



NOTE

Stakeholder participation in nuclear and radiological emergency preparedness and recovery in Spain: benefits and challenges of working together

To cite this article: Liudmila Liutsko *et al* 2020 *J. Radiol. Prot.* **40** N1

View the [article online](#) for updates and enhancements.

You may also like

- [A High-resolution Multiband Survey of Westerlund 2 with the Hubble Space Telescope. III. The Present-day Stellar Mass Function](#)
Peter Zeidler, Antonella Nota, Eva K. Grebel et al.
- [Electrochemical Pressure Impedance Spectroscopy for Polymer Electrolyte Membrane Fuel Cells: A Combined Modeling and Experimental Analysis](#)
Lutz Schiffer, Anantrao Vijay Shirsath, Stéphane Raël et al.
- [Magnetic nanoparticles and magnetic particle spectroscopy-based bioassays: a 15 year recap](#)
Kai Wu, Jinming Liu, Vinit Kumar Chugh et al.

Note

Stakeholder participation in nuclear and radiological emergency preparedness and recovery in Spain: benefits and challenges of working together

Liudmila Liutsko^{1,2,3,7} , Milagros Montero^{4,5} ,
Cristina Trueba^{4,5}, Roser Sala⁴, Eduardo Gallego^{5,6},
Adelaida Sarukhan¹ and Elisabeth Cardis^{1,2,3}

¹ ISGlobal, Barcelona, Spain

² UPF, Barcelona, Spain

³ CIBERESP, Madrid, Spain

⁴ CIEMAT, Madrid, Spain

⁵ SEPR, Madrid, Spain

⁶ UPM, Madrid, Spain

E-mail: Liudmila.Liutsko@ISGlobal.org

Received 3 October 2019, revised 6 November 2019

Accepted for publication 8 November 2019

Published 21 February 2020



CrossMark

Abstract

Emergency preparedness and response (EP&R) to radiological or nuclear accidents depends on many different stakeholder groups: nuclear and radiological regulators and authorities; institutions and ministries concerned by health, environment and consumption; first-line responders including the police, military, firefighters and health workers; as well as local authorities and nuclear industries. Stakeholders also include the general public, such as people living near NPPs⁸ or affected by previous nuclear or radiological accidents and incidents. Teachers and journalists, bloggers and other social media figures would play a key role in effective dissemination of knowledge and information. NGOs⁹ or civil associations/societies can also be involved in radiation monitoring and protection. The present study describes the role of different research institutions (such as CIEMAT¹⁰, UPM¹¹ and ISGlobal¹²) and of the Spanish Society of Radiological Protection (SEPR) in bringing together the

⁷ Author to whom any correspondence should be addressed.

⁸ NPPs: Nuclear power plants.

⁹ NGOs: Non-governmental organisations.

¹⁰ CIEMAT: Research Center on Energy, Environment and Technology.

¹¹ UPM: Universidad Politécnica de Madrid.

¹² ISGlobal: Barcelona Institute for Global Health.

above-listed stakeholders in Spain to discuss EP&R and identify benefits and challenges of working together. Stakeholder opinions on EP&R, collected mainly in the framework of several European-funded projects, are provided. Remaining barriers and examples of good practices in radiation protection are discussed, as well as recommendations for improving nuclear and radiological emergency preparedness in Spain. The conclusions may be useful for other countries.

Keywords: stakeholders, engagement, nuclear emergency, preparedness, post-accidental recovery, knowledge transfer

1. Introduction

The involvement of stakeholders, including the general population, together with citizen science initiatives, are key aspects to improving nuclear and radiological emergency preparedness. The necessity and benefits of such involvement for the affected population and society were already observed in the aftermath of the Chernobyl and Fukushima accidents (Alexander *et al* 2005, Brown *et al* 2016, French *et al* 2007, Monteiro Gil *et al* 2017, Liutsko and Cardis 2018, Lochard *et al* 2019).

Research institutions in different European countries have undertaken efforts to bring together different stakeholders—professionals of different areas that are directly or indirectly related to nuclear emergency response and recovery—in the framework of international research projects with the aim of fostering decision-making processes in preparedness to and recovery from nuclear and radiological emergencies (EP&R).

The ENGAGE¹³ project has led an evaluation of the impact of past or ongoing participatory activities in radiation protection decision-making processes and a comparative analysis of stakeholder engagement in practice, identifying broader lessons that can be learned and applied in the countries of study and beyond (Pözl-Viol *et al* 2018).

