

Attachment 6-2 Simplified measurement procedures for radioactivity concentration of farmland soil

1. Method to determine that the radioactivity (total of Cs-134 and Cs-137) in farmland soil is lower than 10,000 Bq/kg based on the average ambient dose rate at the height of 1 m from the ground surface
 - 1) Measure the average ambient dose rate A ($\mu\text{Sv/h}$) at the workplace (farmland) before starting the work (See Attachment 5 for the measurement method)
 - 2) Select the estimation formula depending on the type of farmland and type of soil as summarized in Table 1.
 - 3) To estimate the radioactivity concentration of Cs in the farmland soil (15 cm in depth), substitute the measurement A ($\mu\text{Sv/h}$) into the formula selected in step 2).

$$(\text{Ambient dose rate } A (\mu\text{Sv/h}) \times \text{Factor } X) - \text{Factor } Y$$

$$= \text{Radioactivity concentration (total of Cs-134 and Cs-137) (Bq/kg)}$$

Example

Radioactivity concentration of Cs in Black soil for a “rice paddy in other areas” when the average ambient dose rate is 0.2 $\mu\text{Sv/h}$ (Estimation formula: E)

$$(0.2 \times 3,340) - 104 = 564 \text{ Bq/kg (Estimated)}$$

Table 1 Selection of estimation formula

Zones	Type of farmland	Type of soil*	Formula**	Factor X	Factor Y
evacuation area	Rice paddy Agricultural field, Orchard, Pasture	Black soil	A	3,250	0
		Non-black soil	B	2,520	0
Other areas	Rice paddy	Black soil	C	3,340	104
		Non-black soil	D	3,610	200
	Agricultural field	Black soil	E	3,330	193
		Non-black soil	F	3,010	138
	Orchard, Pasture		G	2,930	0

* Whether or not the soil of the farmland is black soil can be checked in the soil distribution map on the web site of the National Institute for Agro-Environmental Science (http://agrimesh.dc.affrc.go.jp/soil_db/).

** The conversion factor will change due to radioactivity decay with time. The estimation formula will be revised before the change

becomes significantly large.

Table 2 Lookup table for radioactive Cs concentrations in rice paddies (Black soil) and agricultural fields in the restricted areas, deliberate evacuation areas, and former emergency evacuation preparation areas as a function of ambient dose rates

Ambient dose rate ($\mu\text{Sv/h}$)	Cs concentration (Bq / kg)	Ambient dose rate ($\mu\text{Sv/h}$)	Cs concentration (Bq / kg)	Ambient dose rate ($\mu\text{Sv/h}$)	Cs concentration (Bq / kg)
0.1	325	1.1	<u>3,575</u>	2.1	<u>6,825</u>
0.2	<u>650</u>	1.2	<u>3,900</u>	2.2	<u>7,150</u>
0.3	<u>975</u>	1.3	<u>4,225</u>	2.3	<u>7,475</u>
0.4	<u>1,300</u>	1.4	<u>4,550</u>	2.4	<u>7,800</u>
0.5	<u>1,625</u>	1.5	<u>4,875</u>	2.5	<u>8,125</u>
0.6	<u>1,950</u>	1.6	<u>5,200</u>	2.6	<u>8,450</u>
0.7	<u>2,275</u>	1.7	<u>5,525</u>	2.7	<u>8,775</u>
0.8	<u>2,600</u>	1.8	<u>5,850</u>	2.8	<u>9,100</u>
0.9	<u>2,925</u>	1.9	<u>6,175</u>	2.9	<u>9,425</u>
1.0	<u>3,250</u>	2.0	<u>6,500</u>	3.0	<u>9,750</u>