ISEEH2018

9 - 12 SEPTEMBER 2018
IN BUDWEIS, CZECH REPUBLIC

Fourth International Symposium on
Ethics of Environmental Health

Radiation Protection of environment and humans in a harmonic view

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ATTENTION TO THE RADIOLOGICAL PROTECTION OF ENVIRONMENT

1996	*1st Symposium, Stockholm*
1999	*2nd Symposium, Ottawa*
2002	*3rd Symposium, Darwin*
2000-2003	*Euratom FASSET Project*
2001	*IUR Consensus Conference*
2002	*IAEA Ethical Considerations*
2003	*IAEA, UNSCEAR, EC, IUR , Stockholm*
2003	*NEA Report of the 2002 Forum*
2003	*ICRP Publication 91*
2004-2007	*Euratom ERICA Project*
2005	*Creation of ICRP C5*
2007	*ICRP Publication 103*

OBJECTIVES OF THE RADIOLOGICAL PROTECTION OF ENVIRONMENT

The primary aim of the ICRP Recommendations

'to contribute to an appropriate level of protection for people and the environment against the detrimental effects of radiation exposure without unduly limiting the desirable human actions that may be associated with such exposure.' *(ICRP 103)*

The objectives of the protection of the environment

'the global needs and efforts required to maintain biological diversity, to ensure the conservation of species, and to protect the health and status of natural habitats, communities, and ecosystems.' *(ICRP 103)*

DEVELPING A COMMON APPROACH TO PROTECT HUMANS AND NON-HUMAN ORGANISMS

ICRP 91, 2003 *"There is already a need for a broad international basis for evaluating and managing the actual and potential impact of radiation on the environment."*

" . . . a comprehensive approach to the study of the ***effects*** *on, and* ***protection*** *of biota and that this could best be achieved by way of the* ***development of a small set of Reference Animals and Plants.***"

DEVELOPING A COMMON APPROACH TO PROTECT HUMANS AND NON-HUMAN ORGANISMS

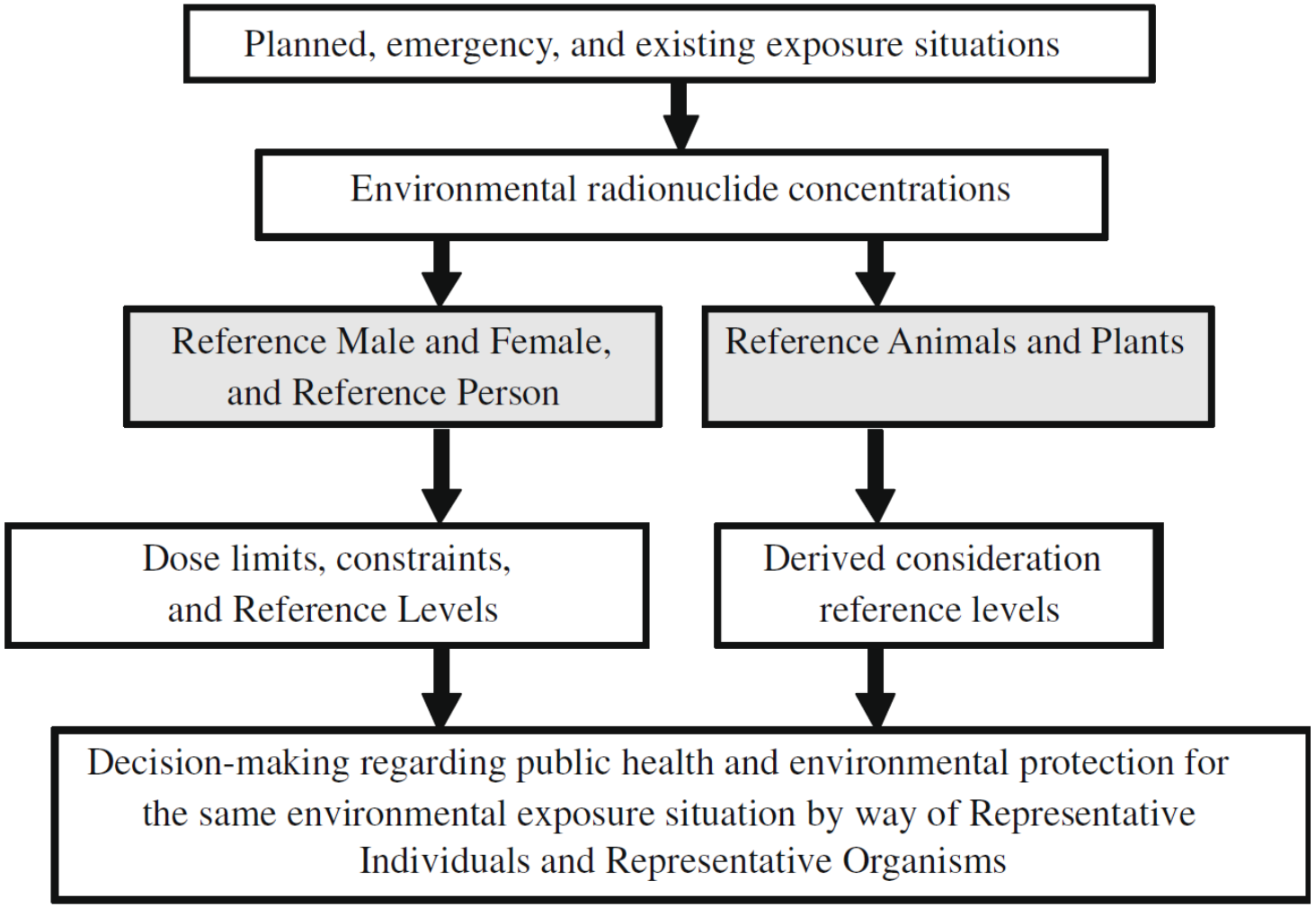
ICRP 108, 2008 *Environmental Protection - the Concept and Use of Reference Animals and Plants*