This publication summarises lessons learned from the work realised so far in Spain by research institutions (CIEMAT, UPM and ISGlobal) and the professional radiation protection association SEPR, with local stakeholders on EP&R. They are based on findings of an observational study of seminars, the analysis of stakeholder discussions during several events and individual interviews.

2. Experience in working with local and international stakeholders on RP issues, preparedness for post-accident management and recovery

Different research activities, mainly in the framework of European projects but also under national initiatives, have addressed the development, improvement and application of methods and tools, including the engagement of stakeholders, to strengthen the preparedness for post-accident management and recovery.

¹³ ENGAGE (2017–2019): enhancing stakeholder participation in the governance of radiological risks. Funded under H2020 EJP CONCERT_JTC2016, GA 662287. <https://engage-concert.eu/en>.

A joint effort between research institutions in Spain (CIEMAT and UPM) and the Nuclear Safety Council (CSN) was initiated in the framework of the Euratom research programme, with the EURANOS¹⁴ project and continued in NERIS-TP¹⁵, allowing the development of a coherent framework for post-accident rehabilitation by involving national, regional and local stakeholders (Dubreuil *et al* 2010). The methodology included scenario-based table-top exercises where, through facilitated discussions, the participants drew answers and solutions to improve the management of post-accidental consequences and the transition to the long-term recovery phase (Montero and Gallego 2013).

This framework has been tested and disseminated in preparedness exercises, dedicated workshops, and stakeholder panels under those projects and along with successive research including CURIEX 2013¹⁶, organised by DGPCE¹⁷, PREPARE¹⁸ (Gallego and Montero 2014, Gallego and Montero 2016) and CONFIDENCE¹⁹. Other national actors concerned, such as ISGlobal or SEPR, have joined later on, contributing with their research or activities in the fields of radiation protection, nuclear emergencies, post-accidental remedies and public health, to support the dissemination of the results.

The first attempts to engage Spanish stakeholders started with the multi-national European project EURANOS (Raskob and Hugon 2010), where a national decision-making exercise allowed to discuss with stakeholders the requirements to progress from the centralised management of emergencies towards coordinated assessment and decision-making (Gallego and Montero 2016).

The establishment of the European Technology Platform NERIS²⁰ (Schneider *et al* 2016), in which CIEMAT and UPM participated as founding members, and the launch of the NERIS-TP (Liland and Raskob 2016), further encouraged EP&R efforts in Europe. In Spain, CIEMAT and UPM, in close interaction with CSN, explored tools and strategies for information and communication to foster cooperation between local, national and international stakeholders (Gallego and Montero 2016).

During the PREPARE project (Duranova *et al* 2011), relevant stakeholders from different European countries were engaged to contribute to the development of strategies, guidance, and tools for better management of the contaminated products (Charron *et al* 2016). In Spain, a panel of stakeholders was established, bringing together national authorities and public agencies with scientific and professional associations, research centers and universities to discuss these issues for the first time (Montero *et al* 2015).

Currently, under the CONFIDENCE project, different national stakeholder panels have been organised (Montero *et al* 2019). In Spain, the panel on ‘The articulation of stakeholder participation in the process of preparation for nuclear or radiological post-accident recovery’ was organised and conducted by CIEMAT with the main goal of facilitating the engagement

¹⁴ EURANOS (2004–2009): the European approach to nuclear and radiological emergency management and rehabilitation strategies. Funded under FP6-EURATOM-RADPROT, contract No. FI6R-CT- 2004-508843.

¹⁵ NERIS-TP (2011–2014): towards a self-sustaining European Technology Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery. Funded under FP7-EURATOM-FISSION, GA 269718.

¹⁶ CURIEX (2013): Cáceres Urgent Response International Exercise. Coordinated by DGPCE in cooperation with the Central Government Representative’s Office in Cáceres, and the European Commission.

¹⁷ CSN: Nuclear Safety Council of Spain.

¹⁸ PREPARE (2013–2016): Innovative integrated tools and platforms for radiological emergency preparedness and post-accident response in Europe. Funded under FP7-EURATOM-FISSION, GA 323287.

¹⁹ CONFIDENCE (2017–2019): coping with uncertainties for improved modeling and decision-making in nuclear emergencies. Funded under H2020 EJP CONCERT_JTC2016, GA 662287. <https://portal.iket.kit.edu/CONFIDENCE/index.php>.

