EDAPHOS

D8.1 OEI – Requirement No.1

WP8 – Task 8.1

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14/11/2023	V0	S. STROLA (LGI)	M. CHALOT (UFC)	
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Summary

The EDAPHOS project focuses on addressing soil pollution and restoration through a holistic land management approach, employing nature-based solutions (NBS) and Artificial Intelligence (AI) techniques. The project involves robust sensing tools, risk assessment methods, and evaluates environmental, social, and economic impacts. To address ethics concerns raised by the European Commission (EC), an independent Ethics Advisor (EA) is appointed to supervise and assess the project's ethical aspects at specific milestones, following EC guidance.

Keywords

Ethics, Soil Remediation, Nature-Based Solutions, Artificial Intelligence

Abbreviations and acronyms

Acronym	Description
AI	Artificial Intelligence
CS	Case Studies
EA	Ethics Advisor
EC	European Commission
EthSR	Ethics Summary Report
GeAs	General Assembly
KOM	Kick-Off Meeting
M	Month (of the project)
NBS	Nature-Base Solutions
RP	Reporting Period
WP	Work Package

Summary

The EDAPHOS project addresses a number of open research problems in the domain of soil pollution and soil restoration. In this framework, EDAPHOS proposes a holistic and innovative land management approach for land rehabilitation and ecological restoration of contaminated areas featuring nature-based solutions (NBS) technologies. Robust sensing tools will be used and applied, as well risk assessment methods will be developed and tested at selected Case Studies (CS). Environmental, social and economic impacts of selected NBS sites will be assessed to develop a quantitative metrics for the evaluation of economic benefits and cost prevention potential. With the aim of providing data-driven tools for forecasting, analyzing and establishing quantitative relationship of multi-scale processes, Artificial Intelligence (AI) techniques will be implemented throughout the project.

In this context, the consortium will face off to several ethics issues, ranging from the human health and safety during their involvement in the field experiments and laboratory tests to the potential risks for the environment, to the collection of personal data of stakeholders involved in the project activities and to the use and the implementation of the AI tools that will be developed and tested during the project. These potential issues have been pointed out by the European Commission (EC) during the proposal evaluation phase, and the grant negotiation.

Based on that assessment and with the aim to assess and evaluate these potential issues within EDAPHOS, an independent Ethics Advisor has been appointed. The Ethics Advisor (EA) will supervise the project on the points identified by the EC evaluators during the Ethics Screening process and will assess the project at M18, M36 and M48 (*i.e.* at the end of each reporting period) with respect to those aspects in a dedicated report to be submitted to the EC. These assessment will follow rigorously the guidance provided in the EC guidance (https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/how-to-complete-your-ethics-self-assessment_en.pdf).

In this deliverable, the appointed EA is presented and their missions described to fulfil with the requirements indicated by the Ethics Summary Report (EthSR).

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1 Introduction

The project deals with several ethical aspects and in particular with the following points: Humans, Personal Data, Environment, Health and Safety, and AI.

This has been pointed out by the EC during the proposal evaluation and grant negotiation phases, and detailed in EthSR. In response to that assessment, ethical requirements were put on the project, including mainly (1) to appoint an external EA, who would follow and supervise the project in ethical aspects, and (2) who would for each reporting period (RP) assess the project with respect to those aspects and submit a deliverable (OEI Requirement) to the EC.

1.1 Objectives

The objectives of this deliverable is to present:

(1) the appointed external EA, and

(2) to give an overview of the potential ethical issues that can be identified in relation to the EDAPHOS objectives and work plan.

The deliverable gives an introduction to the ethical concepts relevant for EDAPHOS (Section 2). Then presents the appointed EA, its profile and its mission within EDAPHOS (Section 3) and an overview and discussion of the specific ethical issues that will become relevant for the project (Section 4). The last section presents a summary of actions taken and next steps (Section 5).

