EDAPHOS

D8.2 OEI – Requirement No.2

WP8 – ETHICS

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Table of contents

List of tables

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Summary

This deliverable represents the first yearly report of the Ethics Advisor (EA) appointed to follow the work of the Consortium as specified by the Grant Agreement (GA) and the structure of WP8. The basic aim of the document is to map the ethics issues identified in the proposal by the EC's Ethics Summary Report, namely humans, personal data, environment, health & safety and finally artificial intelligence. As questions surrounding these issues are scattered in the different WPs, the EA asked that all the partners involved in the project fill out a questionnaire detailing if and how they face or might face each of these ethics issues in their assigned WPs and tasks, and if so, how they address them. This questionnaire follows closely relevant parts of the EC's self-assessment questionnaire. The ultimate aim of this exercise is threefold: 1) to identify where the ethics issues arise or might arise in the project, 2) to verify compliance with HE standards but also 3) to raise the level of ethical awareness among the researchers working on this project.

Keywords

Research ethics, AI ethics, personal data, humans, health & safety, environment

Abbreviations and acronyms

Acronym	Description
CA	Consortium Agreement
D	Deliverable
DPO	Data Protection Officer
DoA	Description of Action
DOI	Digital Object Identifier
EA	Ethics Advisor
EC	European Commission
FAIR	Findable, Accessible, Interoperable and Reusable
GA	Grant Agreement
GDPR	General Data Protection Regulation
HE	Horizon Europe
IPR	Intellectual Property Rights
M	Month (of the project)
NDA	Non- Disclosure Agreement
PMO	Project Management Office
PU	Public
SENS	Sensitive
URL	Uniform Resource Locator
V	Version
WP	Work Package
WPL	Work Package Leader

Introduction

The ethics issues faced in this project are not obvious. The work does not involve the direct participation of human research subjects, nor does it involve directly the collection or storage of personal data. The environmental issues in the project relate to the restoration of soil health, and more precisely the introduction and evaluation of NBS which does not pose any known risks to the environment. Issues pertaining to the health and safety of the research staff are addressed by the partners by detailing existing and applicable laws and regulations in their institutions and countries. To ascertain whether these are followed would require on-site visits, which does not seem feasible or justified in a cost-benefit perspective. That leaves us with the presently ubiquitous issue of artificial intelligence and its application in this field of study. A detailed explanation of how this technology is deployed in this project and how it complies with HE standards is to be found below. AI models deployed in this project will not be used in automated decision-making, but as decision-support tools. Thus accountability and the safeguard of stakeholder interests do appear to be critical issues. In general, the EA considers that the partners have answered satisfactorily to the questionnaire.

1 Work during the first reporting period

During this first reporting period the focus has been for the EA to acquaint himself with the project, to get to know the researchers involved and to set up the framework of his work. The terms of reference for his role in the project is the EC document *Roles and Functions of Ethics Advisors/Ethics Advisory Boards in EC-funded Projects* from 2012. In addition he participated in the drafting of D8.1 which outlines the ethics WP.

Lastly, he also participated in the project's General Assembly in Thessaloniki 16-18 October 2024. The aim was threefold: 1) to acquire a better understanding of the nature of the research, 2) to get to know the researchers and lastly to 3) introduce the subject of research ethics in Horizon Europe for the assembled staff with an emphasis on personal responsibility (not mere compliance). A PDF-version of his presentation is included as an annex. As the meeting included a visit to a CS site, he gained first-hand knowledge of what the work entails practically. He also had a host of informal conversions with the researchers, some of whom wanted to discuss ethical issues. It was a productive and very interesting meeting for him.

2 Structure of the deliverable

As stated above, the main purpose of this deliverable is to identify the tasks where ethics issues arise or might arise and to ask the partners to explain how these ethics issues are addressed in the study. The questions formulated in this survey follow closely the EC's ethics self-evaluation questionnaire and the issues that were identified in the Ethics Summary Report produced by the Ethics Evaluation Review; namely Environment, Health and Safety, Artificial Intelligence, Persons and Data Protection. The answers provided by the partners, and included below, have not been edited other than omitting typos. The EA expects that this deliverable will be an important document of reference in the remaining life of the project, especially if EDAPHOS needs to address specific issues with greater granularity.

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3 Ethics survey

Description of the work as it adversely affects 1) the environment and 2) the health and safety of the researchers involved. Detail per WP number.

3.1 Environment

Concerning the Environment, detail on a WP/task level:

- In what way does the project uses substances or processes (or technologies) that may cause harm to the environment, to animals or plants (during the implementation of the ac-tivity or further to the use of the results, as a possible impact)?
- In what way have you conducted a risk-benefit analysis and what have you concluded?
- How you do apply the precautionary principle (if relevant).
- Detail the safety measures protecting the environment that are being implemented at the CS sites.

WP/Task	Description
1	Not relevant
2	The activities conducted in WP2 are dedicated to ecotoxicological and ecological analyses as well as ecosystem services evaluation. The work performed in the WP2 does not involve any direct impact on the environment. All the laboratory activities are performed following the safety and waste treatment rules according to the general guidelines in force at Ineris and French legislation: • Articles L 541-1 and following of the Environmental Code relating to waste prevention and management. • Articles R 541-42 to R 541-48 of the Environmental Code. • Articles R 1335-1 to R 1335-12 of the Public Health Code. • ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road). • Order of May 29, 2009, amended, known as the "TDG Order". • Order of September 7, 1999, relating to the control of the disposal channels for DASRI (Healthcare Waste). • Order of September 7, 1999, concerning the storage methods for healthcare waste with infectious risks and similar waste, and anatomical parts. • Order of November 24, 2003, concerning the packaging of healthcare waste with infectious risks and similar waste, and human anatomical parts. • Circular of January 11, 2005, relating to the packaging of DASRI. The nature of the biological tests performed in WP2 do not involve any species that fall under the animal testing and experimentation regulation (DIRECTIVE 2010/63/EU of 22 September 2010 on the protection of animals used for scientific purposes).
3	Not relevant
4	The type and nature of activities conducted under WP4 do not involve any direct negative impact on the environment or ecosystems. The work package is dedicated to analytical and conceptual studies based on data and outcomes