ICRP 114, 2009 *Environmental Protection: Transfer Parameters for Reference Animals and Plants*

ICRP 124, 2014 *Protection of the Environment under Different Exposure Situations*

ICRP 136, 2017 *Dose Coefficients for Non-human Biota Environmentally Exposed to Radiation*

EVOLUTION OF TWO PARALLEL PATWAYS



From: *R.J. Pentreath – Radioecology, radiobiology, and radiological protection: frameworks and fractures - 2009 J. Environmental Radioactivity.*

General definition of the three exposure situations

PROTECTION TO DIFFERENT TYPES OF EXPOSURE SITUATIONS

Planned exposure situations *resulting from the operation of deliberately introduced sources.*

Emergency exposure situations *resulting from a loss of control of a planned source, or from any unexpected situation (e.g. a malevolent act) that requires urgent action to avoid or reduce undesirable consequences.*

Existing exposure situations *resulting from sources that already exist when a decision to control them is taken (including natural radiation, past activities or following emergencies).*

PROTECTION TO DIFFERENT TYPES OF EXPOSURE SITUATIONS

Planned exposure situations -*discharge and disposal of radioactive waste, decommissioning of installations, and activities for eventual remediation and decontamination of resulting contaminated sites.*

Emergency exposure situations -*as a result of an accident, a malicious act, or any other unexpected situation in which control of the source has been lost, and urgent actions are required in order to avoid or reduce undesirable consequences.*

Existing exposure situations -*the source already exists and a decision on control has to be taken.*

PROTECTION OF HUMANS AND NON-HUMAN ORGANISMS FOR GIVEN SCENARIOS

The principle of optimisation of protection is intended to assist in ensuring that all exposures are kept as low as reasonably achievable, societal and economic factors being taken into account.

- ***Reference Levels*** *are used to inform decisions on protection strategies for humans.*
- ***Derived Consideration Reference Levels*** *are used to inform on the level of effort that should be expended on environmental protection.*

PROTECTION OF HUMANS AND NON-HUMAN ORGANISMS FOR GIVEN SCENARIOS

For given scenarios, site-specific evaluations are needed when developing a decision on management strategy for protection of ***humans and non-human organisms****.*
In literature case studies are considered in emergency and existing exposure situations.

