

Cs transfer to rice plants from soil and situation at litate Village.

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litate 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 (¹³⁴Cs and ¹³⁷Cs) due to the accident. All the villagers in litate 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 litate Village. We regularly sampled top soils to measure ¹³⁴Cs and ¹³⁷Cs concentration using a Ge semiconductor detector. The concentration of ¹³⁴Cs and ¹³⁷Cs in rice plants was also analyzed by a Ge semiconductor detector after harvest. A transfer rate, defined as total radioactive Cs concentration with ¹³⁴Cs and ¹³⁷Cs in rice plants relative to that in soil, was very small between 0.009 and 0.037 in each year. The amount of ¹³⁴Cs was smaller than that of ¹³⁷Cs 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 field contained Cs.

The evacuation order was finally lifted in 2017 except for the difficult-to-return zone in southern litate 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.

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