

Monitoring Radioactive Cs Concentration in a Small Agricultural Pond

KUBOTA, Tomijiro^{1*} ; SHIN, Moono² ; HAMADA, Koji¹ ; HITOMI, Tadayoshi¹

¹National Institute for Rural Engineering, ²Tohoku Agricultural Research Center

Radioactive materials were released over wide areas around the Tokyo Power Fukushima Daiichi Nuclear Power Plant after the accident caused by the earthquake and tsunami on March 11, 2011. Radioactive cesium pollution in agricultural ponds that supply irrigation water in this region was a concern for the restart of farming. Therefore, it is important to determine the movement characteristics of radioactive cesium around agricultural reservoirs. In this ongoing study since June 2013, we measured the concentrations of radioactive cesium in inflow, outflow, and pooled water in a small agricultural reservoir located in the Abukuma Mountains. The area of the pond was 0.37 ha, and its pondage was 7500 m³. The concentration of total radioactive cesium in the water was relatively high, around 1-3 Bq/kg, during the summer, but decreased to 0.2-1.5 Bq/kg after October. However, the concentration of total radioactive cesium of the outflow temporarily increased to 2.9-4.0 Bq/kg, when the water level decreased by 1.2 m in the middle of September. The increase in radioactivity was believed to be due to disturbance of the bottom water and sediment caused by relatively fast water flow. The dissolved radioactive cesium concentration in the inflow was 0.02-0.07 Bq/kg, whereas that in the outflow was 0.02-0.11 Bq/kg; both were considerably lower than the total radioactive cesium concentration. The ratios of dissolved radioactive cesium to total radioactive cesium were 1-5% in the inflow and 1-3% in the outflow. Thus, our results showed a positive correlation between the total radioactive cesium concentration in stored water and that in precipitation that occurred over the previous 5 days.

Keywords: radioactive cesium, agricultural pond, irrigation water