Supplementary material 1 Selected chemical properties of cultivated field soil and poultry manure used in the pot experiment of forage sorghum (means ± standard error, n = 3)

Property	Cultivated field soil		Poultry manure	
	Measured value	Normal limit*	Measured value	Permissible limit**
pH	8.7 ± 0.1	NA	8.1 ± 0.1	NA
EC (mS/cm)	0.1 ± 0.0	NA	3.8 ± 0.1	NA
Organic matter content (%)	0.9 ± 0.2	NA	31.1 ± 0.3	NA
Cd (mg/kg)	2.9 ± 0.1	3	5.8 ± 1.3	20-40
Co (mg/kg)	35.5 ± 1.1	35	5.3 ± 0.6	10-100
Cr (mg/kg)	134.3 ± 0.7	125	2.5 ± 0.8	50-1750
Cu (mg/kg)	15.0 ± 0.6	105	6.0 ± 1.3	1000-1750
Fe (mg/g)	42.4 ± 0.5	39.2	1.1 ± 0.0	-
Mn (mg/kg)	677.3 ± 3.2	1500-3000	170.0 ± 5.8	-
Ni (mg/kg)	68.1 ± 3.7	40	3.4 ± 0.6	300-400
Pb (mg/kg)	3.5 ± 0.4	160	0.3 ± 0.0	750-1200
Zn (mg/kg)	77.2 ± 1.9	200	1055.0 ± 42.5	2500-4000

EC: electrical conductivity; *: Kabata-Pendias (2011); **: Council of the European Communities (1986)

Supplementary material 2 Regression models for predicting the content of Cd in plants based on the content of Cd in soil and soil properties

Plant	*n*	Model	R^2 (%)	Reference
	35	$Cd_{leaf} = -241.20 + 0.49 \times Cd_{soil} + 27.50 \times pH + 4.21 \times EC\ (mS/cm) + 4.79 \times OM\ (\%)$	43.9	
Sorghum	35	$Cd_{stem} = 545.21 - 0.35 \times Cd_{soil} - 63.34 \times pH - 4.84 \times EC\ (mS/cm) - 0.24 \times OM\ (\%)$	40.9	Present study
	35	$Cd_{root} = -195.37 + 0.62 \times Cd_{soil} + 22.05 \times pH + 7.84 \times EC\ (mS/cm) + 4.29 \times OM\ (\%)$	53.7	
Maize	79	$Cd_{shoot} = 90.1 + 0.24 \times Cd_{soil} - 12.9 \times pH$	17	Tudoreanu and Phillips (2004)
Rye grass	156	$Cd_{shoot} = 35.3 + 0.37 \times Cd_{soil} - 4.9 \times pH$	13	Tudoreanu and Phillips (2004)
Agrostis and Poa species	37	$\log Cd_{plant} = -0.56 + (0.58 \times \log Cd_{soil})$	38	Boshoff et al. (2014)
	37	$\log Cd_{plant} = 0.08 + (0.27 \times \log CaCl_2\ [Cd]_{soil})$	31	
Rice	33	$\log Cd_{grain} = 0.473 \times \log Cd_{soil} - 0.157 \times pH + 0.445 \times \log OM\ (g/kg) - 0.984$	66	Mu et al. (2020)
Wheat	162	$\log Cd_{grain} = 0.28 + 0.44 \times \log Cd_{soil} - 0.18 \times pH$	49	Adams et al. (2004)
Wheat	100	$\log Cd_{plant} = -1.75 + 0.59 \times Cd_{soil} - 0.23 \times OM\ (\%)$	64	Novotná et al. (2015)
Wheat	14	$\log Cd_{grain} = 1.386 + \log Cd_{soil} - 0.279 \times pH$	85	Liu et al. (2015)
Barley	90	$\log Cd_{grain} = 0.04 + 0.21 \times \log Cd_{soil} - 0.23 \times pH$	22	Adams et al. (2004)
	18	$Cd_{grain} = 0.161 - 0.023 \times Cd_{soil} - 0.005 \times pH + 0.012 \times OM$	88	
Barley	18	$Cd_{shoot} = -0.946 + 0.012 \times Cd_{soil} + 0.118 \times pH + 0.031 \times OM$	45	Eid et al. (2022)
	18	$Cd_{root} = -3.339 + 0.298 \times Cd_{soil} + 0.358 \times pH + 0.052 \times OM$	59	
	24	$Cd_{fruit} = 1.41 + 0.005 \times Cd_{soil} - 0.22 \times pH + 0.28 \times OM\ (\%)$	77.7	
Okra	24	$Cd_{leaf} = 2.74 - 0.017 \times Cd_{soil} - 0.31 \times pH + 0.07 \times OM\ (\%)$	92.5	Eid et al. (2021c)
	24	$Cd_{stem} = 0.43 + 0.005 \times Cd_{soil} - 0.05 \times pH + 0.05 \times OM\ (\%)$	77.9	
	24	$Cd_{root} = 1.02 + 0.051 \times Cd_{soil} - 0.13 \times pH + 0.05 \times OM\ (\%)$	89.6	
	18	$Cd_{root} = 0.11 + 0.23 \times Cd_{soil} - 0.04 \times pH + 0.07 \times OM\ (\%)$	49	
Cucumber	18	$Cd_{stem} = -0.56 + 0.02 \times Cd_{soil} + 0.07 \times pH + 0.03 \times OM\ (\%)$	55	Eid et al. (2018a)
	18	$Cd_{leaf} = -0.14 - 0.002 \times Cd_{soil} + 0.02 \times pH + 0.03 \times OM\ (\%)$	56	
	18	$Cd_{fruit} = 0.74 + 0.50 \times Cd_{soil} - 0.15 \times pH + 0.17 \times OM\ (\%)$	76	
	18	$Cd_{pod} = -3.576 - 0.054 \times Cd_{soil} + 0.460 \times pH + 0.099 \times OM\ (\%)$	54	
Kidney bean	18	$Cd_{leaf} = 0.930 + 0.004 \times Cd_{soil} - 0.093 \times pH - 0.002 \times OM\ (\%)$	44	Eid et al. (2020d)
	18	$Cd_{stem} = 1.770 - 0.037 \times Cd_{soil} - 0.174 \times pH + 0.019 \times OM\ (\%)$	51	
	18	$Cd_{root} = 11.361 - 0.138 \times Cd_{soil} - 1.263 \times pH - 0.073 \times OM\ (\%)$	61	
	15	$Cd_{pod} = 4.373 - 0.052 \times Cd_{soil} - 0.480 \times pH - 0.051 \times OM\ (\%)$	60	
Garden pea	15	$Cd_{shoot} = 1.366 + 0.003 \times Cd_{soil} - 0.133 \times pH - 0.020 \times OM\ (\%)$	25	Eid et al. (2020e)
	15	$Cd_{root} = -1.455 + 0.249 \times Cd_{soil} + 0.144 \times pH + 0.042 \times OM\ (\%)$	67	
Tomato	51	$Cd_{plant} = 0.020 + 0.002 \times Cd_{soil} - 0.000008 \times Mn_{soil}$	41	Bešter et al. (2013)
Cabbage	16	$Cd_{plant} = 0.007 + 0.002 \times Cd_{soil}$	44	Bešter et al. (2013)
Carrot	54	$Cd_{plant} = 0.107 + 0.017 \times Cd_{soil} - 0.00007 \times Mn_{soil}$	47	Bešter et al. (2013)
	238	$Cd_{plant} = -0.19 + 0.46 \times Cd_{soil}$	33	
Carrot	238	$Cd_{plant} = 0.89 + 0.42 \times Cd_{soil} - 0.17 \times pH$	45	dos Santos-Araujo et al. (2017)
	238	$Cd_{plant} = 0.90 + 0.42 \times Cd_{soil} - 0.17 \times pH - 0.01 \times OM\ (\%)$	45	
	238	$Cd_{plant} = 0.92 + 0.43 \times Cd_{soil} - 0.18 \times pH - 0.01 \times OM\ (\%) - 0.04 \times Clay\ (\%)$	45	
Eruca sativa	18	$Cd_{leaf} = 0.326 + 0.204 \times Cd_{soil} - 0.070 \times pH + 0.136 \times OM\ (\%)$	81	Eid et al. (2020b)