"However, questions remain, such as how to handle decisions on the management decisions needed where people are considered to be protected, but biota may not be**"** (C-M Larsson, 2016)

PROTECTION OF HUMANS AND NON-HUMAN ORGANISMS FOR GIVEN SCENARIOS

How to address decisions in optimising the protection and in taking specific levels of efforts when considering different cases, for example when we consider that:

- *people need protection, and consideration of impact on environment to be evaluated; or*
- *environment needs protection, and people are protected; or*
- *people and environment need protection*

i.e., a level of concentration for a specific radionuclide in aquatic environment can be seen of more concern from the viewpoint of fauna and flora protection than for people, while for another radionuclides the concern might be higher for people than for fauna and flora.

ENVIRONMENTAL ETHICS

Environmental ethics is far from being reducible to a simple specialized form of ethics applied to the environment*. Since by its very existence environmental ethics demonstrates the limitations of the more traditional interhuman ethics and because its reflection does not imply a necessary rejection of the latter, it is indeed perhaps even the most widely existing form of ethics (Fox, 2006. A theory of general ethics. Human relationships, Nature and built environment).*

Environmental protection implies a discussion and a review of ethical values - we cannot simply apply current (interhuman) ethical values to the environment.

THE ROLE OF SCIENCE

It is often claimed that science stands mute on questions of values: that science can help us to achieve what we value once our priorities are fixed, but can play no role in fixing these weightings. That claim is certainly incorrect. Science plays a key role in these matters. ***For what we value depends on what we believe, and what we believe is strongly influenced by science.*** *(Henry P. Stapp, 2007)*

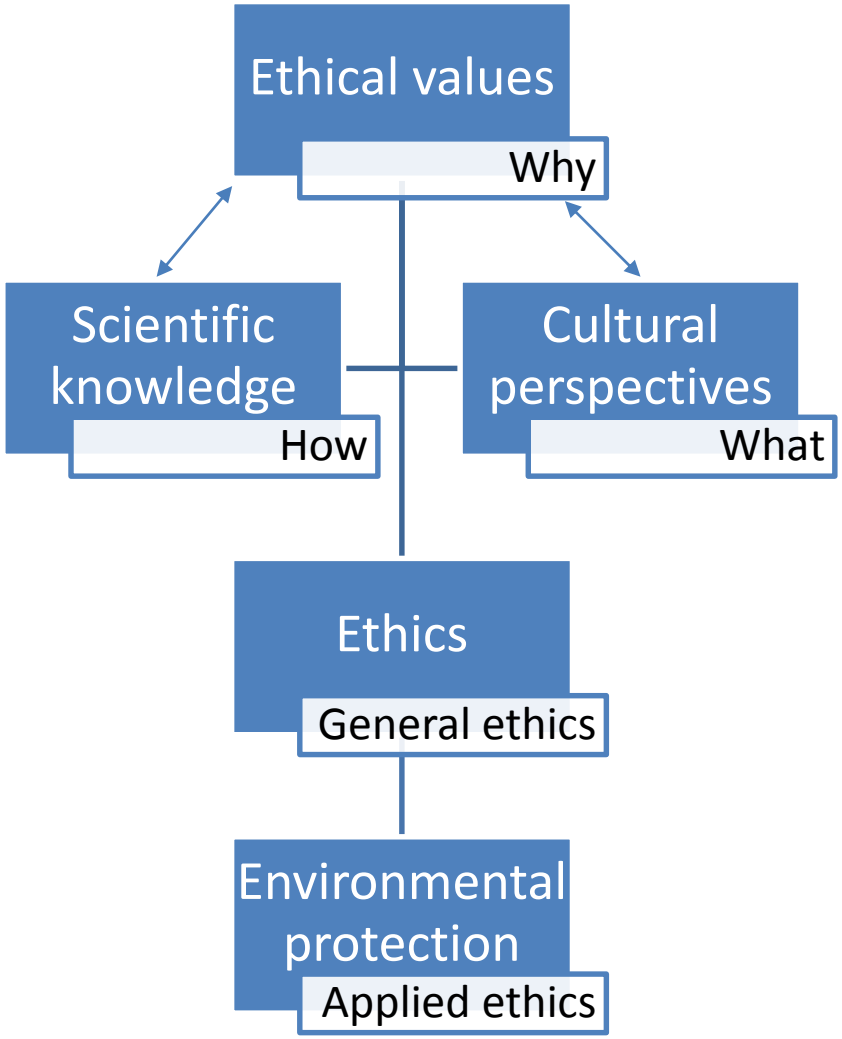
Scientific knowledge plays a dual role: it both influences ethical values and provides practical information on how should we respect them

