

Environmental impact

Research produces knowledge that hopefully benefits society in a broad sense (technological, ecological, social, economic etc...), but all researchers also engage in activities that have an environmental impact.

The following guidance is designed to aide thinking about the environmental impact that might be relevant to your research discipline.

Guidance on identifying potential adverse environmental impact

Adverse environmental impact associated with research projects not only has the potential to damage ecosystems, societies, and rare environments over the long term, but has the potential to bring both the University and the research process into disrepute, damaging our ability to initiate future research. As such, it is important that any impact is weighed against the longer term good generated by a project.

In accordance with the University's Code of Good Research Practice, research with the potential to alter the environment or for adverse environmental impact must be subject to review through the appropriate faculty ethics committee and formally approved before the research is undertaken.

In addition, it is often a funder requirement that potential adverse environmental impact is considered as part of the ethical review. An extract from NERC's guidance:

"Approval to undertake the research must be granted before any work requiring approval begins. Ethical issues should be interpreted broadly and may encompass, among other things, relevant codes of practice, the involvement of human participants, tissue or data in research, the use of animals, research that may result in damage to the environment and the use of sensitive economic, social or personal data."

Typically, environmental impact will include one or more of:

- The release of chemicals into the environment.
- The release of organisms into the environment.
- The removal, or damage, of resources from the environment, especially where these resources are unique or form an important element of the environmental system. NB: Some material can only be removed under licence e.g. some native species, transfer of soils etc..
- The permanent leaving of detrimental or uncommon materials in an environment.
- Actions that impact on the workings of ecosystems.
- Actions that impact on the wellbeing or livelihoods of people, including the potential bringing of uncommon diseases with researchers into protected communities.
- Aesthetic damage, including visual, noise, and odour pollution.
- Actions that enhance indirect risks by others, for example the disclosure of the location of rare resources, nesting sites, or growing locations.
- Actions that impact on future environmental research, including oversampling, permanently changing an environmental system, and causing a deterioration in relationships with organisations or communities.
- Actions that have the potential to raise public concerns, even when those concerns are unjustified, for example, the obvious carrying of chemicals through public spaces.

This list is not exclusive.

However, if a project does fall into the areas above, or you suspect that other types of environmental impact are possible, the researcher should consider:

- 1) The potential type of impact, including the uniqueness and importance of the resources impacted.

- 2) The magnitude of any potential damage.
- 3) The spatial extent of any potential damage.
- 4) The temporal impact of any potential damage, for example, the time scale that environments will take to return to normal, and the impact during that recovery.
- 5) The recoverability of the environment, or the efforts that would be required to return the environment to normal.
- 6) The likelihood of the impact happening, balanced against the magnitude of impact if it did.

Advice may be sought from the relevant Faculty Ethics Committee.

If there is potential for adverse environmental impact then an application for ethical approval must be submitted. This contains space to outline the risk in terms of the six areas above, and to provide a statement of how the risks will be mitigated, and/ or the way in which risks are covered by current processes. It is accepted that some risks or damage may be justified in the pursuit of a greater good (for example, it may be reasonable to chop down a small number of healthy trees if it gives insights that aid globally in developing disease resistance technologies).

The risks, harms, costs and benefits to the environment will need to be assessed as part of the ethical review, along with the risks and benefits to research participants and the researchers themselves. If there are additional or related risks to individual human participants, these should be detailed on the ethics form.

Considering potential indirect environmental impact

Although research activities vary depending on discipline, all research has an impact on the environment, due to the activities required to generate the supporting data (i.e., use of vehicles, resources, and materials). This indirect environmental impact due to the resources used, the fieldwork carried out, the meetings attended and the conferences where the research was disseminated should not be discounted when planning a programme of research.

Much research has a large carbon footprint or causes other sorts of environmental harm, such as through single-use plastics or unsustainable waste disposal.

- Laboratories typically consume 5-10 times more energy per metre squared than typical academic spaces.
- The pace of data driven innovation raises concerns that digital technology could outpace the world's renewable energy sources.
- Beyond energy consumption, health research uses up natural resources and can produce large quantities of waste. It has been estimated that the life sciences alone account for 2% of the plastic produced worldwide.

Researchers should consider the potential to transfer environmental practices from home to work (or vice versa), related to waste, food, energy or travel.

For example, reducing the use of:

- equipment that has environmental concerns e.g., uses a lot of energy
- paper
- catering for meetings, focus groups etc.
- single use laboratory equipment
- travel for research visits and dissemination, especially long-haul flights.

Whilst the impact of these types of activities do not require ethical approval, researchers have a responsibility to minimise the impact of their work and to make environmentally responsible decisions.

Further guidance

- [A joint Biotechnology and Biological Sciences Research Council \(BBSRC\), Medical Research Council \(MRC\) and Wellcome Trust policy statement on managing risks of research misuse](#)
- [UKRI Environmental Sustainability Strategy](#)