

Note

## SHAMISEN SINGS project – stakeholders involvement in generating science (radiation protection)

Liudmila Liutsko<sup>1,2,4</sup>, Adelaida Sarukhan<sup>1</sup>, Paola Fattibene<sup>5</sup>, Sara Della Monaca<sup>5</sup>, Sylvie Charron<sup>6</sup>, Joan Francesc Barquintero<sup>3</sup>, Vadim Chumak<sup>9</sup>, Takashi Ohba<sup>10</sup>, Koichi Tanigawa<sup>10</sup>, Yuliya Lyamzina<sup>10</sup>, Aya Goto<sup>10</sup>, Yevgenia Tomkiv<sup>11</sup>, Deborah Oughton<sup>11</sup>, Philippe Pirard<sup>8</sup>, Natallia Novikava<sup>12</sup>, Mélanie Maître<sup>7</sup>, Pascal Croüail<sup>7</sup>, Thierry Shneider<sup>7</sup>, An Van Nieuwenhuyse<sup>13</sup>, and Elisabeth Cardis<sup>1,2,4</sup>

*ISGlobal<sup>1</sup>, UPF<sup>2</sup>, UAB<sup>3</sup>, Barcelona, CIBERESP, Madrid<sup>4</sup>, Spain, ISS, Rome, Italia<sup>5</sup>, IRSN<sup>6</sup>, CEPN<sup>7</sup>, Fontenay-aux-Roses, Santé Publique France, Saint-Maurice<sup>8</sup>, France, NRCRM, Kyiv, Ukraine<sup>9</sup>, FMU, Fukushima, Japan<sup>10</sup>, NMBU, Ås, Norway<sup>11</sup>, ISEI-BSU, Minsk, Belarus<sup>12</sup>, KULeuven, Leuven, Belgium<sup>13</sup>*

Citizen-science is a blooming field that provides benefits both to citizens – engaging them in research on topics of concern – and scientists, thus enhancing potential for positive societal changes. The roots of the approach go back hundreds of years, when science was not a paid profession (for example, Benjamin Franklin made his living in another profession, and Charles Darwin was not paid for his journey on the HMS Beagle) (1). Benefits of citizen participation in science include not only the data gathered for the project or institution, but also the information received during the process of participation and networking (2).

Today's technological advances, including mobile apps, facilitate the participation of citizens in science. The use of these tools in radiation protection and monitoring is relatively recent, however, and was mostly developed in the aftermath of the Fukushima accident (3) with the Safecast (4) and D-Shuttle projects (5). SHAMISEN SINGS focuses on citizen participation in science in the aftermath of a nuclear accident (particularly during the long-term recovery) through the use of mobile apps and devices.

### *The SHAMISEN SINGS project goals and structure*

The EU-CONCERT funded SHAMISEN SINGS project aims to explore how citizen science can be used for dose and health/well-being monitoring and information through the use of mobile apps that can be made widely available to the general public. Stakeholder consultations carried out during the project will ensure that citizens can participate in the design and evaluation of these APPs.

The specific objectives of SHAMISEN SINGS project are to:

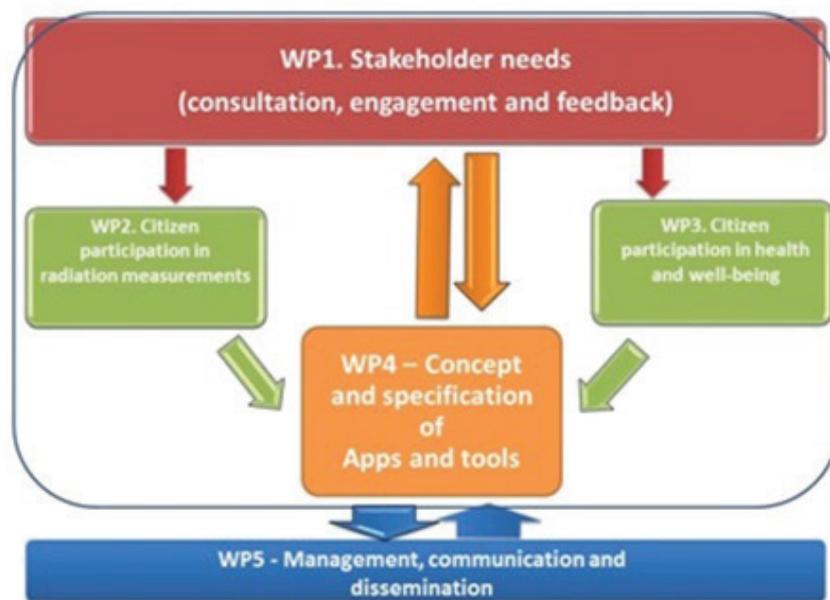
1. Interact with stakeholders to assess their needs and their interest in contributing to dose and health

assessment, and evaluate how new technologies could best fulfill these needs. We will consider lessons from current issues in Fukushima related to the lifting of evacuation orders and medical care for vulnerable populations;

2. Review existing apps for citizen-based dose measurements, and establish minimum standards of quality;
3. Review existing apps/systems to monitor health indicators and develop a core protocol for a citizen-based study on health, social, and psychological consequences of a radiation accident;
4. Build upon existing tools to develop the concept/guidelines for one or more APPs that could be used to:
  - monitor radiation doses to empower affected populations and contribute to radiation assessment after an accident, including visualisation of radiation conditions;
  - log behavioural and health information that can be used, with the appropriate ethics and informed consent, for citizen science studies,
  - provide a channel for practical information, professional support and dialogue
5. Assess the ethical challenges and implications of the apps and citizen science activities through a consensus workshop.

### *Expected results*

SHAMISEN-SINGS brings together an experienced multi-disciplinary and multi-national consortium to improve countermeasures for nuclear emergencies and provide important knowledge on stakeholder engagement in radiation protection, including a critical assessment of the benefits and challenges of citizen science. By taking a practical ethics approach and fostering co-reflection



**Figure 1** SHAMISEN SINGS Project structure

between natural and social scientists, the project will strengthen the integration of social science approaches in raising radiation protection awareness. It will also set the basis for facilitating partnerships between residents and professionals through the collection and management of data that can be used by residents, professionals, and authorities for decision making, dose assessment, evaluation of health/social conditions and health surveillance in general, and support in the implementation of BSS (Basic Safety Standards).

#### Funding

SHAMISEN-SINGS is part of CONCERT. This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 662287.

#### REFERENCES

1. Silvertown J. A new dawn for citizen science. *Trends Ecol Evol* 2009;24:467-71. doi: 10.1016/j.tree.2009.03.017
2. Reed MS. Stakeholder participation for environmental management: a literature review. *Biological Conserv* 2008;141:2417-31. doi:10.1016/j.biocon.2008.07.014
3. Liutsko L, Cardis E. Benefits of participation citizen science in recovery programs (post-nuclear accidents). ISEE Young, Freising Germany; March, 2018. [displayed 27 November 2018]. Available at: [https://www.isee-young.eu/fileadmin/ISEE\\_2018/PDF/ISEEYoung2018\\_program\\_final.pdf](https://www.isee-young.eu/fileadmin/ISEE_2018/PDF/ISEEYoung2018_program_final.pdf).
4. Brown A, Franken P, Bonner S, Dolezal N, Moross J. Safecast: successful citizen-science for radiation measurement and communication after Fukushima. *J Radiol Prot* 2016;36:S82-S101. doi:10.1088/0952-4746/36/2/S82
5. Adachi N, Adamovitch V, Adjovi Y, Aida K, Akamatsu H, et al. Measurement and comparison of individual external doses of high-school students living in Japan, France, Poland and Belarus-the 'D-shuttle' project. *J Radiol Prot* 2016;36:49-66. doi: 10.1088/0952-4746/36/1/49