CULTURAL PERSPECTIVES

- ***Anthropocentrism****: only humans matter*
- ***Weak anthropocentrism****: non-human world matters in order to respect human beings*
- ***Zoocentrism****: every sentient being matters*
- ***Biocentrism****: every life form matters*
- ***Ecocentrism****: ecosystems matter*

Different cultural paradigms offer different perspectives about what is worthy of moral respect. They influence ethical approaches, but should also be shaped by a revisitation of ethical values in the light of scientific data and methodologies.

FROM ETHICAL VALUES TO ENVIRONMENTAL PROTECTION



THE HARMONY BETWEEN BIO/ECOCENTRIC AND ANTHROPOCENTRIC OUTLOOKS

We should develop and promote ethical values that exemplify the two attitudes of respect for persons and respect for nature. The most apt phrase for describing this ***"best possible world"*** *in its simplest terms is:* ***a world order on our planet where human civilization is brought into harmony with nature****. (P.W. Taylor, 1986, Respect for Nature: A theory of Environmental Ethics)*

Once we overcome the anthropocentric cultural paradigms, recognizing the moral value of life beings and ecosystems, a world of harmony between human civilization and nature is a distinct empirical possibility.

HARMONIZATION

*Harmony means the preserving of a **balance between human values and the well-being of animals and plants** in natural ecosystems. In this ethical ideal our role is to direct and control our conduct so that, with regard to animals and plants living in the wild, we comply with non-anthropocentric ethical values. (P.W. Taylor, 1986, 309-310)*

Paradoxically, the best way to respect human beings, in dangerous environmental situations, is to act respecting the environment, for the sake of the environment

RADIOLOGICAL PROTECTION

The practices of human and veterinary medicine also often appear to be progressing along parallel lines, whereas there is probably much to be gained from a more integrated approach. *(Some aspects of veterinary medicine are indeed regarded as being in advance of those applied to humans.)*

*(**R J Pentreath 2016** - Radiological protection and the exposure of animals as patients in veterinary medicine)*

*In the case of **planned exposure** of PET animals for radiological imaging.*

*By considering **that animal has a value** independent of the instrumental values that has for us, we can open a series of ethical questions on how **to preserve its well-being** and have an **adequate respect**.*

ICRP 138, 2018

Ethical foundations of the system of radiological protection

'Where this publication will help the most is in more ethically complex situations. ***One example of this is the protection of animals*** *not normally considered part of the environment.*

We are just beginning to explore this area, which includes, e.g., ***veterinary patients*** *and animals used in scientific experiments.'*

Christopher Clement - on line 3 August 2018, IOP Publishing

To explore this question further, ICRP has established Task Group 107 on Advice on Radiological Protection of the Patient in Veterinary Medicine. The intention is that ICRP would consider the advice of this Task Group in late 2018, and at that time decide on whether to embark on an effort to provide recommendations and guidance on radiological protection of animals as patients in diagnostic, interventional, and therapeutic veterinary medicine.

With respect to protection of the environment and non-human species, all theories can defend the principle that ***radiological protection should not be limited to humans.*** *(D. Oughton, 2015)*

Towards Radiological Protection of humans and non-human organisms in a harmonic view

Thank you for your attention

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