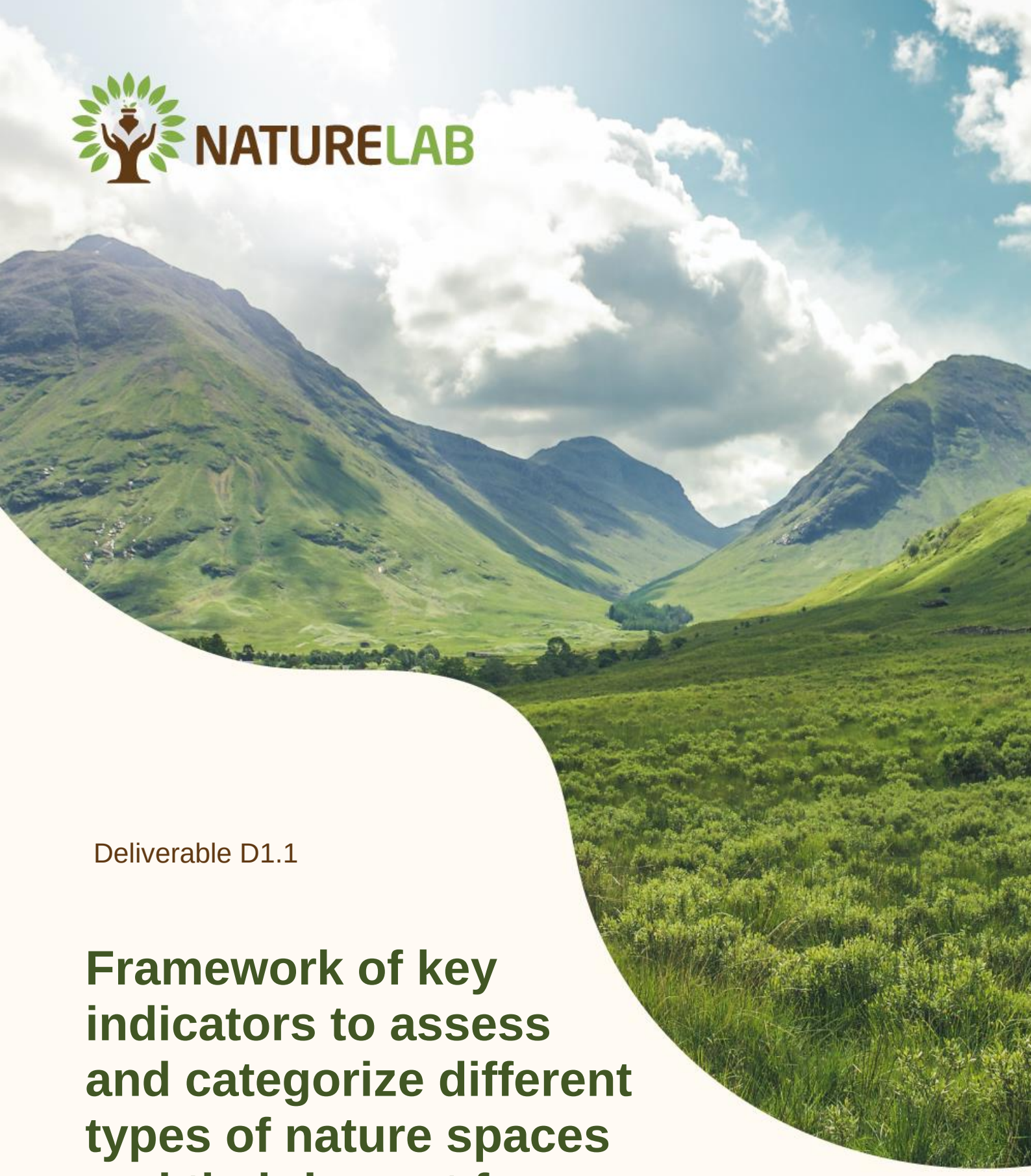
NATURELAB



Deliverable D1.1

Framework of key indicators to assess and categorize different types of nature spaces and their impact for therapeutic indications

Funded by the European Union

UK Research and Innovation

DOCUMENT CONTROL SHEET

PROJECT INFORMATION

Project Number	101083857		
Project Acronym	NATURELAB		
Project Full title	Nature based interventions for improving health and well-being		
Project Start Date	1 June 2023		
Project Duration	54 months		
Funding Instrument	Horizon Europe	Type of action	Research and Innovation Action (RIA)
Topic	HORIZON-CL6-2022-COMMUNITIES-02-02-two-stage		
Coordinator	Laboratório Nacional de Engenharia Civil (LNEC)		