	generated within previous WPs. As such, WP4 does not include any physical, chemical, or biological experiments or field tests. The tasks are non-invasive and focus entirely on desk-based research, modelling, and interdisciplinary data synthesis. Specifically, WP4 aims at the valuation of ecosystem services (EES) capital and final economic products, as well as the assessment of the Product Environmental Footprint (PEF) of selected nature-based solutions (NBS) implemented at pilot sites. These activities provide science-based, strategic insight to support sustainable decision-making, while ensuring no physical interaction with the environment or ecosystems.
5	Design of NBS business models and tailored ecological finance instruments. No physical experiments take place, no direct impact on the environment and ecosystems.
6	Not relevant

Table 1 - Description of the work as it adversely affects the environment

Health and safety

Concerning Health and Safety, detail on a project level:

the health and safety procedures put in place at the CS sites and in the laboratory/laboratories:

the safety classification of the laboratory/laboratories used

the host institution/host institutions safety procedures.

Confirm that the laboratory/laboratories used in the project and the staff involved in the work operate under relevant and valid safety authorizations.

Partner	**Description**
UMLP	The staff involved in the CS work operates under relevant and valid safety authorizations, with a mission order validated by the hierarchical bodies • Mission sheets made available to staff describe: mission-related hazards (e.g. transport, fauna and flora, topography (rough terrain, altitude, etc.) • the modalities of exposure to hazards (e.g. exposure to pathogens carried by air, water, food, animals, humans) • means of prevention, organizational, technical (training kits, clothing and protective equipment adapted (sunglasses, mosquito net, etc.) and human (information on the specificities of the mission area) Each Technical Unit (UT) concerned provides 'field' first aid kits, all you have to do is make a request to the person in charge according to the Technical Unit (UT) concerned. Managers check the contents and maintain the kits to ensure they are complete, in good condition, and ready for use. They also show users the materials and products contained in the kit: a memo is available in each kit, explaining the use of each material and product. Each kit manager must regularly check the expiry dates of the elements and can adapt the contents according to the mission and the specificities of the field. Each manager can adjust the elements according to the space available and the particular needs of their team.
CRES	The staff involved in the CS work operate under relevant and valid safety authorizations, with a mission order validated by the hierarchical bodies.

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	First aid kits are provided to all technical units at the request of the personnel in charge. Managers check the contents of each first aid kit and replace what it contains to ensure personnel safety. Equipment and dress code: it is mandatory to use long pants and long sleeves.
UNIBO	At the University of Bologna (UNIBO), field labor is managed in full compliance with national legislation (Italian Legislative Decree 81/08) and relevant European regulations (e.g., CLP, REACH). The institution applies a structured approach to health and safety in research environments, based on the following key principles: The staff involved in the CS work operate under relevant and valid safety authorizations, with a mission order validated by 2 hierarchical bodies: the Deputy Director of DISTAL and the Coordinator of the Sector. All members of the CS workgroup receive preliminary training on risk prevention and security both in fieldwork settings and in laboratory settings (Italian Legislative Decree 81/08), though online and in presence lessons and certified by final exams. UNIBO provides PPE such as: protective footwear, gloves and under-gloves, safety goggles, sun protection, filtering face masks (FFP2, FFP3, FFP4) and boiler suits. Equipment and dress code: it is mandatory to use long pants and long sleeves. The staff involved in fieldwork is provided with a first aid kit adapted for field conditions. The field equipment includes sufficient drinking water during the hot season and appropriate protective gear.
CSIC	• All members of the CS workgroup receive ongoing training on occupational risk prevention and best practices in fieldwork, available on the CSIC training platform: https://formacion.corp.csic.es/course/index.php?categoryid=165. • Each project must complete a detailed document that includes project description, operational plan for the campaign/fieldwork, specific work instructions, non-exhaustive hazard identification, including Land-based activities (field, mountain) and activities in extreme conditions (polar regions, deserts, etc.). It also includes personnel management: Identification of fieldwork team members, specific training on risks and procedures, individual health monitoring, planning, and safety. Finally, each project must include a Contingency and Emergency Plan, and all participating personnel must be informed of the associated risks. This plan is subject to control, review, and continuous improvement, and must be approved by the CSIC. • Equipment and Dress Code: Mandatory use of long pants and long sleeves. • The CSIC provides protective footwear, gloves, caps, safety goggles, appropriate sun protection and insect repellent. • The CSIC provides also field Resources: Each field trip must include a first aid kit. • Due to the climatic conditions in southern Spain, a specific work plan for high temperatures is in place. In high-temperature conditions, the team must carry sufficient drinking water. • Training in Biological Risks: All team members are trained to identify and respond to biological risks, such as insect bites and other common incidents in natural environments
PHY	Not relevant

