

Ethical questions in terrestrial environments research: applied research for bioproduction

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**Kohti kestävä, terveellistä ja
ilmastoneutraalia
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Topics

1. Definitions and focus
2. DNSH (do not significantly harm the environment)
3. Consistency (with other sustainability goals)
4. Ecosystem as subject

What are “terrestrial environments” (TE)?

- ChatGPT 6.9.2024 “What is the definition of the concept “terrestrial environment” *[additions by JH]*:

“A terrestrial environment refers to any environment that exists on land, as opposed to aquatic or marine environments. It includes all ecosystems and habitats found on solid ground, such as forests, grasslands, deserts, mountains, and tundra. These environments are characterized by the availability of soil, air, and light, which influence the kinds of plants, animals, and microorganisms that can thrive there.

Key features of a terrestrial environment include:

- Land-based ecosystems: Such as forests, savannas, and deserts. *[incl.: agricultural and horticultural environments, including pastures and cultural meadows, parks – typically created by modifying the original terrestrial environment, including land claimed from wetlands, rivers, lakes and seas]*
- Atmospheric conditions: Temperature, humidity, and weather patterns affect life in these environments. *[Hydrology]*
- Soil: The type and quality of soil, which influences vegetation and nutrient availability. *[biota + abiota]*
- Biodiversity: Terrestrial environments support a wide variety of species adapted to life on land. *[notice: populations and communities, ecosystem’s functional integrity]*

These environments contrast with aquatic environments, which exist in bodies of water like oceans, lakes, and rivers.”

about the structuring of this series:

- Aquatic environments
- Terrestrial environments
- Atmosphere and space
 - organisms as species, populations, and communities (vs. animals as subjects with rights)
- Animals
- Naturecultures and society

- geosphere (land),
- biosphere (living things),
- hydrosphere (water)
- atmosphere (air)



RTE principles: in compliance with [The Finnish Code of Conduct for Research Integrity](#) (TENK 2023)

What is research in terrestrial environments (RTE)?

- basic and applied
 - interest in **knowing** about
 - interest in **using** for human needs (technological in its broad meaning)
 - no clear division to basic or applied
- desktop research: theoretical but uses data
- research obtaining data from TE:
 - observational
 - experimental
 - long term or causing (local) long term change, recoverable or non-recoverable (->DNSH)
 - short term, transient change
- consistency with (other than environmental / ecological) sustainability goals
 - **dual use** of results? (intended use for accepted purposes, but adoption also to non-accepted purposes)
 - **sustainability**: many (most?) advances in science have created challenges – along with significant benefits – when applied technologically
 - examples from agriculture: mechanical tilling of soil, breeding of high yielding cultivars, development of chemical plant protection, ...
 - not assessed in, e.g. EU's DNSH protocols for green transition and recovery funding
 - creates an (overwhelmingly?) difficult challenge for ethical assessment of research proposals (goal conflicts, valuing)

Do No Significant Harm (DNSH) assessment

Member States must provide a DNSH assessment for each of the measures in their recovery and resilience plan. No action included in a recovery and resilience plan should cause significant harm to any of the six **environmental objectives**:

1. climate change mitigation
2. climate change adaptation
3. sustainable use and protection of water and marine resources
4. transition to circular economy
5. prevention and control of air, water and soil pollution
6. protection and restoration of biodiversity and ecosystems.

- The Finnish Environment Institute, Syke, has developed guidance and methodologies: [Implementation of the DNSH principle for measures set out in Finland's recovery and resilience plan](#) (SYKEra 3/2022)
- [how to define the significance \(of harm\)?](#)

NENT's¹ Guidelines for Research Ethics in Science and Technology (Norway):

2 Research should be compatible with sustainable development.

Researchers and research institutions have a collective responsibility to contribute to sustainable development and the preservation of biological diversity. **The concept of "sustainability" encompasses economic, social, institutional, and environmental aspects.**

3 Research has a responsibility to contribute to greater global justice.

Research results and their application must be shared with society as a whole, both nationally and globally, and in particular with developing countries. Research must not be oriented in such a way as to exacerbate global injustice. The benefits, drawbacks, and risk associated with research activities and technological development should be shared fairly. As a general rule, the knowledge ensuing from research should be made available to all. Researchers have a responsibility to impart knowledge where such knowledge can make a difference in rectifying imbalances in the distribution of wealth.

-> these can be included as principles, but not in assessment procedures? Possible to develop web-tools for self-assessment when planning the research? (see e.g. ["Reiluustyökalu ympäristötekojen arvioinnin tueksi"](#) and [Tribaldos, T. & Kortetmäki, T. \(2022\). Just transition principles and criteria for food system and beyond. Environmental Innovation and Societal Transitions 43, 244-256.](#)

¹ The National Committee for Research Ethics in Science and Technology, Norway

NENT's principles:

- *Uncertainty, risk, and the precautionary principle*

Research may have far-reaching consequences for health, society, or the environment. It is therefore **important that the uncertainty and risk** that are often accompanying factors when research becomes practical and concrete, **are not neglected**, and that **decision-makers who use scientific knowledge have a thorough understanding** of this knowledge and the context.

→ how to "not neglect" uncertainty and risk in RTE?

