

Table A2.1: Range in parameter values used for Sensitivity Analysis - Residential Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Body weight age classes 1-6	kg	5.6 - 19.7	2.4 - 12.1	8.8-28.7	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009.
Body height age classes 1-6	m	0.7-1.1	0.62-1	0.78-1.2	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009. Needed to calculate non-CLEA total skin area.
EF (soil and dust ingestion) age class 1	day yr ⁻¹	180	175	180	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays and a 0-1 year old child does not come into contact with surfaces for first 6 months of
EF (soil and dust ingestion) age classes 2-6	day yr ⁻¹	365	350	365	
EF (consumption of homegrown produce) age class 1	day yr ⁻¹	180	175	180	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays and a 0-1 year old child does not come into contact with surfaces for first 6 months of
EF (consumption of homegrown produce) age classes 2-6	day yr ⁻¹	365	350	365	
EF (skin contact, indoor) age class 1	day yr ⁻¹	180	175	180	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays and a 0-1 year old child does not come into contact with surfaces for first 6 months of
EF (skin contact, indoor) age classes 2-6	day yr ⁻¹	365	350	365	
EF (skin contact, outdoor) age class 1	day yr ⁻¹	180	88	180	No change for maximum values. Minimum values assume child comes into dermal contact with soil outdoors at property 50% of days at property
EF (skin contact, outdoor) age classes 2-6	day yr ⁻¹	365	175	365	
EF (inhalation of dust and vapour, indoor) age classes 1-6	day yr ⁻¹	365	350	365	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays
EF (inhalation of dust and vapour, outdoor) age classes 1-6	day yr ⁻¹	365	175	365	No change for maximum values. Minimum values assume child is outside (1hr per day) at property 50% of days at property
Occupancy Period (indoor) age classes 1-4	hr day ⁻¹	23	20	23	No change for maximum values. Minimum values are reasonable for representing majority of 0 to 6 year old children
Occupancy Period (indoor) age classes 5-6	hr day ⁻¹	19	17	19	
Occupancy Period (outdoor) age classes 1-6	hr day ⁻¹	1	0.5	2	Min and max is a reasonable range for representing majority of 0 to 6 year old children
Soil to skin adherence factor (indoor) age classes 1-6	mg cm ⁻² day ⁻¹	0.06	0.01	0.06	No change for maximum value. Minimum value taken from US EPA (2004) for 1-13 year old children for indoor play . Based on the geometric mean of experimental studies.
Soil to skin adherence factor (outdoor) age classes 1-6	mg cm ⁻² day ⁻¹	1	0.2	1	No change for maximum value. Minimum value taken from US EPA (2004) for 8-12 year old children for wet soil (the more conservative scenario). Based on the geometric mean of experimental studies.
Soil and dust ingestion rate age classes 1-6	g day ⁻¹	0.1	0.04	0.175	Minimum value based on 70% of mean values in USEPA, 2008 (assumes that 30% of 100 mg soil ingested is from off-site sources). Maximum value based on SR3 which notes that a reasonable worst-case estimate is 150-200mg/day.
Inhalation rate age classes 1-6	m ³ day ⁻¹	8.5-13.3	4.8-10.9	8.5-13.3	No change for maximum values. Minimum values are recommended mean inhalation rates from USEPA, 2008.
Max exposed skin fraction (indoor) age classes 1-6	m ² m ⁻²	0.32-0.35	0.17-0.18	0.52-0.59	Minimum values assume face, hands and feet exposed. Maximum values assume face, hands, arms, legs and feet exposed (Values taken from USEPA, 2008 for age classes 1 to 6)
Max exposed skin fraction (outdoor) age classes 1-6	m ² m ⁻²	0.25-0.28	0.1-0.11	0.45-0.52	Minimum values assume face and hands exposed. Maximum values assume face, hands, arms and legs exposed (Values taken from USEPA, 2008 for age classes 1 to 6)
Produce consumption rate	g FW kg ⁻¹ BW day ⁻¹	1	5.00E-01	1.00E+00	No change in maximum values, i.e.90th percentile rates. Minimum values are half the maximum values.
Homegrown fraction	dimensionless	average	none	high	Minimum and maximum values reflect other two options available in CLEA model
Produce soil loading	g g ⁻¹ DW	0.001	5.00E-04	2.00E-03	Min and max values based on 0.5 x and 2 x CLEA value
Porosity, air-filled	cm ³ cm ⁻³	0.2	0.12	0.3	Minimum values assume clay type soil. Maximum values assume sand type soil. Values used taken from Table 4.4 in SR3.
Porosity, water-filled	cm ³ cm ⁻³	0.33	0.47	0.24	
Residual soil water Content	cm ³ cm ⁻³	0.12	0.24	0.07	
Saturated hydraulic conductivity	cm s ⁻¹	0.00356	9.93E-04	7.36E-03	
van Genuchten shape parameter (m)	dimensionless	0.3201	0.2972	0.3509	
Bulk density	g cm ⁻³	1.21	1.07	1.18	
Soil organic matter	%	6	1.00E+00	1.00E+01	Minimum and maximum values considered to give a reasonable range to test uncertainty
Threshold value of wind speed at 10m	m s ⁻¹	7.2	3.6	14.4	Min and max values based on 0.5 x and 2 x CLEA value