A21	Not relevant
ONERA	Not relevant
EVO	Development of KPIs (WP4) and Design of NBS business models and tailored ecological finance instruments (WP5). No physical experiments take place, no direct impact on the environment and ecosystems.
MIC	MIC staff is not involved in the work on CS.
INERIS	With the support of the Internal Risk Control Department and in collaboration with the various divisions, departments, and the occupational health service, INERIS takes all the necessary measures to ensure the safety and protect the physical and mental health of staff. Ineris is committed to: • Raising awareness among Institute staff about roles and responsibilities in Occupational Health, Safety, and Environment, and maintain their skills through training and exercises; • Ensuring compliance with current regulations and their effective implementation; • Provide staff with general and specific safety instructions and supply employees with appropriate personal protective equipment for their workstation; • Regularly assessing their occupational risks and promptly analyze any accidents, incidents, or malfunctions observed on site in order to implement appropriate corrective or preventive measures; • Evaluating employee exposure by conducting and monitoring controls on exposure to hazardous chemical agents and ensure traceability; • Monitoring the health of their employees; • Harmonizing practices within Ineris while taking into account the specificities of each profession; • Assessing environmental risks related to their activities, improve their management, and reduce the use of energy and natural resources; • Involving their contractors by requiring an equivalent level of safety. Ineris shall ensure that these measures are adapted to reflect changing circumstances and aim at improving existing working conditions. Ineris shall record and update, in a single document, the results of the assessment of risks to the health and safety of workers, as carried out in accordance with Article L. 4121-3 of the French labour code. This assessment includes an inventory of the risks identified in each work unit of the company or establishment, including those related to thermal environments. Ineris shall implement the measures provided for in Article L. 4121-1 of the French labour code based on the following general principles of prevention: • Avoid risks; • Evaluate risks that cannot be avoided; • Eliminate risks at their source; • Adapt work to the individual, in particular with regard to the design of workstations, the choice of work equipment, and the methods of work and production, with a view especially to reducing monotonous and repetitive work and mitigating their effects on health; • Take account of technical progress; • Replace what is dangerous with what is not dangerous or less dangerous;

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	• Plan prevention by integrating it into a coherent whole, covering technology, work organization, working conditions, social relationships, and the influence of environmental factors—including risks related to moral harassment and sexual harassment, as defined in Articles L. 1152-1 and L. 1153-1 of the French labor code, as well as those related to sexist behavior as defined in Article L. 1142-2-1 of the French labor code; • Prioritize collective protective measures over individual protective measures; • Provide appropriate instructions to workers. Fieldwork: All the staff involved in the CS work operate under relevant and valid safety authorizations, with a mission order validated by the hierarchical bodies. The mission order clearly explains why the fieldwork is needed, what work will be done, and when and for how long the visit will take place. A minimum of 2 staff members must be present during any field activity. Ineris members activities on CS are performed in agreement with the CS leader and follow the specific safety rules of the CS leader teams if any. Filed equipment: Mandatory use of long pants and long sleeves, protective footwear, gloves. Depending on the nature of the task, staff are equipped with additional individual protective such as dust mask and safety goggles. All equipment are provided by Ineris and are always available during the field activities. Laboratory Work: All the staff involved in laboratory work (ecotoxicity assessment) operate according to the safety rules and specific procedures established by Ineris as describe above. All individual and collective equipment are adapted and always available in the laboratory.
GIG-PIB	Operational and Safety Regulations for GIG-PIB Personnel Working at CS4 within the EDAPHOS Project In accordance with internal procedures adopted at the Central Mining Institute – National Research Institute (GIG-PIB), any business trip or site visit, including work at CS4 under a project, must follow formal authorization steps (procedure: Zarządzenie nr 20 Dyrektora Głównego Instytutu Górnictwa z dnia 12 grudnia 2022 roku w sprawie zasad i trybu delegowania pracowników Instytutu na wyjazdy służbowe). The following guidelines apply: Travel authorization and approval: Each site visit (visit to CS4) must be approved in advance by both the Project Manager and the Head of the relevant GIG-PIB Department. Authorization is granted based on a mission order that clearly explains why the field visit is needed, what work will be done, and when and for how long the visit will take place. Access to CS4 Site: Access to the CS4 site requires prior permission from the site manager or authorized land administrator.

	Entry is only allowed to staff whose names appear on the approved mission order and who hold valid safety authorizations. **Field Team Composition:** For safety reasons, a minimum of two staff members must be present during any field activity at CS4. Solo fieldwork is not permitted. **Protective Equipment:** All field personnel must wear protective clothing suitable for outdoor work and environmental conditions. Depending on the nature of the task, staff are equipped with individual protective gear that meets applicable certification standards (e.g., EN/ISO-certified masks, gloves, goggles, etc.). **First Aid and Communication:** Each team is equipped with a first aid kit Unit managers or their designated representatives are responsible for maintaining the first aid kits in proper condition, checking expiry dates, and adjusting contents as needed based on the field mission specifics. Each team is also equipped with a mobile phone for communication and emergency contact. Each first aid kit includes a brief instruction manual describing the use of each item; the person in charge ensures all users are familiar with its contents.

Table 2 - Health and safety procedures put in place at the CS sites.

Partner	Description
UMLP	A health and safety document available on the lab portal is part of the health and safety process, which aims to provide assistance in this evaluation as well as in the implementation of prevention, by providing information currently known, and by providing practical sheets. The prevention booklet has two parts: • THE BODY OF THE DOCUMENT in which are presented definitions, the different steps needed to elaborate a risk assessment (classification of staff biological pathways, pathways of penetration, etc.), the principles of general prevention measures divided into human resources, technical and organisational measures as well as requirements for the transport of biological materials . • PRACTICAL SHEETS numbered from 1 to 20 detailing certain aspects or special cases such as GMOs, safety levels biological and waste treatment. Information sheets are posted on all floors of the research buildings, called "Conduct to be taken in the event of an accident involving exposure to blood".
CRES	All members of Cres laboratory team must follow the following standards: • Mandatory training in laboratory and field activities including safety, risk awareness and proper use of PPE • Emergency plans and safety instructions are displayed in research facilities and laboratories • Documentation is available in our facilities and are regularly updated.

