General information

Description	The main aim of this study was to obtain a real-time snapshot of the microbial community structure during a litter decomposition experiment in a normal year in forests dominated by Scots pine, European beech and pedunculate oak in Atlantic and submediterranean climate.
Geographical area	Euskadi
Group of tree species	Pinus sylvestris, Fagus sylvatica and Quercus robur
Date	December 2018
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Tool type	Report
Tool format	Text
Language	English
Risk management plans to which the tools can be added	Soil degradation risk management plan
Risk management plans link	https://plurifor.efi.int/wp-content/uploads/WP2/plans/Soil-degradation-plan_ES.pdf
This tool is…	☒ a new tool
Original tool of which this one is an improvement	none

Topic

Risk	Soil degradation		
Risk component	☐ hazard	☒ impact	☐ vulnerability
Risk area	Risk management		
Risk phase	Rehabilitation/restoration		
Risk phase (alternative terms)	Recovery		
Level	Regional		
Sendai priorities	☐ Priority 1: Understanding disaster risk ☐ Priority 2: Strengthening disaster risk governance to manage disaster risk ☒ Priority 3: Investing in disaster risk reduction for resilience ☒ Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction		

Contribution to Sendai targets	☐ Reduce global disaster mortality ☐ Reduce the number of affected people ☒ Reduce the direct disaster economic loss ☐ Reduce disaster damage to critical infrastructure ☐ Increase the number of national and local disaster risk reduction strategies ☐ Enhance international cooperation to developing countries ☒ Increase availability of and access to multi-hazard early warning systems and disaster risk information and assessment

Description and analysis

Summary

Secondary old-growth forests of European common species such as *Pinus sylvestris*, *Fagus sylvatica* and *Quercus robur* have been studied as reference stands for soil biodiversity.

Place in national/regional policy

At this moment, this tool is not considered in any policy in any region.

Goals and achievements

In Communication 2006 [Communication (COM(2006) 231)], the European Commission underlined that little public awareness of the importance of soil protection. Measures to improve knowledge and exchange information and best practices are needed to fill this gap. This tool has been prepared to help forest resource managers plan, to prescribe and implement sound forest practices that comply with sustainable forest management that protect soils.

Stakeholders involved

The municipality of Donostia-San Sebastian, Junta administrativa de Peñacerrada and Sociedad de Diviseros del monte La Isla.

Implementation stage

This information will be incorporated in a PhD entitled: “Estrategias de mitigación y adaptación de masas forestales al Cambio Climático”

State of technical knowledge

Still more research is needed to ascertain if soil biodiversity enhances ecosystem stability and productivity **.**

Regulatory and/or socio-economic contexts

At present little regulatory context but potentially important socio-economic benefits by helping forest planners to avoid unwanted impacts, and support successful and sustainable forest-based sector development.

Impacts of the tool

To date, very little impact because the tool has not been adopted by forest resource managers. Efforts will be made to increase the impact by discussing with forest authorities how the tool can be incorporated in normal operating procedures.

Implementation requirements and durability

Description of the implementation steps

1. Selection of study sites and establishment of the litter bag experiment.
2. Sample collection and analysis. Litterbags were collected along a year and PLFAs were analysed.
3. Analysis and interpretation of the results.
4. Tool available to download (not implemented yet).

Governance

The report was developed for research purposes of NEIKER. NEIKER does not accept any liability whatsoever for any error, missing data or omission in the data, or for any loss or damage arising from its use. NEIKER agrees to provide the data free of charge but is not bound to justify the content and values contained in the databases.

Regulatory framework

The tool is advisory only to assist regional planners and all parties involved in risk management in the Basque Country. There is no regulatory framework at present.

Human resources requirements

The report aims to provide knowledge on soil microbial diversity in European forests. No special resources are needed to use the report. The target public are the foresters.

Financial requirements

None.

Technical requirements

None.

Priorities identified for successful implementation of the tool (political, technical, human, financial…)

The priority is to increase public awareness of the need of soil protection. As the protection of forest soil is an issue of increasing concern to Central European forestry (Thees and Olschewski, 2017), South Western plantation forestry should also address this issue.

Soil protection must not be seen as a barrier to forest activity. When forest operations protect soil, the manteinance of productivity is assured, the surrounding ecosystems such as streams and rivers do not receive high loads of sediments and social perception of forest operations is gained. Protecting soils is a win win solution.

Challenges or risk factors (legal, financial, safety…) expected during the implementation and solutions proposed

The main challenge is to incorporate the knowledge generated in the decision making process. To increase public awareness of the need to protect soil, forest authorities might foster the use of this kind of tools. The incorporation of this kind of tools in the forest management might be linked to change in the business as usual management and this may rise the price of the harvested wood that need to be to compensated.

Additional and non-formal experiences to help the implementation of good practice

This results can be used as stand alone. Little knowledge is required on soil microbial community. The main challenge is to ensure end-users understand the origins of the results and their limitations.

Reference values for soil biodiversity

SWOT analysis

Strengths	Weaknesses
Fill a little gap in soil biodiversity knowledge	A stronger study (soil monitoring programm) is needed
Opportunities	**Threats**
First step to integrate soil biodiversity in forest planning	Difficulties in persuading people to use the results because they add complexity to existing decision making.

Lessons learnt

Evaluation process, if exists (internal or external)

The work of Microbial ID, Inc. has been essential for the development of this tool.

Assessment of results (quantitative and qualitative) and comparison with main goals

The analysis of PLFA has been developed by Microbial ID, Inc.(www.soilplfa.com). Microbial ID can identify over 160 unique fatty acids (and related compounds) in the samples, including saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), trans fatty acids, branched-chain fatty acids (including iso/anteiso & 10-methyl branched), hydroxy fatty acids, cyclopropane fatty acids and dimethyl acetals (DMAs). Microbial ID uses MIDI, Inc.'s Sherlock PLFA Analysis. System to automatically name and quantitate the PLFAs in a sample and categorize them by microbial origin.

They have over 25 years of experience in fatty acid analysis and have analyzed thousands of soil samples from around the world.

Negative aspects identified

The analysis of PLFAs is expensive and a small number of samples could be analysed. It could be desirable to establish soil monitoring programms at regional scale as LUCAS, Land Use and Coverage Area frame Survey had been established in 2009 at European scale. In 2018, In 2018, the LUCAS Soil survey included additional analyses for the first time: a) Bulk density , b) Soil biodiversity c) Visual assessment of soil erosion and d) Measurement of the thickness of the organic horizon in organic-rich soil.

Unexpected consequences (short- / mid- / long-term) and corrective measures implemented

None.

Access to complete tool

Files	Reference_values_soil_biodiversity
Web links	https://plurifor.efi.int/wp-content/uploads/WP2/tools/Soil-degradation-Biodiversity.pdf