	18	$Cd_{root} = 1.518 − 0.298 × Cd_{soil} − 0.088 × pH + 0.067 × OM (\%)$	49	
Hop	13	$Cd_{plant} = 0.061 × Cd_{soil} −0.28 × OM (\%)$	51	Novotná et al. (2015)
	293	$Cd_{plant} = −0.06 + 0.39 × Cd_{soil}$	35	
Lettuce	293	$Cd_{plant} = 1.10 + 0.44 × Cd_{soil} −0.18 × pH$	42	dos Santos-Araujo et al. (2017)
	293	$Cd_{plant} = 1.35 + 0.48 × Cd_{soil} −0.18 × pH −0.28 × OM (\%)$	44	
	293	$Cd_{plant} = 1.11 + 0.39 × Cd_{soil} −0.14 × pH −0.22 × OM (\%) −0.14 × Clay (\%)$	47	
Chicory	29	$Cd_{plant} = 0.016 + 0.017 × Cd_{soil}$	60	Bešter et al. (2013)
Endive	26	$Cd_{plant} = 0.089 + 0.032 × Cd_{soil} − 0.014 × OM (\%)$	90	Bešter et al. (2013)
Onion	35	$Cd_{plant} = 0.208 + 0.005 × Cd_{soil} − 0.002 × OM (\%) − 0.027 × pH$	85	Bešter et al. (2013)
Potato	29	$Cd_{plant} = 0.042 + 0.007 × Cd_{soil}$	76	Bešter et al. (2013)
Potato	17	$Cd_{plant} = −0.018 + 2.46 × Cd_{soil} −0.0041 × Clay (\%) + 0.036 × Zn_{soil} + 0.021 × pH:OM (\%) − 0.0056 × Zn_{soil}:pH − 0.37 × Cd_{soil}:pH$	60	Novotná et al. (2015)
Red beet	20	$Cd_{plant} = 0.017 + 0.026 × Cd_{soil}$	67	Bešter et al. (2013)
Spinach	12	$Cd_{leaf} = 0.402 + 0.014 × Cd_{soil} − 0.047 × pH + 0.043 × OM (\%)$	88	Eid et al. (2018b)
	12	$Cd_{root} = 2.144 + 0.060 × Cd_{soil} − 0.294 × pH + 0.130 × OM (\%)$	83	
Corchorus olitorius	15	$Cd_{shoot} = 1.251 + 0.080 × Cd_{soil} − 0.128 × pH + 0.015 × OM$	69	Eid et al. (2020a)
	15	$Cd_{root} = 15.049 + 0.901 × Cd_{soil} − 2.005 × pH − 0.206 × OM$	75	
Urtica dioica	66	$\log Cd_{plant} = 0.26 + (0.24 × \log CaCl_2 [Cd]_{soil})$	10	Boshoff et al. (2014)
	68	$\log Cd_{plant} = −0.13 + (0.69 × \log Cd_{soil}) − (0.87 × \log clay \%)$	47	