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UNIBO	At the University of Bologna (UNIBO), laboratory safety is managed in full compliance with national legislation (Italian Legislative Decree 81/08) and relevant European regulations (e.g., CLP, REACH). The institution applies a structured approach to health and safety in research environments, based on the following key principles: • Mandatory training for all staff and students involved in laboratory activities, including general safety, risk awareness, and proper use of PPE. • Risk assessment procedures are systematically applied to identify and mitigate chemical, biological, and procedural hazards. • Use of appropriate PPE and adherence to safety protocols are strictly enforced. • Emergency plans and safety instructions are clearly displayed in all research facilities and laboratories. • Internal documentation (manuals, procedures, and safety data sheets) is available via the university's intranet and regularly updated.
CSIC	The staff of the Spanish National Research Council (CSIC) adheres to the standards established in the Royal Decree 822/1993, of May 28, which sets forth the principles of Good Laboratory Practice (GLP) and their application in conducting non-clinical studies on chemical substances and products. These principles are designed to ensure the quality, integrity, and reliability of data generated in laboratories, particularly for regulatory purposes and international acceptance. All personnel working in CSIC laboratories receive ongoing training in these practices, as detailed on the IRNAS-CSIC occupational risk prevention page. To support safe and compliant laboratory operations, CSIC has implemented a Laboratory Safety Manual (FREMAP), which is visibly posted in laboratories and outlines basic procedures. Additionally, a comprehensive set of protocols and procedural documents is available to guide staff in specific situations: CSIC order and cleanliness procedure (IT_01_PRL Limpieza_14 08 2024), work instruction for use of dangerous equipment or equipment without CE marking (IT_01_PRL_EQUIPOS PELIGROS / SIN CE_14 08 2024), CSIC laboratory dress code, CSIC Biological agents' safety Leaflet, CSIC Gas Cylinder Safety Leaflet, Personal Protective Equipment (PPE) Management Document, Recommendations for Selecting Chemical Protection Gloves (SPS 01-18) Emergency Protocols: In case of fire, chemical splash, gas leak and spill. These measures ensure that laboratory activities are conducted in a safe, organized, and legally compliant manner, in line with both national and international standards.
PHY	Phytowelt is a certified S1-Laboratory and is managed in full compliance with national legislation (Germany). The company applies a structured approach to health and safety in our research laboratories and the fields where our plants are cultivated for propagation (mother culture) and R&D. We have regular training for our staff and students by our certified lab and field personal.
A21	Safety training is mandatory at the company focused on sampling in the field and correct use of office tools, mainly computers. Information on workplace in public open and visible. Emergency training is performed periodically.
ONERA	At ONERA, laboratory safety begins with a professional risk assessment, in which the manager, who is the designated health, safety, and environment officer, participates. A safety action plan illustrates the priorities assigned to various areas (fire, chemistry, laser, etc.). Safety instructions, human resources, and budgets are allocated for both

	physical risks and psychosocial risk prevention. Safety awareness training begins when new employees are welcomed. Information on safety and risk prevention are provided by the Health, Safety and Environment department. Related documentation and process are available on the ONERA portal.
EVO	Development of KPIs (WP4) and Design of NBS business models and tailored ecological finance instruments (WP5). No physical experiments take place, no direct impact on the environment and ecosystems.
MIC	Safety training is mandatory and provided to access and use the workshop and the microfluidics lab. Specific training is given to the users on the machines and instruments they need to use to fulfil their tasks. Relevant documentation is available First aid kits are signalled to labs' users and regularly checked and maintained.
INERIS	Ineris is classified as level 1 laboratory according to the French national legislation.
GIG-PIB	Health and safety issues for staff are generally regulated in the Integrated Management System procedures and work regulations (procedure: Zarządzenie nr 10 Dyrektora GIG z dnia 25.04.2023 r. w sprawie wprowadzenia "Regulaminu Pracy Głównego Instytutu Górnictwa"). Laboratory work at the Central Mining Institute-National Research Institute (GIG-PIB) is carried out by the Environmental Monitoring Department, which conducts comprehensive activities covering the monitoring of all environmental components, with particular emphasis on groundwater and surface water, wastewater, water extracts, soil and land, as well as waste. The research is conducted in laboratories operating under a quality management system compliant with the PN-EN ISO/IEC 17025:2018-02 standard, implemented since 1997 and confirmed by accreditation from the Polish Centre for Accreditation (PCA), certificate no. AB 145. The scope of accredited activities includes sampling of surface water, groundwater, wastewater, soil, and land, as well as a wide range of physico-chemical analyses of environmental samples. The laboratories also perform analyses of municipal and industrial waste, mineral binders, alternative fuels, and other test materials. GIG-PIB applies a structured approach to health and safety in research environments, based on the following key principles: Mandatory training for all personnel involved in laboratory activities, covering general safety, risk awareness, and proper use of personal protective equipment (PPE). Systematic risk assessment to identify and minimize chemical, biological, and procedural hazards. Strict enforcement of PPE use and compliance with safety protocols. Clearly displayed emergency plans and safety instructions in all laboratories and research facilities. Access to updated internal documentation (manuals, procedures, and safety data sheets) for all laboratory personnel.

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	Entry to laboratories is restricted to authorized and trained personnel holding valid access cards to the building and laboratory areas.

Table 3 - The safety classification of the laboratory used

Partner	Description
UMLP	similar
CRES	Health and safety protocols are implemented in line with the Greek legislation and EU standards
UNIBO	Health and safety protocols are implemented in line with Italian legislation (D.Lgs. 81/08) and EU standards. Mandatory training is required before any field and laboratory work begins. Risk assessments are systematically carried out, PPE usage is enforced, and emergency instructions are posted in all research areas. Documentation is accessible via the university intranet.
CSIC	At CSIC, worker health and safety are prioritized through the Occupational Risk Prevention Unit, which coordinates risk prevention services nationwide. New or reassigned staff are informed about general and specific workplace risks, safety measures, and emergency procedures. Initial training is provided via Moodle, with ongoing training available both online and in person. Medical check-ups related to occupational risks are offered, especially for vulnerable situations like pregnancy or breastfeeding. Employees must follow safety protocols, use equipment properly, and report any health or safety risks. CSIC also has a protocol to address workplace harassment.
LGI	Health and safety protocols are implemented in line with the French legislation and EU standards.
A21	Safety training is mandatory at the company focused on sampling in the field and correct use of office tools, mainly computers. Information on workplace in public open and visible. Emergency training is performed periodically.
ONERA	ONERA's Environmental Safety Management System (ESMS) provides a framework defining the rules for integrating safety and environmental concerns into the organization's activities, in order to reduce exposure and control impacts, and thus reconcile the organization's operational requirements. The achievement of these commitments is based on the implementation of our ESMS, which includes: • periodically updated objectives; • a functional and hierarchical human resources organization, notably through the establishment of a health, safety, and environment delegation chain; • an analysis of the occupational risks involved in our activities; • monitoring and anticipation of regulatory obligations using our software tools; • training our employees to provide the skills necessary for their roles and responsibilities; • management of co-activities induced by external companies; • integration of environmental safety clauses into contracts and procurement; - an evaluation and monitoring of the ESMS performance through the implementation of an internal audit system and indicators.

