Role of Citizen Monitoring in Post-Accident Recovery : Opportunities, Challenges and Lessons Learned from Fukushima

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A wide area of Fukushima Prefecture and neighboring prefectures was contaminated by radioactive materials released due to the accident at the Fukushima Daiichi Nuclear Power Plant that occurred on March 11, 2011. As such, Radiation exposure and contamination has become an important social issue. Radiation dose is one of the important factors for the government to determine the target areas for decontamination and the criteria for evacuation and lifting of evacuation orders, as well as for the affected residents to consider where and how to live. Accurate information on radiation doses are necessary for government policy makers and affected residents when rebuilding their lives in the affected areas.

After the Fukushima accident, a number of radiation measurements programs with various forms of public participation have been conducted. The author and his colleagues, with help of the local residents in Fukushima, used a new type of personal dosimeter (D-shuttle), along with the Global Positioning System (GPS) and Geographic Information System (GIS) to investigate realistic individual external doses in the affected areas in Fukushima and to establish a pragmatic dose estimation tool to assess, manage and communicate the individual external doses among stakeholders. More than 300 Fukushima residents participated in our study. A series of studies conducted separately by the authors and others revealed that the individual external doses measured by personal dosimeter are generally much lower than those determined using a simple model with ambient dose data. Our attempts have demonstrated that during post-accident recovery, the measurement of individual external doses could help the authorities to understand the dose distribution in the population and to determine the need for additional protective measures.

Following the Fukushima accident, some citizen science groups endeavored to fill data gaps, as citizen group members in Japan measured radioactivity in the environment and communicated the results via the Internet. Those citizen monitoring activities played an important role in improving the public understanding of radiation by confirming the reliability of radioactivity measurements in the environment by the government and obtaining data in areas the government does not cover.

Experiences in Fukushima suggested that the public-involved radiation monitoring programs were valuable for understanding the realistic radiation situation and for formulating effective measures for post-accident recovery, but it was also considered that the radiation measurements by the affected residents could be a double-edged sword. The measurement of radiation by residents can be a solution to a problem (e.g., relieving anxiety), but it can also be limited to the discovery of a problem (e.g., discovery of a high dose level or the generation of anxiety). The effective utilization of individual dose measurement obtained by the affected residents during the post-accident recovery phase requires for stakeholders to understand and share the purpose of the measurement and the meaning of obtained data and prepare appropriate mechanism to responding to the residents' concerns caused after communicating the measurement data.