

Supporting Information

Spatial Distribution and Soil-to-Plant Transfer Factor of Radionuclides in Agricultural Soil around the Barapukuria Coal Mining Site, Bangladesh

Table S1 Locations, depth, latitude and longitude of the collected soil samples

Sample ID	Location	Depth	Distance from coal mine (cm)	Latitude	Longitude
S1	Outside the CMCL area (outside coal yard)	0-5cm	92.7	N25°32'810"	E88°57'391"
S2	Outside the CMCL area	0-5cm	59.4	N25°32'701"	E88°57'403"
S3	Outside the CMCL area (outside the south-gate)	0-5cm	65.7	N25°32'582"	E88°57'602"
S4	Outside the CMCL area pond	0-5cm	94.0	N25°32'696"	E88°57'646"
S5	Outside the CMCL area	0-5cm	134.5	N25°32'760"	E88°57'775"
S6	Outside the CMCL area	0-5cm	160.5	N25°32'817"	E88°57'843"
S7	Outside the CMCL area	0-5cm	197.0	N25°32'881"	E88°57'955"
S8	Outside the CMCL area	0-5cm	352.7	N25°33'946"	E88°57'912"
S9	Outside the CMCL area	0-5cm	117.4	N25°33'002"	E88°57'789"
S10	Outside the CMCL area	0-5cm	104.3	N25°33'025"	E88°57'732"
S11	Outside the CMCL area	0-5cm	91.3	N25°33'090"	E88°57'640"
S12	Outside the CMCL area	0-5cm	46.0	N25°33'025"	E88°57'278"
S13	Res. Area	0-5cm	147.4	N25°32'987"	E88°57'395"
S14	Res. Area	0-5cm	144.2	N25°32'977"	E88°57'390"
S15	Res. Area	0-5cm	149.0	N25°32'990"	E88°57'430"

CMCL = Coal Mining Company Limited

Table S2 Contamination factor of ^{238}U , ^{232}Th and ^{40}K in the soil samples

Soil Code	Contamination factor ^{238}U	Contamination factor ^{232}Th	Contamination factor ^{40}K
S1	0.93±0.23	0.68±0.26	0.96±0.07
S2	1.09±0.27	0.52±0.18	0.95±0.08
S3	0.82±0.25	0.85±0.28	0.98±0.06
S4	1.38±0.37	0.89±0.34	1.04±0.08
S5	1.20±0.35	0.86±0.25	0.74±0.06
S6	0.84±0.29	0.79±0.25	0.97±0.07
S7	0.91±0.33	0.64±0.23	0.89±0.08
S8	1.03±0.40	0.79±0.27	0.88±0.08
S9	1.12±0.43	0.66±0.22	0.79±0.07
S10	0.82±0.27	0.81±0.33	0.80±0.07
S11	1.05±0.33	0.88±0.35	1.03±0.09
S12	0.94±0.31	0.73±0.26	0.80±0.08
S13	0.93±0.36	0.72±0.24	0.99±0.09
S14	1.07±0.37	0.91±0.28	0.94±0.08
S15	0.98±0.34	0.67±0.25	0.90±0.07
Mean	1.03	0.76	0.91

Table S3 Radiation Hazard parameters in soil samples

Sample ID	R_{eq}(Bq/Kg)	D_R (nGyh⁻¹)	AEDE (mSvy⁻¹)	ELCR	(Hex)
S1	368.08	47.79	0.058	0.205	0.274
S2	363.43	46.39	0.056	0.199	0.264
S3	378.79	50.06	0.613	0.214	0.289
S4	418.37	61.15	0.075	0.262	0.354
S5	319.35	52.51	0.064	0.225	0.308
S6	372.68	48.78	0.059	0.209	0.281
S7	343.48	45.10	0.055	0.193	0.259
S8	353.25	50.66	0.062	0.217	0.294
S9	321.28	47.31	0.058	0.203	0.274
S10	324.46	46.49	0.057	0.199	0.271
S11	403.99	55.48	0.068	0.238	0.321
S12	322.44	45.76	0.056	0.196	0.265
S13	379.80	48.96	0.060	0.210	0.282
S14	380.24	55.13	0.067	0.236	0.321
S15	349.79	47.12	0.058	0.202	0.271

Table S4 Radiation Hazard parameters in plant Samples

Sample ID	R_{eq}(Bq/Kg)	D_R (nGyh⁻¹)	AEDE (mSvy⁻¹)	ELCR	(Hex)	(Hin)
C1	103.90	10.19	0.012	0.043	0.056	0.294
C2	113.58	12.14	0.015	0.052	0.067	0.338
C3	88.73	12.10	0.015	0.052	0.070	0.257
C4	112.09	15.89	0.019	0.068	0.092	0.329
C5	95.12	13.12	0.016	0.056	0.075	0.289
C6	128.44	11.64	0.014	0.049	0.063	0.368
C7	112.62	11.23	0.013	0.048	0.062	0.312
C8	79.42	9.79	0.012	0.042	0.056	0.228
C9	121.82	11.44	0.014	0.049	0.063	0.350
C10	89.55	11.49	0.014	0.049	0.066	0.260
C11	130.08	15.63	0.019	0.067	0.089	0.375
C12	102.69	8.63	0.010	0.037	0.024	0.284
C13	80.46	11.45	0.014	0.049	0.066	0.236
C14	123.07	14.75	0.018	0.063	0.085	0.348
C15	110.35	12.74	0.016	0.054	0.072	0.321

Table S5 Pearson Correlation matrix of soil samples

Correlations									
	²³² Th	²³⁸ U	⁴⁰ K	Ra _{eq}	D _R	AEDE	ECLR	H _{ex}	Distance
²³² Th	1								
²³⁸ U	.194	1							
⁴⁰ K	.060	.126	1						
Ra _{eq}	.273	.360	.955**	1					
D _R	.754**	.684**	.452	.697**	1				
AEDE	.758**	.700**	.437	.684**	.998**	1			
ECLR	.750**	.702**	.453	.697**	1.000**	.998**	1		
H _{ex}	.787**	.670**	.395	.650**	.997**	.997**	.997**	1	
Distance	.067	-.113	-.117	-.094	-.002	.006	-.003	.012	1

******. Correlation is significant at the 0.01 level (2-tailed).

Table S6 Pearson Correlation matrix of plant samples

Correlations									
	²³² Th	²³⁸ U	⁴⁰ K	Ra _{eq}	D _R	AEDE	ELCR	H _{ex}	H _{in}
²³² Th	1								
²³⁸ U	-.042	1							
⁴⁰ K	-.356	.118	1						
Ra _{eq}	-.138	.265	.961**	1					
D _R	.666**	.587*	.217	.469	1				
AEDE	.663**	.605*	.185	.433	.993**	1			
ELCR	.674**	.584*	.204	.457	.999**	.993**	1		
H _{ex}	.655**	.626*	.062	.315	.942**	.951**	.940**	1	
H _{in}	-.122	.395	.931**	.988**	.543*	.516*	.531*	.400	1