	These commitments apply to all our research activities and at every level of the organization. ONERA does not currently pursue certification in this area. However, the implementation of ONERA's ESMS is based on a voluntary approach based on the ISO 45001 standard (occupational health and safety management).
EVO	Development of KPIs (WP4) and Design of NBS business models and tailored eco-logical finance instruments (WP5). No physical experiments take place, no direct impact on the environment and ecosystems.
MIC	Safety and emergency training (incl. Fire training) is dispensed to every employ-ee.
INERIS	similar
GIG-PIB	At the Central Mining Institute – National Research Institute (GIG-PIB), employee health and safety are a top priority. All safety activities are managed in line with national regulations and overseen by the Occupational Health and Safety (BHP) unit. Key safety principles at GIG-PIB include: • All new and reassigned staff receive information on general safety rules, workplace risks, and emergency procedures. • Safety training at the workstation and regular OHS courses are mandatory for all employees. Training may be conducted on-site or online, depending on the job. • Laboratory staff must undergo regular medical check-ups, especially if exposed to hazardous substances. • All employees must follow safety procedures, use equipment correctly, and report any health or safety risks (procedure: Health and safety issues for staff are generally regulated in the Integrated Management System procedures and work regulations and procedures: PS 6.08 Identyfikacja zagrożeń i ocena związanego z nimi ryzyka zawodowego i szans dotyczących BHP, PS 6.09 Nadzorowanie prac i działań związanych z zagrożeniami dla zdrowia lub życia ludzi and PS 8.01 Monitorowanie i pomiary procesów, zanieczyszczeń wprowadzanych do środowiska oraz stanu bezpieczeństwa i higieny pracy).

Table 4 - the safety classification of the host institution used

3.2 Artificial intelligence

Any use of AI systems or techniques should be clearly described in the project and you must demonstrate their technical robustness and safety (they must be dependable and resilient to changes).

The approach must be built upon the following key prerequisites for ethically sound AI System:

- Human agency and oversight - AI systems must support human autonomy and decision-making, enabling users to make informed autonomous decisions regarding the AI systems.
- Privacy and data governance - AI systems must guarantee privacy and data protection throughout the system's lifecycle.
- Transparency - All data sets and processes associated with AI decisions must be well communicated and appropriately documented. AI systems must be explainable and open in the communication about their limitations.

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- Fairness, diversity and non-discrimination - Best possible efforts should be made to avoid unfair bias (e.g. stemming from the used data sets or the ways the AI is developed).
- Societal and environmental well-being - The impact of the developed and/or used AI system/technique on the individual, society and environment must be carefully evaluated and any possible risk of harm must be avoided.
- Accountability - Requires that the actors involved in their development or operation take responsibility for the way that these applications function and for the resulting consequences.

WP	Description
1	T1.2 and T 1.3 (Lead by ONERA) concerns image processing based on machine learning algorithms to provide classification maps representing land cover. Data structure and architecture follow FAIR principle.
4	In Task T4.1, AI and machine learning techniques will support the econometric assessment of NBS performance. UMLP will carry out data homogenization to ensure a consistent structure of NBS variables and parameters across all case studies, enabling cross-site comparability for the econometric analysis and AI applications. EVO and GIG will analyze abiotic parameters to identify environmental risks, such as increased plant mortality resulting from climate variability, with the outcomes informing the development of risk-hedging and compensation mechanisms to be further integrated into the decision-support tools in Task T5.1. EVO will lead the environmental-econometric modeling, including the theoretical reformulation of the structural performance model for NBS, multivariate econometric analyses, extrapolation of panel data relations, and Granger-causality testing for multiple time lags and cross-correlations. All AI-driven analyses will be based on anonymized and standardized datasets to ensure full compliance with privacy, data protection and to guarantee robust and comparable results across different case studies based on FAIR principles. The AI models will function under strict human oversight, with all outputs subject to expert validation to ensure that AI supports but does not replace expert judgement. Full documentation will be maintained on data sources, processing methods, model structures, limitations, and the scope of applicability to ensure transparency. Through data homogenization (UMLP) and methodological rigor, efforts will be made to prevent bias and ensure fairness and non-discrimination in AI processes. The AI applications are expected to support societal and environmental well-being by improving knowledge on NBS performance and contributing to sustainable development goals. EVO, UMLP, and GIG will be fully responsible for the development, implementation, operation, and evaluation of AI models in this task. In Tasks T4.2 and T4.3, AI systems will not be directly applied. However, the outputs of the AI-supported econometric analyses from Task T4.1 may serve as input data for further economic valuation of ecosystem services performed by GIG and EVO in T4.2, and for product environmental footprint analyses led by GIG, EVO, INERIS, LGI, and PHY in T4.3. While LGI does not develop or train AI models directly in this task, it ensures that the use of AI-generated insights respects the principles of transparency (by clearly documenting data provenance and model assumptions), fairness (by reviewing outputs for potential socio-environmental biases), and human oversight (by validating results through expert review). LGI maintains responsibility for ensuring that any AI-derived data used in the environmental footprint calculations complies with data governance requirements and contributes to robust, verifiable sustainability assessments. T4.4 (LGI) develops a data architecture enabling interoperability between regional Soil Degradation Observatories (SDOs) and the European Soil Observatory (EUSO). Although LGI does not implement AI models itself, it designs the

