



**RadoNorm**  
Managing risks from radon and NORM

# **NORM management through a social lens**

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10<sup>th</sup> International Symposium on Naturally Occurring Radioactive Material (NORM),  
Utrecht, May 9 – 13, 2022.

**sck cen**



This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 900009.

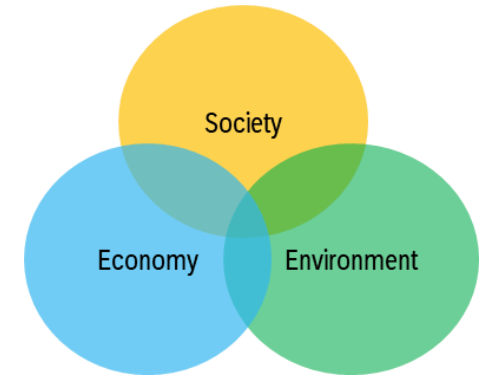
# Why is social science needed in the field of NORM?



Identify perceptions, behaviours interests, concerns, values



Support effective communication and stakeholder engagement



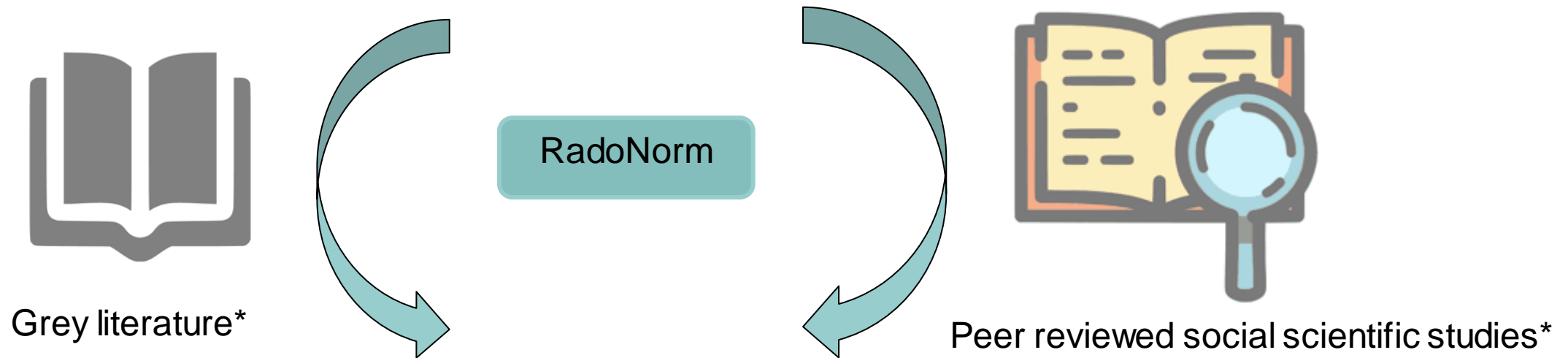
Address the “social” dimension of sustainability and its inter-connections with economy and environment



Facilitate mutual learning, trust and cooperation



- What are the societal challenges related to NORM sites and exposures?
- What is the state of the art in social science studies addressing these challenges?



\* Published in English language

# Keywords for academic literature search

<p><b>NORM</b></p>	<p>(radioactiv*) AND ((natural NEAR/1 (radiation OR "radioactive material")) OR tenorm OR residue OR remainder OR leftover OR waste OR oil OR gas OR water OR phosphate* OR fuel* OR geothermal OR building* OR "flying ash" OR mining OR mine OR "NORM industries" OR "building material*" OR "alum shale" OR (environment* NEAR/0 remediation))</p>
<p><b>Social science research method</b></p>	<p>((field OR case OR comparative OR cohort OR archival) NEAR/2 stud*) OR ((network OR content OR sentiment OR meta OR framework OR media OR discourse OR morphological OR text* OR conversation OR narrative) NEAR/2 analysis) OR ((systematic OR meta) NEAR/0 review) OR ((mixed OR mental OR mixed OR delphi OR q OR economic) NEAR/2 method*) OR "delphi techniq*" OR "focus group*" OR "repertory grid" OR "analytic induction" OR "life history*" OR historiography OR "socio mapping" OR "feeling thermometer" OR "cybermethod*" OR "participatory action" OR bibliograph* OR questionnaire* OR "secondary data" OR "e-research" OR "memory work" OR interview* OR observation* OR ethnography OR phenomenolog* OR RCT OR "randomized controlled trial*" OR workshop OR "public opinion" OR panel* OR omnibus OR poll OR triangulation OR hermeneutic)</p>
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## Document analysis

- international and European legislation, directives and standards
- regional and national legal and technical documents
- international guidelines
- proceedings
- case studies conducted in international projects (notably TERRITORIES, CIDER, MAESTRI).