Since the project has just started, and the detailed description of CS and technical requirements (in terms of tools and methods that will be used) are not yet finalised, potential ethical issues are here presented at general level and not exhaustively discussed, as it will be the case the for next linked deliverables (*i.e.* OEI – Requirements No. 2, 3 and 4). In the same view, Section 5 does not report any concrete actions to be taken at this stage, but simply the next steps to advance of this project facet.

2 Ethical issues

The potential ethical issues discussed in this deliverable are related to the following general concepts:

Humans

- The beneficiaries will carry out the action in compliance with the ethical principles of autonomy, beneficence, nonmaleficence and justice, including the highest standards of research integrity.
- EDAPHOS plans to assess the social impact of the developed technologies to evaluate the potential social impacts in terms of, e.g., employment creation (WP4). This assessment is relevant to develop soil remediation methods with a positive view among citizens and with the most beneficial impact in the well-being of society as a whole.

Personal Data

- The beneficiaries will pay particular attention to the right to the protection of personal data. Limited personal data (name, occupation, gender, email) from beneficiaries will be required

during the project. The consortium will comply with the EU General Data Protection Regulation 2016/679 (GDPR), the EU Regulation 2016/679 and the EU Directive 2016/680. Access to these data will only be allowed for authorized employees working on the specific tasks of the project. Data won't be transferred; it will be only stored internally in company servers

Environment

- Ecotoxicity studies involving (a) bacteria, (b) earthworms, (c) nematodes are proposed (WP2, Task 1.4). The envisaged ecotoxicity tests are well-established and standard within the field of ecotoxicity evaluation (according to *ISO DIS 10871), (OECD 207), (ISO 10872), (OECD 208, NF EN ISO 11269-1), (OECD 202), (OECD 201).* These tests are necessary to evaluate the detoxification efficiency of the biotechnologies developed in the project as one main objective of bioremediation is reducing the ecological risk of pollution. INERIS, the partner responsible for these tests, has the experience, knowledge and permits to perform these tests following the highest safety standards

Health and Safety

- The research foresees the development of recombinant microbial strains to characterize metabolic pathways. The development and manipulation of GMO raises concerns in terms of potential harm to worker and regarding the risk of accidental release in the environment. To avoid confusion, explicitly, the project EDAPHOS does not aim to release genetically modified organisms into the environment. Only confined work with recombinant organisms is envisioned during the project.
- In the laboratories, project staff members will follow prescribed standard regulations (i.e. wearing safety shoes and suitable clothing) while at the sites those imposed by the industrial partners (wearing safety shoes, suitable clothing and glasses).

AI

- EDAPHOS acknowledges the ethical concerns associated with the deployment of Artificial Intelligence and Machine Learning. The consortium will adhere to the seven principles defined in the "Ethics guidelines for trustworthy AI" published by the EC. Big data and AI techniques will be applied, such as machine learning algorithms deployment to survey databases and collect pathways, plant and microbial genetic information, molecular structures and chemical properties of pollutants. These techniques will not be applied to personal data.

3 EDAPHOS EA

The project general assembly has decided to appoint Dr. Axel Carlberg as the independent external EA of the project. Dr. Carlberg has a PhD in ethics and has over twenty years' experience in assessing and reviewing EU-funded research projects and serving in different capacities as expert, panel chair and project ethics advisor. Dr. Carlberg also works as an organisational consultant process facilitator which can be an asset for the project.

During the project lifetime, the EA will be invited to participate in all General Assembly (GeAs) meetings. In these meetings a dedicated slot will be planned for the EA to provide feedback and guidance to the project. Specifically in the GeAs discussions on risks and risk mitigation, care will be taken to involve him in order to capture and sufficiently deal with ethical risks. Dr. Carlberg will

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receive all project deliverables as soon as they are produced, to spot any potential ethical issues in them. Acting as the EDAPHOS EA, he will provide a report to the EC at each RP, as D8.2-4 (Ethics Assessment Report, OEI – Requirements No. 2, 3 and 4).

4 Ethical issues relevant for EDAPHOS

During the project implementation, ethical considerations will be addressed both when producing, sharing and using data internally within the project, as a part of the research process, as well as considering ethical issues and implications of the research output of the project, *i.e.* the delivered ontologies, data sharing platform software, methods, and research data etc.