	architecture to support downstream applications of ML/AI by third parties (e.g. EUSO). These systems aim to assess soil condition via classification methods (e.g. Köppen-Geiger) and improve the reliability and speed of soil health monitoring. LGI ensures that the architecture supports data privacy, complies with the FAIR principles, and includes metadata standards facilitating explainability and traceability of future AI use. Human decision-makers retain full oversight, and LGI's role is confined to enabling ethically sound, privacy-compliant data flow for AI applications managed by institutional partners.
5	T5.1 (Lead by A21) develops a 3-tier Decision Support System (DST) with Tiers 2 and 3 utilizing Machine Learning and Artificial Intelligence (ML/AI) methods. Specifically, Tier 2 utilizes ML/AI for Weather Derivatives (WDs) in relation to hydro-climate conditions in CSs via correlating long-time series and plant survival risks and Tier 3 the estimated long-term productivity of the two types of poplars for the BioL models. Data structure follows FAIR principles T5.4 (Lead by LGI) develops a NBS digital marketplace, utilizing the results of previous tools that incorporate ML/AI methods. While LGI does not develop proprietary AI tools in this task, it integrates AI-informed insights and indicators—such as cost-efficiency ratios or impact scores—generated in earlier tasks (e.g. T5.1). LGI ensures that these indicators are presented transparently, with source attribution and methodological notes, allowing users to understand and interpret results independently. The marketplace operates under strict human oversight: no decisions are made autonomously by AI systems, and users maintain full control over interpretation and use of AI-derived content. Privacy and data protection are guaranteed by anonymization of any user-contributed content and secure data storage protocols. Fairness is maintained by ensuring accessibility and equal visibility of all eligible NBS solutions regardless of origin, geography, or organisational scale.

Table 5 - Detail on a WP/task level the activities involving the development, deployment and/or use of AI-based systems, when relevant

In these cases, explain for each task how the participants and/or end-users will be informed about:

1. Their interaction with AI
2. Their abilities, limitations, risks and benefits of the proposed AI-system
3. The manner in which decisions are taken and the logic behind them.
4. Details on the measures taken to avoid bias in input data and algorithm design
5. Detailed explanation on the potential ethics risk and the risk mitigation measures.
6. If relevant, provide copies of ethics approvals.

Detail in which task the deployment of AI could potentially stigmatize or discriminate against people. If relevant, detail the measures set in place to avoid this.

Detail in which task the deployment of AI system/technique interact, replace or influence human decision-making processes. In such cases please provide 1) Justification of the need for developing/using this particular technology as well as 2) Assessment of the ethics risks and detailed description of the measures set in place to mitigate the potential negative impacts during the research, development, deployment and post-deployment phase.

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WP	Description
1	T1.2 and T 1.3 (Lead by ONERA) concerns image processing based on machine learning algorithms to provide classification maps representing land cover. Data structure and architecture follow FAIR principle.
4	The deployment of AI takes place in Task T4.1, where EVO, UMLP and GIG apply ML and econometric models to fully anonymized environmental and economic datasets related to NBS. No personal or sensitive data is processed, eliminating risks of stigmatization or discrimination. Data homogenization (UMLP) minimizes bias by ensuring consistency across sites. The AI models support, but do not replace, expert decision-making, providing predictive insights to inform risk assessment and policy design (T5.1). The use of AI is justified by the complexity of multivariate relations that exceed the capacity of conventional analysis. Ethical risks, such as potential model bias or misinterpretation, are mitigated by full human oversight, expert validation, transparency of data and methods, and clear communication of model limitations. AI models will not be used in any automated decision-making, but strictly as decision-support tools, ensuring accountability and safeguarding stakeholder interests. In Task T4.3, LGI incorporates AI-supported outputs from upstream econometric models (Task T4.1) into environmental footprint analyses without developing or applying AI directly. Participants and end-users are clearly informed that any AI-generated indicators (e.g., NBS impact estimates) are supportive tools, not autonomous decision-makers, and are always reviewed by human experts before inclusion. LGI provides transparent documentation on the source, methodology, and limitations of these AI-informed data to ensure interpretability and user awareness. Bias mitigation is ensured through reliance on validated, standardised, and anonymised datasets provided by partners (UMLP, EVO) who apply harmonised preprocessing methods. Ethical risks—such as over-reliance or misinterpretation—are mitigated through expert validation, clear labelling, and disclaimers in outputs. No AI ethics approvals are required for LGI in this task, as all AI activities are managed upstream under partner responsibility. T4.4 (LGI) focuses on the design of a data architecture that enables secure and standardised data exchange between regional Soil Degradation Observatories and the European Soil Observatory (EUSO), supporting downstream AI-based soil classification (e.g., via Köppen-Geiger methods) to be deployed by third parties. End-users do not interact directly with AI through LGI's systems, but are informed via technical documentation that the infrastructure is AI-ready and designed for compatibility with machine learning workflows. LGI embeds FAIR principles and metadata standards to ensure future AI applications are transparent, traceable, and capable of supporting explainability and human oversight. While LGI does not build or operate AI models, its data structuring practices actively prevent bias propagation by enforcing interoperability and data quality standards. The primary ethical risk is misuse of downstream AI; LGI mitigates this through clear documentation of intended usage and system boundaries. No ethics approvals are needed from LGI as it does not develop or apply AI systems.
5	T5.1 (Lead by A21) develops a 3-tier Decision Support System (DST) with Tiers 2 and 3 utilizing Machine Learning and Artificial Intelligence (ML/AI) methods. Specifically, Tier 2 utilizes ML/AI for Weather Derivatives (WDs) in relation to hydro-climate conditions in CSs via correlating long-time series and plant survival risks and Tier 3 the estimated long-term productivity of the two types of poplars for the BioL models. Data structure follows FAIR principles.