\*Turcanu C. *et al.* (2022): Societal aspects of NORM: an overlooked research field. J. Environmental Radioactivity



Database  
search

**16.590** unique records  
(**NORM** *and Radon*)



Screening

**14 articles on NORM**

- incl. social science studies (containing primary data and method description)
- excl. indoor radon (N=154) (unless from industrial activities)
- incl. radon in water, U mining and milling and sites contaminated from nuclear weapon industry

Snowballing

**6 additional articles**

- identified from the list of references

\*Tomkiv Y. *et al.* (2021): Collection of existing methods, databases, scales, protocols and other tools – state of the art. Deliverable D6.1 of RadoNorm.

# Social, economic, political, legal and cultural-historical challenges for NORM management

Impact of contamination / remediation

Knowledge and awareness

Trust between societal actors

Risk perception and acceptability

Plurality of values and interests

Historical and cultural context

Communication

Political

Policy and legal

Stakeholder involvement

Evaluation and decision processes

Economic

Ethical



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# Knowledge, awareness & communication

- Limited knowledge/awareness on sources of contamination and radiation among stakeholders and wider publics
  - Limited technical knowledge about remediation issues
  - Lack of timely information
  - Lack of experts' understanding of residents' values
  - Unsuitable objectives, tools or form of communication
- Stakeholders, media and technical experts use **different framings**
  - People **build expertise** as they become engaged
  - **Vulnerable groups** may have less or no access to information
  - Perceived **misinformation** or **lack of transparency**, and **conflicting risk information** provided by different governmental actors causes:
    - **distrust** in responsible actors and risk mitigation measures
    - **distrust** in scientific knowledge.



- ✎ actionable, tailored information and advice
- ✎ consistent culture of honesty and transparency, with regular information and disclosure of environmental data
- ✎ communication of both risks and benefits of environmental remediation options
- ✎ stakeholder involvement in co-development of communication tools
- ✎ community empowerment through co-creating knowledge



# Perception and acceptability of risk

- Different problem framing, vocabulary & understanding of risks
- Perception of radiological risks
- Uncertainties about links between illness history and pollution
- Health impact of NORM and influencing factors
- Impact on socio-economic development of region
- Long-term effectiveness of remedial actions

- NORM legacy sites
  - Concerns **directly linked to radioactivity** or to **more visible pollution**
  - Feelings of “**trapped in pollution**” among residents
  - Negative **health perceptions**, unfair **cost distribution**, **social injustice** and **lack of involvement** increase **risk perceptions**.
  - Perceptions evolve with **time**
  - Not only physical health, but also preservation of **community values** and its social space
- NORM industries
  - Hydro-fracking: NORM associated with “**dangerous**” and “**health hazard**”, but equally with “**natural and/or safe**”
  - Offshore oil and gas: **less than half of workers feel safe** when working with radioactive substances.



# Perception and acceptability of risk

- 👤 social scientific studies clarifying risk perceptions and understandings
- 👤 use of scientific methods for data gathering and reliable instruments
- 👤 inclusion of social considerations in decision making



- Absent or ineffective policies and legal framework for stakeholder involvement
- Complex procedures for involvement
- Changing positions within one stakeholder group
- Limited capacity to express opinions in public
- Limited access to information
- Different needs and expectations
- Absence of continuity
- Unfairly perceived power distribution
- Empirical evidence on the importance and ethical justification of stakeholder involvement
- Unfairly perceived power distribution heightens anxiety and risk perception
- Information on wider societal values, than simply techno-scientific facts, helps people make choices about risk management options
- Critical dialogue is beneficial to all parties
- Need to involve non-governmental actors and public health practitioners in analyzing & managing risks from NORM industries