The potential ethical issues that could arise during the course of the project seem to fall under the following general categories, as previously identified:

- Humans
- Personal Data
- Environment
- Health and Safety
- AI

Humans

Even if the project will not involve research ***on*** humans, it is clear that the involvement ***of*** humans and the possible impact of the work on CS-sites communities and stakeholder groups might give rise to some ethical issues.

Indeed, the project, which will involve the advanced mapping, risk assessment and nature-based depollution methods and its ambition to propose state-of-the art ecological restoration, might directly or indirectly affect the communities living or working on the land or adjacent to it as well as all the stakeholders along the value chain of the businesses that will benefit as a result the soil restoration and the nature based-solutions that will be implemented. This dimension of the proposal must be monitored closely during the lifetime of the project.

Personal data

The gathering of personal data is not a central feature of the proposal. However, personal data will be collected and processed from shareholders and urban actors involved in knowledge sharing capacity building activities and events. It is important that the collection and storage of this data is done according to GDPR rules and standards and is outlined in the project's DMP.

Environment

The aim of the project is to depollute soils and to restore the ecological balance in the chosen CS sites. As such the project will bring great benefits to the environment. However, the introduction of the planned nature-based solutions might produce diverse and undesired side-effects to the existing flora and fauna of the CS sites which must also be monitored closely.

Health and Safety

Project staff members will work with hazardous materials both in laboratories as well as on the polluted sites. It is important that the health and safety of the staff be protected. Safety procedures must thus be followed, which might include proper safety classification of laboratory and qualified personnel as well as proper protective clothing and other regulatory provisions for on-site work.

AI

The deployment of AI technologies in this project must be consistent with EU ethics guidelines which include the principles of 1) human agency and oversight, 2) privacy and data governance, 3) transparency, 4) fairness, diversity and non-discrimination, 5) societal and environmental well-being and finally 6) accountability.

The AI spatial model platform and the Decision Support Tool which will be developed as part of the HLO 5 will have to be the object of especial scrutiny,

5 Conclusion

The project has appointed an EA with background and valuable experience in EU ethics assessment and advisory work. The EA participated in the preparation of the kick-off meeting (KOM) of the project, and will also be part of each GeAs meeting, to report on his view on ethical aspects in the project, and to raise any ethical risks that should be considered in the project risk assessment.

Further, in M18 of the project, the EA will submit his first yearly report on ethical aspects in the first project year (D8.2). Overall, the EA does not foresee at this stage major issues regarding ethical aspects for EDAPHOS due to the recent launch of the project and the not mature yet implementation of the tools and methods that will be developed and further used. Any counter measures have been applied in the EDAPHOS work plan as well, but all Work Packages (WPs) will be regularly monitored and ethical aspects considered throughout the project implementation.

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Annex 1: Curriculum Vitae of Dr. Axel Carlberg

ACADEMIC MERITS

1998 Ph.D. in ethics, Lunds universitet, Sweden

1987 D.E.A. in theology (M.A. equivalent), Université de Strasbourg, France

1982 B.A. in philosophy, University of Toronto, Canada

WORKING LANGUAGES

English, French, Spanish, Swedish

EMPLOYMENT HISTORY

2008 Senior associate and organisational consultant at MiL Institute, (Consulting firm at www.milinstitute.se)

2006 Founder and owner of Upspring AB (private consulting firm at www.upspring.se)

1999 Researcher in ethics at the Faculty of Medicine, Lunds universitet

1992-98 Doctorate fellow at the Faculty of Theology, Lunds universitet

CURRENT LINES OF WORK

Since 2006 my main line of work has been consultancy in ethics in leadership and research with special focus on health-care sector. This critical reflexion has been framed by a longstanding association with the Faculty of Medicine at Lund University where I serve as part-time researcher and lecturer. Another longstanding professional collaboration in my work has been with the European Commission (Research and Innovation) where I have served regularly as expert ethics reviewer and advisor since during more than twenty years.