	T5.2 and T5.3 developing the core of nature-based financial engineering, address numerous ethical issues pointed out in the EDAPHOS initial proposal, to prevent the asymmetrical information and use of ML/AI to use the contracts for speculation, inflate the market and eventually reduce its reliability. Specifically, the foundational and eligibility principles and standards of T5.2 for new EDAPHOS Treasuries is undergoing in multiple levels (e.g. SGDs, modelling, legal, economic) and in coherence to other WPs (T4.4) such as the unethical utilization of ML/AI to inflate the value of ESs. Respectively, T5.3 develops a thorough framework on the eligibility criteria of NBS soil bio-remediation investors and the tradability of contracts in order to prevent excessive trading frequencies via ML/AI that tend to inflate temporarily the contracts' value for short-term speculation (the "pump and dump" phenomenon). T5.4 (Lead by LGI) develops a NBS digital marketplace, utilizing the results of previous tools that incorporate ML/AI methods, which integrates AI-informed outputs from previous tasks (notably econometric analyses in T5.1) into user-facing decision-support tools. End-users are explicitly informed when interacting with AI-generated indicators—such as solution rankings or impact scores—through labelling, tooltips, and a dedicated methodology section outlining the models used, their purpose, limitations, and assumptions. The platform is designed to ensure user autonomy, with no automated decision-making, and all outputs are subject to expert validation before publication. LGI does not develop AI algorithms but ensures fairness and non-discrimination by verifying data standardisation and ensuring equal representation of solutions across geographies and actors. Ethical risks—such as biased rankings or misinterpretation of model results—are mitigated through transparency, disclaimers, and clear communication on the supportive nature of AI. No ethics approvals are required for this task as LGI does not implement AI but integrates pre-validated outputs from partner-developed systems.

Table 6 - Detail in which task the deployment of AI will impact on stakeholders, participating research subjects and/or end users, when relevant

3.3 Humans

This section refers to project activities involving work with human beings that are not part of the project staff. It thus covers research or study participants, persons concerned by the project activities, etc., regardless of its nature or topic. Attendees at stakeholder meetings are not to be considered as participating research subjects.

Please clarify (with a yes or no) whether there are any of the Adult volunteers:

- Potentially vulnerable individuals or groups:
- Children/minors:
- Persons unable to give consent:
- Does the project activities involve interventions (physical also including imaging technology, behavioural treatments, tracking and tracing, etc.) on the study participants? Yes or No

WP	Description
1	No
2	No

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3	No
4	EVO will work with representatives of the EU Soil Observatory (EUSO) through its active role in the Business Models Cluster of the Mission Soil Platform. GIG-PIB also collaborates with representatives of the EU Soil Observatory, as well as engages with members of the Soil Indicator and Monitoring Cluster to support knowledge exchange and methodological alignment in the area of soil assessment and monitoring. To date, collaboration with EUSO has primarily taken place through online meetings; however, face-to-face interactions are also anticipated in the future. Participants involved in WP4 actively engage in national and international conferences attended by representatives of the scientific and business communities, particularly in the fields of biotechnology and environmental engineering, as well as by local government officials and NGOs. These interactions foster knowledge exchange and support the development of practical, stakeholder-informed approaches to soil-related innovation.
5	EVO will work with representatives from the financial sector to test the willingness of potential early adopters to create a commercial financial instrument on soil bioremediation -as developed in T5.2 and T5.3- that are compliant to the EU Taxonomy

Table 7 - project activities involving work with human beings

If yes on any of the questions above please specify or provide, per task

1) Details on recruitment, inclusion and exclusion criteria and informed consent procedures.
2) Copies of ethics approvals (if required by law or practice)
3) Informed consent forms and information sheets

3.4 Personal data

This issue concerns research activities that involve processing of personal data, regardless of the method used (e.g. interviews, surveys, questionnaires, direct online retrieval etc.). Personal data refers to information relating to an identified or identifiable natural person. An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person (Article 2(a) EU General Data Protection Regulation 2016/679 (GDPR)).

Examples: name, address, identification number, pseudonym, occupation, e-mail, CV, location data, Internet Protocol (IP) address, cookie ID, phone number, data provided by smart meters, data held by a hospital or doctor. Ad hoc lists of names and e-mails used, for example, to organise stakeholder meetings are not considered to fall under the category of personal data. In research, personal data processing normally covers any project that uses data for research purposes.

Please clarify (with a YES or NO) whether the project will involve the collection or processing of personal data.

- If YES: Does it involve the processing of special categories of personal data (e.g. sexual lifestyle, ethnicity, genetic, biometric and health data, political opinion, religious or philosophical beliefs)? YES or NO
- If YES on any question, please specify the type of the data collected and the nature of the processing of this data per task:

Furthermore, please specify or confirm:

- 1) Provide details of the technical and organizational measures to safeguard the rights and freedoms of the participants/data subjects. These must include the security measures to prevent unauthorised access to personal data.
- 2) Confirm that project-specific data protection policy and/or the contact details of the data protection officer are available (these must be provided to the participants).
- 3) Confirm that the data controller has a lawful basis for the data processing and that a) the appropriate technical and organizational measures are in place to safeguard the rights of the data subjects b) permission by the owner/manager of the data sets (e.g. social media databases) (if applicable) and c) Informed Consent Forms + Information Sheets + other consent documents are available (if applicable)