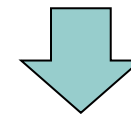
- ✎ stakeholder involvement too often perceived by risk managers as one-way information provision
- ✎ more intensive stakeholder interactions and impact on decisions have the potential to generate solutions that better reflect societal needs and concerns
- ✎ participatory activities should be adapted to the social and cultural contexts
- ✎ effectiveness of policies should receive equal attention to fairness



# NORM management through a social lens

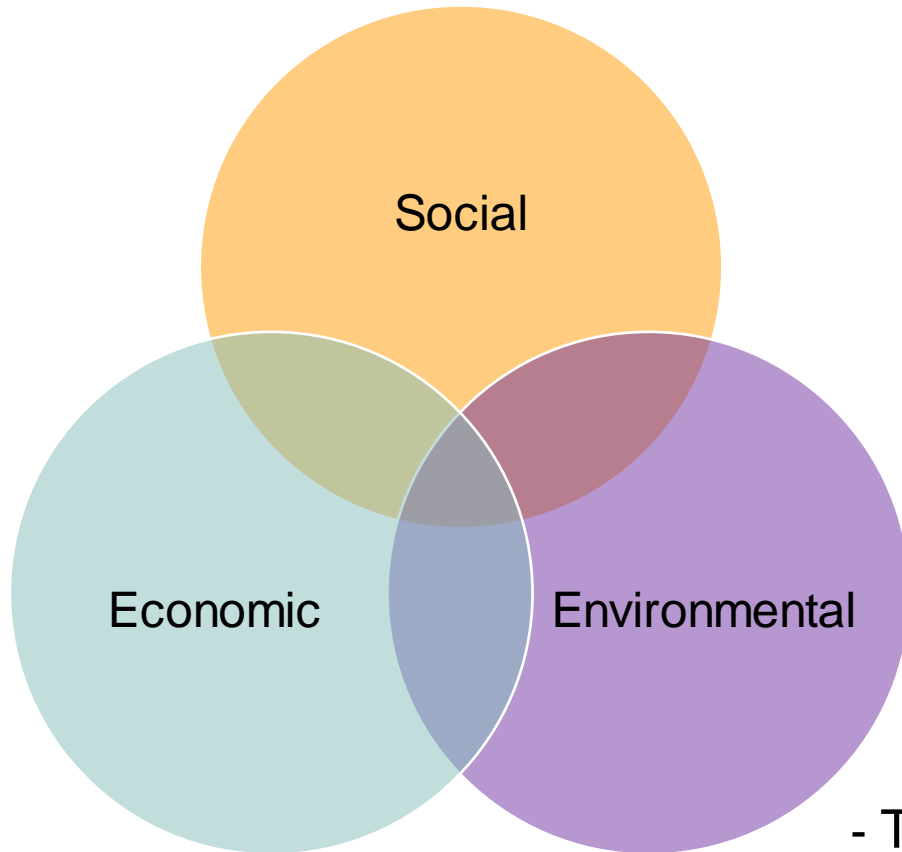


- Social science research is needed to strengthen and broaden the empirical evidence:
  - follow-up and extend older studies;
  - design dedicated research methodologies;
  - address particular NORM situations;
  - longitudinal studies.

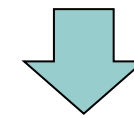


RadoNorm ([www.radonorm.eu](http://www.radonorm.eu))

## NORM management through a social lens



- Social, environmental and economic are inter-connected
- Context-sensitive, balanced approaches are needed, integrating social, environmental and economic considerations



- Transdisciplinarity → RadoNorm ([www.radonorm.eu](http://www.radonorm.eu))
- Social multi-criteria evaluation → MAESTRI (IAEA-ENVIRONET)

This work was supported by the European [name anonymized]RadoNORM project. This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 900009.

We are also thankful to Yevgeniya Tomkiv (NMBU) for support with coding the systematic review articles.

# Thank you for your attention!

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## More information:

Turcanu C., Perko T., Muric M., Mrdakovic-Popic J., Geysmans R., Železnik, N. (2022). Societal aspects of NORM: An overlooked research field. J. Env. Rad.

<https://doi.org/10.1016/j.jenvrad.2022.106827>