→ how to ensure that the decision makers (relying on the RTE results) have "a thorough understanding"

NENT's principles:

8 Researchers must clarify the degree of uncertainty in their research and evaluate the risk associated with the research findings

Researchers must clarify the degree of certainty and precision that characterises their research results. They must be particularly meticulous about clarifying the relative certainty and validity range of their findings. In addition to presenting knowledge critically and in context, **researchers must strive to point out any risk and uncertainty factors that may have a bearing on the interpretation and possible applications of the research findings.**

Communicating the relative certainty and validity of knowledge is part of a researcher's ethical responsibility and effort to achieve objectivity. Where possible, researchers should also use appropriate methods for demonstrating the uncertainty of the research. Research institutions have an obligation to teach these methods to their employees and students.

NENT's principles:

9 Researchers must strive to observe the precautionary principle

Where there is plausible, but uncertain knowledge to the effect that a technological application or a development of a **research field may lead to ethically unacceptable consequences for health, society, or the environment**, the **researchers in the field in question must strive to contribute knowledge that is relevant for observing the precautionary principle**. This means that researchers **must work together with other relevant parties in observing the precautionary principle**. The precautionary principle is defined here as follows: "When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm." This principle is important for a large part of science and technology research, and researchers have a shared responsibility for ensuring that evaluations are based on the precautionary principle and contribute to avoiding or diminishing harm.

Ecosystem as a subject?

- RTE must be consistent with, and apply when relevant, the ethical guidelines in human, and in medical, sciences
 - [TENK's guidelines for ethical review in human sciences](#)
- RTE must be consistent with ethical norms in research using animals (as sentient individuals) as subjects (3(4)R principles: Reduce, Refine, Replace, (Reject))
 - often, these are not (seen) relevant in RTE ([TENK 2023](#))
- emerging ethics: ecosystems are entities with rights?

NENT:

Protection of research subjects

10 Researchers must respect the requirement of freely given, informed consent.

11 Researchers must protect the privacy of their research subjects.

do not include: an ecological community or an ecosystem as an entity with rights

Protection of animals used in research

12 Researchers must proceed with due care and respect animal welfare when preparing and conducting experiments involving animals. Researchers must justify the necessity of the experiment to the responsible supervisory authorities.

13 Researchers must arrange their research in such a way that the use of the research results is not in conflict with fundamental animal welfare requirements.

do not include: a species (or a population) as an entity with rights

Gabrielle Samuel & Christina Richie 2023. Reimagining research ethics to include environmental sustainability: a principled approach, including a case study of data-driven health research. *J Med Ethics* **49**:428–433. doi:10.1136/jme-2022-108489, and references there in:

*Nevertheless, an increasing number of scholars have advocated bioethics readopt a broader perspective that aims to explore the relationships between individuals and the natural environment.^{23–29} They reject that the land and ecosystems are just instrumentally valuable—good because of how humans can use them—but rather argue that our moral sentiments need to extend to the biotic community, to the soils, waters, plants and animals that make up our planet³⁰ since nature is both inherently valuable—good in itself—and because humans are a part of, not separate from, nature.³⁰ Most widely recognised ethical theories acknowledge interconnectedness (with people and communities), and it **makes moral sense to include the biotic community within this moral framework.**³¹ They call for a systems approach that considers individuals, populations and environmental factors in understanding (health) practices and policies (for instance, see Lee ²⁵; also see Richie³²).*

Jan McDonald & Manon Simon 2023. Ethics requirements for environmental research, Australasian Journal of Environmental Management, 30:2, 148-169, DOI: 10.1080/14486563.2023.2217152, p. 154 and p. 162:

[...] developments in environmental ethics which promote less anthropocentric approaches (Palmer, McShane, and Sandler 2014), including recognising the ‘**moral standing**’ (Curzer, Wallace, and Perry 2013;) or **legal rights of ecosystems** (Takacs 2021).

Some conservation practitioners and scholars advocate **extending animal research ethics principles to research on ecosystems** (Marsh and Kenchington 2004). Curzer, Wallace, and Perry propose applying the 3Rs of animal research to environmental research, and adding a fourth R: ‘Refusal’, with the effect that ‘[r]esearch which would harm an ecosystem greatly and which would yield only trivial [or small] gains in knowledge should not be pursued’ (2013, 23–24). Curzer et al. (2013, 56) separately propose a new framing for environmental research ethics which encompasses the animal and ecological principles of refusal, replacement, reduction and refinement, and adds the principle of ‘Animal/Ecological Relaxation,’ meaning:

[W]hen one must choose between (1) a plan that moderately sacrifices the welfare of animals to protect the ecosystem and (2) a different plan that moderately sacrifices the welfare of the ecosystem to protect animals...both options are morally acceptable. (Curzer et al. 2013, 56).

However this framework does not specify which interests – of individual animals or ecosystems – should prevail in case of conflict (A. Palmer and Greenhough 2021) or provide assurances of precaution. **Another approach would be a ‘subject-neutral’ ethics framework** that would include the obligation to ‘[a]nticipate, assess and communicate how the research ...might pose risks to or harm biodiversity, the integrity of natural ecosystems, and the welfare of animals’ (Benčín et al. 2017, 11).

Thank you.