[EJ] Evening Poster | H (Human Geosciences) | H-CG Complex & General

[H-CG26]What scientists should do for reconstruction after Fukushima Daiichi Nuclear Power Plant Accident

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Seven years have passed since the Fukushima Dai-ichi Nuclear Power Plant accident on March 2011. Some local villagers have started returning their own home. Most of suspension on shipment of agricultural products from Fukushima has been released. Scientists temporarily concentrated on Fukushima-related issues are returning to their own research topics although we still need to solve various problems from application levels to pure scientific topics. For example, it is critical for farmers in Fukushima how to recover productivity of decontaminated agricultural lands. Radiocesium (Cs)-bearing microparticles having relatively high specific radioactivity (Bq/kg) had recently been discovered; however, the fate of the Cs-bearing microparticles, e.g., inert or not, is not well understood to date. It is about time for rural planning scientists to propose their own opinions rather than reporting case studies. We had preliminary discussion at ASA, CSSA and SSSA International Annual Meeting in Tampa, USA 2013 by driving a session of "Battles of Soil Scientists in Fukushima, Japan". In addition, we had "Battles of soil scientists for recapturing Fukushima land from Nuclear Power Plant accident. What can we do then?" last year. In this session, we are looking forward to presentations from soil and water sciences to social and agronomic sciences related to interaction of human and nature under the condition of post-nuclear power plant accident.

[HCG26-P03]Cs transfer to rice plants from soil and situation at Iitate Village.

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Iitate Village, located at about 40 km northwest from the Fukushima Daiichi Nuclear Power Plant, was famous for their agriculture before the accident of the power plant occurred in 2011. Agricultural fields were contaminated by radiocesium fallout (^{134}Cs and ^{137}Cs) due to the accident. All the villagers in Iitate Village was forced to evacuate from the village in May 2011. The evacuation order was finally lifted at the end of March, 2017. Since almost all the villagers engaged in agriculture before the accident, they have to face and overcome damages caused by harmful rumors or misinformation. Wiping off such the damages may be very difficult so that it is necessary to continue sending correct information.
We have sent out the correct information to the general public since 2013 by conducting experiments to investigate radiocesium transfer to japonica rice plants from soil after stripping the contaminated top 5 cm soil off at approximate 6 x 10 m strips of a paddy field in Iitate Village. We regularly sampled top soils to measure ^{134}Cs and ^{137}Cs concentration using a Ge semiconductor detector. The concentration of ^{134}Cs and ^{137}Cs in rice plants was also analyzed by a Ge semiconductor detector after harvest. A transfer rate, defined as total radioactive Cs concentration with ^{134}Cs and ^{137}Cs in rice plants relative to that in soil, was very small between 0.009 and 0.037 in each year. The amount of ^{134}Cs was smaller than that of ^{137}Cs because the difference of their half-lives. The transfer rate of brown rice was lower than that of

unhulled rice, meaning that rice husk contained more Cs than brown rice. Transfer rates in 2014 were lower than in 2013. It might be resulted from smaller transfer rates in 2014 because of more Cs fixed by soil and radioactive decay having advanced. Although Cs concentration in some leaves and stems became a little high because of the adhesion of inflow mud including Cs when the experimental field was flooded by Kanto-Tohoku Heavy Rainfall in 2015, the Cs concentration in brown rice was lower than the regulation level made by the Japanese government. It meant that the edible part of rice was less contaminated than the government regulation level with the appropriate amount of potassium and organic matter even if the flooded inflow into the rice paddy filed contained Cs.
The evacuation order was finally lifted in 2017 except for the difficult-to-return zone in southern Iitate Village. As of January 1, 2018, 254 households and 525 people out of more than 5,000 evacuees returned to the village. A Japanese government report in 2015 showed that one third of previous residents intended to go back to the village; however, the present number who already returned to the village was approximately 1/10 of the evacuees. The present situation was a result of evacuees’ mixed feelings whether living outside of the village without any risks of radiation exposures or returning to the village having uneasiness of living in the village with radiation risks and of looking at the mass of polluted soil, resulted from decontamination processes, piled up everywhere in the village. We not only investigated Cs contaminated situations in scientific ways but also showed the results to people who attended study tours in the village to know the real situation. We should continue to perform scientific investigations to offer true information to the villagers already returned back and who did not decide to return yet, and people who might become consumers of farm products in the future.