Ethics Advisory in the following projects:

EDAPHOS. Advanced mapping, risk assessment and nature-based depollution methods are combined to accelerate the recovery of contaminated soils and ensure that ecological restoration enters mainstream business. HORIZON-MISS-2022-SOIL-01-04

ADABTS. Automatic Detection of Abnormal Behaviour and Threats in Crowded Spaces. FP7 SEC-2007- 2.3-03.

Research partner in EU funded project:

SET-DEV. Science, ethics and technological responsibility in developing and emerging countries FP7 Science in Society 2007-1 SiS-2007-1.2.1.1

Latest ethics review and consultancy contracts for European Commission

2023

Vice-chair: MSCA-PF

Horizon-EIC-2021-Transition (Contract signed) 2022

Vice-chair: MSCA-PF Horizon-EIC-2021-Transition

2021

Ethics Screening 2 ERC-2020-ADG 2020

Evaluation – Call H2020-MSCA-IF 2020 H2020-SC1-2020-Two-Stage-RTD

2018

Ethics MSCA-IF Vice Chair. Remote and Central Evaluation H2020.SMEINST-2-2016-2017

Ethics checks and Follow-ups Panels

2017

Ethics checks and Follow-ups Panels

2016

Ethics Assessments. February 2016

2015

H2020-MSCA-IF-2015-Ethics Remote and Central:

Ethics Assessment Panel Central

International Conferences:

PRO-RES Conference. “Ethical frameworks and responsible research: challenge to science in a changing world”, 12-13 June 2019.

MiL Management Conference “Make Strategy Happen”, 26-27 March 2010, MiL Campus, Klippan EU Conference on “Ethics, Research and Globalisation”, 14-15 May 2007, Brussels, Belgium

EU Conference “Science in Society Forum”, 9 – 11 March 2005, Brussels, Belgium

7th Conference of European Health Ministers, "Health, Dignity and Human Rights", 12-13 June 2003, Oslo, Norway.

6th European Conference of National Ethics Committees, "Genetics and Society: Opportunities and

Threats", 11 - 13 November 2001, Paphos, Cyprus.

EU Conference "Ethics and Biomedical Research - the Process of Balancing Benefits and Risks", Umeå, 11-12 June, 2001.

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"Genetik - möjligheter och begränsningar", (Genetics - possibilities and limits), Sigtunastiftelsen, 23-24 March 2001.

Fifth World Congress of Bioethics. Ethics, law and public policy, London, UK, 21-24 September, 2000.

Third Global Summit of National Bioethics Commissions, London House, London, UK, 20-21 September 2000.

International Conference of the Council of Europe. "On ethical issues arising from the application of biotechnology". Oviedo, Spain, 16-19 May 1999.

Fifth European Conference on Family Law: "Civil law aspects of emerging forms of registered partnerships," Peace Palace, The Hague, Netherlands, 15-16 March 1999.

Congress and Convention of the Society of Christian Ethics, Washington, DC, USA, 3-7 January 1995.

"Resources and Population." Conference organised by the Pontifical Academy of Sciences, Vatican City, 23-27 November 1991.

Abridged list of publications:

Etik i krisens skugga. Det nya ledarskapets krav och möjligheter. Ekerlids Förlag, 2023.

Patientens bästa. En kritisk introduktion till läkaretiken. Nordic Academic Press, 2022.

(together with C.-F. Burman) “Future challenges in the design and ethics of clinical trials” in Clinical Trials Handbook (red. S. Cox Gad), Wiley, 2009.

“Kristna perspektiv på genetik och dess tillämpningar” in Etik och genteknik, filosofiska och religiösa perspektiv på genterapi, stamcellsforskning och kloning (red. Carl-Gustaf Andrén och Ulf Görman), Nordic Academic Press, 2004, 113–159.

The Moral Rubicon. A Study of the Principles of Sanctity of Life and Quality of Life in Bioethics Lund University Press, Lund, 1998.