DELIVERABLE INFORMATION

Deliverable No.	D1.1							
Deliverable Title	Framework of key indicators to assess and categorize different types of nature spaces and their impact for therapeutic indications							
Work-Package No.	WP1							
Work-Package Title	Assessment and selection of green spaces with potential for improving health and well-being							
Lead Beneficiary	LNEC							
Main Author	João Fernandes, LNEC; Ana Estela Barbosa, LNEC; Miriam Finkhäuser, UG; Adriana Cardoso, LNEC; António Santos, LNEC; Sónia Antunes, LNEC							
Other Authors	Jannik Schultner, WU; Holger Mühlan-Rehmer, UG; Silke Schmidt-Schuchert, UG							
Due date	M8							
Deliverable Type	X	Document, Report (R)		Data manage-ment plan (DMP)		Websites, press & media action (DEC)		Other
Deliverable Type	Document, Report (R)							
Dissemination Level	X	Public (PU)		Sensitive (SEN)		Classified		
	PU: Public, fully open SEN: Sensitive, limited under the conditions of the Grant Agreement Classified R-UE/EU-R – EU RESTRICTED under the Commission Decision No2015/444 Classified C-UE/EU-C – EU CONFIDENTIAL under the Commission Decision No2015/444 Classified S-UE/EU-S – EU SECRET under the Commission Decision No2015/444							

Legal disclaimer

This project is funded by the European Union under Grant Agreement No. 101083857 and co-funded by the UK Research and Innovation Grant Award No. 10067111. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

DOCUMENT HISTORY OF CHANGES

Version	Date	Author and Short Org. Name	Description
Version0	2023.10.23	LNEC	First draft structure of D1.1
Version1	2023.11.10	LNEC and UG	Master document
Version2	2023.12.18	LNEC, UG and WU	Complete version excluding Executive Summary and Abbreviations
Version3	2024.01.19	LNEC	Revised version (except Chapter 4), with Executive Summary and Abbreviations
Version4	2024.01.25	UG	Revision of Chapter 4
Version5	2024.01.26	LNEC	Final version

DOCUMENT REVIEW

Reviewer	Date	Reviewer Short Organisation Name
Stefanie Frech	2024.01.14	BioCon Valley® GmbH
Lars Hein	2024.01.15	Wageningen University

ABBREVIATIONS

Abbreviation	Definition
CO	Carbon monoxide
D	Deliverable
DF	Demonstrator Fellows
DSR	Daylight and Solar Radiation
ES	Experimental Sites
GIS	Geographical Information System
HWC	Health, Well-being and Comfort
IEQ	Indoor Environment Quality in buildings
NBS	Nature-Based solutions
NBT	Nature-Based Therapies
NO_2	Nitrogen dioxide
O_3	Ozone
OEQ	Outdoor Environment Quality
$PM_{\#.\#}$	Particulate Matter that is smaller than #.# microns
SO_2	Sulphur dioxide
T	Types of nature spaces (T1; T2; T3)
TESSA	Toolkit for Ecosystem Service Site-based Assessment
WHO	World Health Organisation
WP	Work Package

Table of contents

Index of figures

Index of tables

Executive Summary

Executive Summary

Deliverable D1.1 provides a framework of key indicators of green space characteristics that have a high potential to be relevant regarding their impact on health and well-being. These indicators comprise the characteristics of a nature site, and its context, including the variables that can impact health and well-being, and also the requests that ensure people can have comfort and their basic needs attended to. Moreover, NATURELAB's holistic strategy seeks to offer also indicators that go beyond health and well-being, enhancing the resilience of the sites and the population therefore boosting communities' sustainability.

Since the topic of this document is wide, the work was done by a comprehensive team of experts. All authors used for this work their know-how and previous experience. This framework of scientific and practical background was supported with literature review, in order to ensure using state-of-the art knowledge and the integration of health, well-being, and sustainability and resilience of communities (Chapter 3).

There is evidence showing positive associations between green spaces and health and well-being outcomes. Despite this, there has been little research into which components of green spaces benefit people's well-being and health, and how they can be categorized. To address this gap, a proposal of key indicators of natural and infrastructural characteristics that have a high potential to be relevant for health and well-being is presented in Chapter 4. The following four categories of indicators are proposed: Spatial characteristics, design, and conditions; Infrastructural characteristics; Natural characteristics and Cultural Ecosystem Services.

The interconnectedness of health and well-being with sustainability best practices is explored by Chapter's 5 key indicators. Sustainable sites should promote cleaner air and water, reducing exposure to pollutants and to poor environmental conditions. Moreover, green and blue spaces and sustainable communities have been linked to improved mental health. Access to nature, greenery, biodiversity and well-maintained environments can reduce stress, anxiety, and depression while enhancing overall well-being. Reducing environmental hazards and ensuring water management strategies are pathways to increase biodiversity, greenness, mitigate and adapt to extreme precipitation and temperature that are connected to climate changes, thus contributing to sustainable, inclusive and resilient living spaces and communities. The indicators related to the sustainability and resilience of the sites and the population are divided in three categories: (i) climate and geophysical context which include the management of water cycle, solar radiation and climate region; (ii) air quality and (iii) noise.

D1.1 is a thorough and comprehensive report. The indicators will be applied, tested and validated at all Experimental Sites (ES) through T1.2. During this implementation, a clearer awareness of the intrinsic value of each indicator, the easiness and effectiveness of measuring or establishing it, as well as the need of monitoring and updating each indicator will be recognised, allowing the development of future outcomes and deliverables under WP1.