SDG	TARGETS
3.- Good health and wellbeing	3.9. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
4. Quality education	4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship 4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development
5. Gender equality	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life
	13.3 Improve education, awareness-raising

13. Climate action	and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
15. Life on land	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements 5.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

11.- HOW IS THE GENDER PERSPECTIVE INCORPORATED INTO THIS SERVICE-LEARNING EXPERIENCE (Equitable distribution of tasks among man and women; use of non-sexist language and images; recognizing and value the existence of multiple gender identities)

We will follow SDG 5 in gender equality, particularly ensuring ensure women's full and effective participation and equal opportunities at the Service learning.
We will also look for female reference figures in fire management and restoration of damaged ecosystems.
We will bring the firefighting profession to students, so that women can also see it as a career opportunity.

12.- ENTITIES PARTICIPATING IN THE PROJECT (social entities, Public Administrations, educational centers, etc.)

This project will be done in close collaboration with the Forest Rangers of the Autonomous Region of Madrid (in Spain). They will help us choosing an area recently burnt during summer to do our research. They will also provide us with tools and training on how to clean an area devastated by a forest fire.
All renaturalization and prevention plans depicted by the students at the end of the course will be sent to the regional office of environment, housing and agriculture of the autonomous region of Madrid. Experts on this matter, together with Forest Rangers will choose one or several of these planning to renaturalize the area in which the students have been working.

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In addition, it is expected the collaboration of environmental organizations suc as:

- Fire: Foundation working on the restoration and conservation of ecosystems, transferring academic knowledge into operational projects.
- Agresta: Cooperative focus on improving the forest territory by forest management to improve forest care, develop a low-carbon economy, and integrate the needs of forest environments with local communities

13.- REFLECTION ACTIVITIES (Outline how reflection will be carried out with S-L participants: Reflection about what; when and through what means the reflection will take place. Analysis of different perspectives related to the problem that is being faced, and link of the S-L experiences to the theoretical and methodological framework of the academic subject/curriculum)

Two questionnaires will be issued to the students to discuss either individually or in group.
At the beginning of the course to check their expectations on the project

- What do they expect to learn
- How do they think they are going to help the community
- Why is it important this project for society

At the end, the questionnaire will help us analyse if the students think they have reached the objectives of the course with questions such as:

- What have you learnt during this project? Did they learn from the connection between disciplines?
- What is the most relevant thing you have learnt?
- What have we done that has had a deep impact in the socio-ecological system?
- After the experience, have you changed your perspective on topics such as forest fires, fire prevention and renaturalization?
- What other actions/activities should be implemented in this project?
- What valuable competences do you think you have obtained?

We will also ask them if they are interested in keep the collaboration with the forest rangers and the environmental organizations implicated

14.- EVALUATION (who evaluates, what is to be evaluated, when will the evaluation take place, and through what means will the evaluation be conducted)

Continuous evaluation will be done by markings on:

- Laboratory notebook of the techniques used to analyse the biodiversity and soil samples extracted in October and March.
- Mock presentations of the dissertations that are expected to be held in high schools.

A final evaluation will be done by marking the prevention and renaturalization plans to be sent to the competent authority to renaturalize the burnt area.

Indicators of impact on learning	Indicators of social impact
Students have a good knowledge and understanding of the protocols used in the	Second analysis in the laboratory to check if the area cleaned by the

laboratory	students have partially recovered the original soil properties and biodiversity
Students are able to raise awareness on the impact of fire and the importance of its prevention to schoolers	Follow up with the public administration to analyse if any of the renaturalization/prevention plans has been taken into consideration and have been used in the area (after the end of the project)
Quality of the prevention and renaturalization projects	

15.- CELEBRATION OF THE PROJECT AND ITS RESULTS (diploma award ceremony, party, meetings, etc.)

Celebration through Hacenderas: The hacendera is collective work for social utility purposes carried out in Spain. Its origins date back to the Middle Ages as part of a tribute or benefit with community work in favour of a municipality.
It ends with a space for celebration and fellowship to share experiences.
Usually, the town hall itself provides a communal meal.

16.- COMMUNICATION AND DISSEMINATION ACTIVITIES (use of social media, internet, YouTube, publications, conference presentation, etc.)

Every summer local and national news follow up the development of forest fires and extinction steps of fires. Human, material, environmental, economic and cultural losses are important factors implicated that explain the virality of this kind of news, not only in the classic media, but in social networks.
It is expected that local media will follow the activities developed by the students.
Even though, we will promote the use of social networks by the students to explain the work they are doing and we will use the university press to advertise the labour done in this project and the results observed.

17.- CALENDAR (timeline of the project activities)

Activities	October	November	December	January	February	March	April	May
Visit a burnt area								
Extract samples and analysis of biodiversity								
Cleaning a burnt area after training								
Laboratory work								
Presentations in high schools								
Preparation of the speech								
Visit to high schools								
Preparation of prevention and renaturalization plans								
Dissemination activities								
Discussion and Questionnaries (critical reflection activities)								
Evaluations			Cont. Ev.	Cont. Ev.			Cont. Ev.	Final Ev.

- October: visit an area that have been affected by a forest fire during the summer. Extraction of soil samples and analysis of biodiversity. Cleaning of the burnt area.
- November-December: Analysis of the soil in the laboratory
- First continuous evaluation in December: marking of laboratory notebooks.

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- January: Preparation of the presentations to raise awareness on fire prevention to high schools.
- Second continuous evaluation: Mock presentations
- February: Visit to high schools to raise awareness on the deleterious effects of fire and ways to prevent them.
- March: visit of the same area to take new samples and reanalyse the biodiversity.
- April: Analysis of the samples and discussion of the results
- Third continuous evaluation: marking of laboratory notebooks.
- May: Development of renaturalization and prevention plans for the area
- Final evaluation: marking of renaturalization and prevention plans.

18.- HUMAN AND MATERIAL RESOURCES NEEDED TO CARRY OUT THE PROJECT (teachers, students, administrative staff; teaching resources, furniture, etc.)

3-4 teachers for 15-20 students. An average of one teacher per 4-5 students
Environmental laboratories to analyse the samples with materials and chemicals to run the experimental protocols.
A bus and a hostel for two weekends (one in October, another one in March) to do the sample extraction and clean the burnt area.

19.- BUDGET (income, expenses and co-financing)

Expenses and equipment will be covered by the School/University responsible for the S-L program.
Tools for cleaning the area and a basic training on forest cleaning will be offered by the local fire station.

*Designed by Pilar Aramburuzabala and Rosario Cerrillo. Autonomous University of Madrid.
*Reviewed by the Subcommittee of the Technical Commission of S-L in the Public Universities and the City Council of Madrid.