²⁰ NERIS: European Platform on preparedness for nuclear and radiological emergency response and recovery. <https://eu-neris.net/>.

of relevant stakeholders in this national post-accident preparedness process and obtain their feedback in terms of critical aspects and uncertainties that arise during the transition phase, in order to better manage the consequences of the accident and plan the recovery (Salas *et al* 2019). Two sessions have been performed in July 2018 and April 2019, bringing together national stakeholders who had already participated in previous panels related to the preparedness and response in a nuclear emergency.

In recent years, the Barcelona Institute for Global Health (ISGlobal) has led some European research projects on radiation protection (SHAMISEN²¹ and SHAMISEN-SINGS²²) in addition to contributing to ENGAGE⁷, with the purpose of bringing relevant stakeholders together to prepare for disaster management (Oughton *et al* 2017, Liutsko *et al* 2018a).

A meeting held by SHAMISEN in Paris, in October 2017, provided the opportunity to actively discuss with relevant stakeholders and obtain feedback for the *Recommendations and procedures for preparedness and health surveillance of populations affected by a radiation accident*, which were later published (Oughton *et al* 2017). Since these recommendations include cross-cutting issues common to other types of accidents, such as communication during emergencies, evacuation, socio-psychological and ethical consequences, the SHAMISEN recommendations can be easily transferred and adapted to other cases (natural, chemical and biological disasters, for example) (Liutsko *et al* 2018a) and involve a large circle of stakeholders, professionals and experts from different areas (Liutsko *et al* 2018b) including citizen scientists (Brown *et al* 2016, Liutsko and Cardis 2018).

A synthesis of work done so far in Spain on fostering stakeholder involvement in radiological protection was presented during the *Workshop on Preparedness to Nuclear and Radiological Emergencies: Keys for Improvement*, organised by SEPR with the collaboration of UPM, CIEMAT and ISGlobal in September 2018 in Madrid (hosted by UPM).

Past and ongoing international projects were presented to local stakeholders—about 40 participants representing a wide spectrum of organisations and stakeholders involved in Emergency Preparedness and Response—followed by group discussions on challenges and key issues related to radiological protection issues in Spain.

From the concerns raised during the workshop, it was clear that efforts must be made to increase the radiation protection culture of the different stakeholders and the population in general, for example, through periodic exercises and analysis of realistic accident scenarios. It was suggested that experts and other stakeholders should interact and cooperate through open networks. Apart from certain technical aspects, the improvements in emergency preparedness and response mainly depend on the participation, motivation and commitment of all parties involved (Gallego *et al* 2019).

3. Challenges and points of improvement for stakeholders' participation in EP&R in Spain

The workshops and individual interviews revealed a series of challenges and issues to be improved, including:

²¹ SHAMISEN (2015–2017): Nuclear Emergency Situations: Improvement of Medical and Health Surveillance. <http://radiation.isglobal.org/index.php/nl/shamisen-project>.

²² SHAMISEN-SINGS (2017–2019): Stakeholders Involvement in Generating Science. <http://radiation.isglobal.org/index.php/es/shamisen-sings-home>.

- Better definition of the role of relevant authorities and stakeholders in case of a nuclear emergency.
- Improve the networking between relevant stakeholders including the general public, NGOs and journalists or mass media agents.
- Provide more adequate and transparent communication between different stakeholder groups to reduce misinformation.
- Prepare communication and provide education / training on the basics of radiation and radiation protection culture to enhance efficiency and inclusiveness of all groups (NGOs, general public and journalists).
- Reduce the gap between theory and practice by working together on emergency plans and simplifying them, with a clear priority for human lives. The opinion of first responders was that it 'seems that those who are writing plans will never implement them in practice'²³. In one of the discussion groups, firemen noted that theoretical or 'ideal' emergency plans frequently do not fit reality since when they are in an emergency, they have little time to consider all aspects. Thus, priorities should be clear and the documents shortened to allow timely action in an emergency.
- Address lack of 'continuity' of work performed at the local authority level due to rotation and possible changes that occur every four years (after political elections).
- Consider demotivation of the general public in issues related to EP&R radiation due to the lack of knowledge on radiation and its risks.
- Address lack of motivation among some professional stakeholders to put efforts in EP&R due to plans to reduce nuclear power plants in Spain (no new NPPs are planned in the future).
- Training in radiological protection among other professionals involved in emergencies is sufficient in theory, but in practice there is a lack of motivation and resources. The lack of interest of some producers of goods and food was pointed out, despite their potential role in promoting a radiological protection culture.
- Not all invited stakeholders attended the workshops, due to agenda problems and possible lack of appeal. And, in parallel, not all stakeholders (including general public representatives) could be invited. This may be due to a fear of possible conflicts and lack of constructive dialogue with certain stakeholders such as some journalists or NGOs members. To avoid these situations, previous preparatory work should be done with the different stakeholders and the moderator's role during the discussions should be reinforced.