Partner	**Please clarify (with a YES or NO) whether the project will involve the collection or processing of personal data**
UMLP	Rules in place at UMLP The General Data Protection Regulation (GDPR) of 27 April 2016 governs the use of personal data on the territory of the European Union. In line with the French "Informatique et Libertés" law of 6 January 1978, it aims to strengthen the rights and control of data subjects over the use of their personal data. To this end, it imposes on the UMLP a certain number of rules to be respected when it uses personal data, in particular the obligation to communicate to the persons concerned certain information that guarantees a fair and transparent use of their personal data. The purpose of this policy at UMLP is to fulfil this obligation. Responsible person For the purposes of this policy, the person responsible for the use of your personal data ("data controller" according to the GDPR) is the UMLP embodied by its president, Hugues DAUSSY. Université Marie et Louis Pasteur 1 rue Claude Goudimel 25030 Besançon cedex Data Protection Officer (DPO) The CFO of the UMLP is the person designated by the UMLP to ensure its compliance with the regulations relating to the protection of personal data and the privileged contact to answer all your questions about the use of your personal data by the UMLP. Déléguée à la protection des données Université de Franche-Comté 1 rue Claude Goudimel 25030 Besançon cedex dpd@univ-fcomte.fr Categories The UMLP only uses personal data that is strictly necessary for the purposes for which they are used. In view of these objectives, the UMLP therefore uses different categories of data (surname, first name, postal and e-mail addresses,

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	identifier, photograph, family situation, level of education, professional life, health, etc.). Recipients In principle, your personal data is only accessible to authorized personnel of the UMLP who participate in the achievement of the purposes pursued by their use. However, your personal data may also be disclosed to third parties in the event of a legal obligation or subcontracting. In any case, these third parties are subject to the same obligations as the UMLP, in particular in terms of transparency, confidentiality and security. These third parties include: • the MESR (Ministry of Higher Education and Research), • the Rectorate of the Academy of Besançon, • the CROUS (Regional Centre for University and School Works), • other higher education institutions in the event of mobility, and • our institutional partners such as the CNRS (National Centre for Scientific Research), the CHU (University Hospital Centre) of Besançon or GBM (Grand Besançon Métropole). Retention periods Your personal data is kept for as long as the regulations require or, failing that, for a limited period of time at least to allow the achievement of the objectives pursued by their use. Rights Depending on the case, you benefit from: • a right to information on the use of your personal data, • a right of access to your personal data, • the right to withdraw your consent to the use of your personal data, • the rights to rectification, portability and erasure of your personal data, and • the rights to restrict and object to the use of your personal data. To exercise these rights (information, access, rectification, portability, erasure, limitation and opposition) you can contact the DPO of the UMLP at the following address: *Data Protection Officer, UMLP, 1 rue Claude Goudimel, 25030 Besançon cedex* or dpd@univ-fcomte.fr.
CRES	Not relevant
UNIBO	Not relevant
CSIC	Not relevant
LGI	Limited use of personal but not sensitive data in WP6 in relation to dissemination and communication tasks and WP7 in relation to project management. The DPO for LGI is Nicolas Bihel. WP6: When it comes to the issue of personal data, participants who are registered to project events, are informed in advance that their consent will be collected for the use of their image in photographs or in videos. Additionally, newsletter subscriptions are managed in full compliance with GDPR, requiring explicit consent and a double opt-in confirmation to validate the subscriber's intention. The project website does not use cookies or collect personal data, ensuring maximum respect for user privacy. Any data collected via communication tools (e.g., the newsletter

	sign-up) is processed solely for the stated purpose and is not shared with third parties **WP7:** contact details of project partners and advisory board members are stored in an Excel file shared on the Teams platform hosted by LGI. For meetings and events, contact details of participants may be collected with the mention of purpose limited to the event and no transfer to third parties, using a form through the Evenium website or Microsoft form.
PHY	Not relevant
A21	Not relevant
ONERA	Not relevant
EVO	Not relevant
MIC	Not relevant
GIG-PIB	All personal data processing activities in the project are carried out in full compliance with Regulation (EU) 2016/679 (GDPR). The data controller is Główny Instytut Górnictwa – Państwowy Instytut Badawczy (GIG). For all data protection matters, participants may contact the Data Protection Officer, at gdpr@gig.eu. The processing of personal data, where applicable, is based on lawful grounds under Article 6(1)(a–f) and Article 9(2)(a–j) GDPR, covering legal obligations, contractual necessity, consent, protection of vital interests, public interest, legitimate interests, and scientific research purposes. Participation and data provision are voluntary; however, failure to provide data may prevent participation in specific project activities. All participants retain the right to access, rectify, delete, restrict, or object to the processing of their data, request data portability, withdraw consent at any time, and lodge complaints with the national supervisory authority (President of the Personal Data Protection Office in Poland). All personal data are processed with appropriate technical and organizational measures in place to safeguard rights and freedoms, including access controls, encryption, anonymization where applicable, secured servers, and regular internal audits. GIG has implemented internal data security procedures under Zarz nr 5 Dyrektora GIG z dnia 20.04.2022 r. w sprawie wprowadzenia "Polityki Bezpieczeństwa Informacji w GIG" to ensure the confidentiality, integrity, and availability of data. Only authorized personnel have access to personal data, and such data are not subject to automated decision-making or profiling. Data will not be transferred to third countries or international organizations unless required by applicable law. Where external datasets are used, necessary permissions from data owners or managers are obtained. If applicable, participants receive detailed Information Sheets and Informed Consent Forms prior to any data collection, which describe the scope and purpose of data processing, legal basis, data protection measures, and contact details of the data controller and Data Protection Officer.

Table 8 - Personal data

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4 Preliminary conclusions and possible issues ahead

As previously stated, there are no ethics issues that need immediate attention, and the partners have confirmed that they are operating within existing regulations. This does not mean, however, that there are no outstanding issues to be addressed or that no new issues will surface later on. There are two that come to mind of the EA and might need to be addressed in the future.

A. This study is innovative and carries out pilot projects that introduce NBS on a small scale. What issues would surface if these NBS are upscaled? And what happens to the toxins absorbed by the plants introduced in the study? How are they managed and disposed of?

B. At this stage of the project there is little mention of third parties. Who are the stakeholders that would be affected by the introduction of NBS and how will they be engaged? One obvious group is the landowners. What concerns do they have and how will they be ad-dressed?