4. Good practices and benefits of stakeholders' joint work

- The work done already—efforts to put different stakeholders together and create a network in Spain—was positively assessed by both organisers and participants. 'Before we had not met before in person; it is easier to communicate when you know people personally'.
- Previous positive experiences by attending stakeholders (The Red Cross) underlined the important role of working with the general public to provide reliable channels of information and alert on possible false sources or misconduct in providing information.

²³ Citation provided from the firemen team in the group discussion (personal communication, 2018).

- Concise and clear messages (involving a careful selection of what should be transmitted and how) when working with the general public was mentioned as a good practice to follow.
- Examples, like the training courses and information by the Polytechnic University of Valencia, addressed to all first responders (firemen, health workers, civil protection, environmental agencies), with 2–3 editions per year, was considered beneficial.

5. General discussion

The experience gained with the workshops and interactions with Spanish stakeholders have shown the increasing demand to transform the traditional top–bottom approaches, for the planning and management of post-emergency and recovery situations. The active involvement of key stakeholders, the participation of civil society in decision-making, and their involvement in citizen science seems crucial to improve the EP&R in Spain. Among the issues highlighted in the debates were communication and coordination between relevant actors, the participation of the public in the EP&R, maintaining public trust in different actors and institutions, and ensuring an optimal human health surveillance. Opportunities to involve and gather relevant stakeholders to discuss and work together promoted not only the transfer of new knowledge originated by EU and national projects, but also to the establishment of personal interactions between those need to work together in case of an accident. One of the great limitations to overcome is the lack of continuity. On the one hand, key stakeholders—for example, local authorities—are periodically changing and sometimes it requires additional effort to start again; on the other hand, if there no funded projects, there could be financial limitations to continue with such activities.

6. Conclusions

Spanish research institutions and the SEPR, with the support of European-funded projects, play an important role in organising workshops and other actions related to stakeholder engagement in EP&R. These joint exercises helped to create a network of different stakeholder groups that should work together in case of a nuclear or radiological emergency, even if they normally do not interact. Joint participation of professionals from different areas and backgrounds, from state and non-governmental institutions, promotes a better mutual comprehension and more efficient work in case of a real emergency situation. Notwithstanding, other challenges remain, such as providing a basic knowledge on radiation and its risks to other stakeholders, including journalists and the general public, and doing so in the most inclusive manner.

Findings

The publication of this paper is supported by the ENGAGE project, which is a part of CONCERT. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 662287. However, the context of paper expresses the positions and opinions of its authors only.

ORCID iDs

Liudmila Liutsko  <https://orcid.org/0000-0002-2569-0760>

Milagros Montero  <https://orcid.org/0000-0002-7288-5990>

References

- Alexander C, Burt R and Nisbet A F 2005 Stakeholder involvement facilitates decision making for UK nuclear accident recovery *J. Environ. Radioact.* **83** 297–303
- Brown A, Franken P, Bonner S, Dolezal N and Moross J 2016 Safecast: successful citizen-science for radiation measurement and communication after Fukushima *J. Radiol. Prot.* **36** S82
- Charron S, Lafage S, Van Asselt E, Baptista M, Van Bourgondiën M, Brandhoff P and Durand V 2016 Overview of the PREPARE WP3: management of contaminated goods in post-accidental situation—synthesis of European stakeholders’ panels *Radioprotection* **51** S83–91
- Dubreuil G H, Baudé S, Lochard J, Ollagnon H and Liland A 2010 The EURANOS cooperative framework for preparedness and management strategies of the long-term consequences of a radiological event *Radioprotection* **45** S199–213
- Duranova T, Mustnoner R, Raskob W, Nisbet A, Schneider T, Croteau C and Liland A 2011 NERIS—European platform on preparedness for nuclear and radiological emergency response and recovery XXXIII Days of Radiation Protection Conf. Proc. of Abstracts 46 (Slovakia: Environmental, as) pp 151
- French S, Carter E and Niculae C 2007 Decision support in nuclear and radiological emergency situations: are we too focused on models and technology? *Int. J. Emergency Manage.* **4** 421–41
- Gallego E and Montero M 2014 Preparedness exercises in Spain for post-accident rehabilitation involving regional and local stakeholders *Int. Experts Meeting on Radiation Protection after the Fukushima Daiichi Nuclear Power Plant Accident—Promoting Confidence and Understanding’ (IAEA-IEM 6) (17–21 February 2014) (Vienna: IAEA)*
- Gallego E and Montero M 2016 Experience in Spain with local-national fora for better post-accident preparedness *Radioprotection* **51** S31–4
- Gallego E, Bravo B, Cardis E, García-Puerta B, Liutsko L, Montero M and Sarukhan A 2019 Nuclear and radiological emergency preparedness in Spain: some keys for improvement *5th NERIS Workshop (Roskilde, Denmark, 3–5 April 2019)*
- Liland A and Raskob W 2016 Towards a self-sustaining European platform on nuclear and radiological emergency preparedness, response and recovery. Key results of the NERIS-TP European project *Radioprotection* **51** S1–3
- Liutsko L and Cardis E 2018 P II–3–8 benefits of participation citizen science in recovery programs (post-nuclear accidents) *Occup Environ Med* **75** A45–6
- Liutsko L, Sarukhan A, Fattibene P, Della Monaca S, Charron S, Barquinero J F and Goto A 2018a SHAMISEN SINGS project—stakeholders involvement in generating science (radiation protection) *Arhiv za Higijenu Rada i Toksikologiju* **69** 364–5
- Liutsko L, Ohba T, Cardis E, Schneider T and Oughton D 2018b Socio-economic, historical and cultural background: implications for behaviour after radiation accidents and better resilience *Environmental Health Risks: Ethical Aspects* ed F Zölzer and G Meskens (Oxford, UK: Routledge) ch 3 pp 28–42
- Lochard J, Schneider T, Ando R, Niwa O, Clement C, Lecomte J F and Tada J I 2019 An overview of the dialogue meetings initiated by ICRP in Japan after the Fukushima accident *Radioprotection* **54** 87–101
- Monteiro Gil O, Vaz P, Romm H, De Angelis C, Antunes A C, Barquinero J F and Della Monaca S 2017 Capabilities of the RENEB network for research and large scale radiological and nuclear emergency situations *Int. J. Radiat. Biol.* **93** 136–41
- Montero M and Gallego E 2013 An approach to stakeholder involvement in the preparedness for nuclear and radiological emergency response and recovery in Spain *13th Int. Congress of the Int. Radiation Protection Association (IRPA 13) (Glasgow, Scotland, 13–18 May 2013)*
- Montero M, Trueba C and Sala R 2015 Spanish panel on management of radioactively contaminated foodstuffs, feedstuffs and consumer goods *Final Workshop of the European Research Project*

- PREPARE WP3 on Management of Contaminated Goods after a Nuclear Accident* (Paris: OCDE—Château de la Muette) (12–13 November 2015)
- Montero M *et al* 2019 European scenario-based stakeholder discussion panels, to test their engagement in the decision making process during the transition phase of a nuclear emergency *In 5th NERIS Workshop (Roskilde, Denmark, 3–5 April)*
- Oughton D *et al* 2017 *Recommendations and procedures for preparedness and health surveillance of populations affected by a radiation accident*. SHAMISEN Consortium
- Pözl-Viol C *et al* 2018 *D9.82—Report on key challenges, best practices and recommendations for stakeholder engagement*. H2020 – 662287 ENGAGE project
- Raskob W and Hugon M 2010 Enhancing nuclear and radiological emergency management and rehabilitation: Key Results of the EURANOS European Project *Radioprotection* **45** S1–S262
- Sala R, Montero M, Trueba C, García-Puerta B and Germán S 2019 Social uncertainties in the preparation and planning of the transition phase. Findings from nine national stakeholders' panels *RICOMET Conf. (Barcelona, Spain, 1–3 July)*
- Schneider T, Lafage S, Bardelay J, Duranova T, Gallego E, Gering F and Raskob W 2016 NERIS: European platform on preparedness for nuclear and radiological emergency response and recovery: activities and perspectives *Radioprotection* **51** S5–8