Table A2.1: Range in parameter values used for Sensitivity Analysis - Residential Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Empirical function (Fx) for dust model	dimensionless	1.22	0.26	2.55	Minimum and maximum values calculated using minimum and maximum threshold values of wind speed at 10m and Equation 9.4 in SR3.
Ambient soil temperature	K	283	280	284	Minimum and maximum values taken from range given in Section 4.3.1 in SR3.
Building footprint	m ²	28	28	78	No change for minimum value. Maximum value assumes a bungalow building type, table 4.21 in SR3.
Living space air exchange rate	hr ⁻¹	0.5	0.5	0.5	No change
Living space height (above ground)	m	4.8	2.4	4.8	No change for maximum value. Minimum value assumes a bungalow building type, table 4.21 in SR3.
Living space height (below ground)	m	0	0	0	No change
Pressure difference (soil to enclosed space)	Pa	3.1	2.6	3.1	No change for maximum value. Minimum value assumes a bungalow building type, table 4.21 in SR3.
Foundation thickness	m	0.15	0.075	0.3	Min and max values based on 0.5 x and 2 x CLEA value
Floor crack area	cm ²	423.3	423.3	706.5	No change for minimum value. Maximum value assumes a bungalow building type, table 4.21 in SR3.
Dust loading factor	µg m ⁻³	50	25	100	Min and max values based on 0.5 x and 2 x CLEA value
Mean annual windspeed (10 m)	m s ⁻¹	5	4.1	9.3	Minimum and maximum values taken from range given in Section 9.2.2 in SR3.
Air dispersion factor at height of 0.8 m	g m ⁻² s ⁻¹ per kg m ⁻³	2400	2200	3500	Minimum and maximum values taken from Table 9.1 in SR3.
Fraction of site with hard or vegetative cover	m ² m ⁻²	0.75	0.5	1	Minimum and maximum values considered to give a reasonable range to test uncertainty
Depth to top of source (beneath building)	cm	65	30	100	Minimum and maximum values considered to give a reasonable range to test uncertainty
Air-water partition coefficient (Kaw) benzene	cm ³ cm ⁻³	0.116	0.09	0.116	No change in the maximum value. Minimum value based on lowest henry's law constant value given in Table A4, SR7.
Air-water partition coefficient (Kaw) benzo(a)pyrene	cm ³ cm ⁻³	0.00000176	1.76E-06	1.91E-06	No change in the minimum value. Maximum value highest henry's law constant value given in Table A4, SR7.
Diffusion coefficient in air benzene	m ² s ⁻¹	0.00000877	7.98E-06	8.80E-06	Minimum value from table E1, SR7. Maximum value from J&E database
Diffusion coefficient in air benzo(a)pyrene	m ² s ⁻¹	0.00000438	4.16E-06	4.60E-06	Maximum value fromtable E1, SR7. Minimum value assumes that CLEA default value is a median based on max
Diffusion coefficient in water benzene	m ² s ⁻¹	6.64E-10	5.78E-10	7.5E-10	Average absolute error between calculateed and experimental values reported as 13%. Minimum and maximum values reflect this error.
Diffusion coefficient in water benzo(a)pyrene	m ² s ⁻¹	3.67E-10	3.19E-10	4.15E-10	Average absolute error between calculateed and experimental values reported as 13%. Minimum and maximum values reflect this error.
Koc benzene	Log (cm ³ g ⁻¹)	1.83	1.8	1.85	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR7
Koc benzo(a)pyrene	Log (cm ³ g ⁻¹)	5.11	4.99	5.12	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR8
Kow benzene	Log (dimensionless)	2.13	2.1	2.16	Minimum value from Table A7, SR7. Maximum value given assumes that CLEA default value is a median based on min
Kow benzo(a)pyrene	Log (dimensionless)	6.18	6.04	6.2	Minimum and maximum values from Table A7, SR7.
Dermal absorption fraction benzene	dimensionless	0.1	0.05	0.2	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction benzo(a)pyrene	dimensionless	0.13	0.065	0.26	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction arsenic	dimensionless	0.03	0.015	0.06	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction chromium (VI)	dimensionless	0.01	0.005	0.02	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction cadmium	dimensionless	0.001	0.0005	0.002	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction lead	dimensionless	0	0	0.001	No change in the minimum value. Reasonable maximum value given.
Relative Bioavailability soil	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given
Relative Bioavailability airborne dust	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given
Soil-to-plant concentration factor (green vegetables) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.000412	5.24E-05	3.90E-03	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (green vegetables) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00043	1.60E-05	1.10E-02	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (green vegetables) Cd	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.052	1.10E-03	4.4	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (green vegetables) Pb	mg g ⁻¹ DW plant / mg g ⁻¹ DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (root vegetables) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00178	2.73E-05	1.39E-02	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (root vegetables) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.0004	6.00E-05	3.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As

Table A2.1: Range in parameter values used for Sensitivity Analysis - Residential Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Soil-to-plant concentration factor (root vegetables) Cd	mg g-1 FW plant / mg g-1 DW soil	0.029	5.40E-04	3.30E-01	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (root vegetables) Pb	mg g-1 DW plant / mg g-1 DW soil	0.008	0.004	0.016	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (tuber vegetables) BaP	mg g-1 FW plant / mg g-1 DW soil	0.000889	7.33E-06	4.57E-02	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (tuber vegetables) As	mg g-1 FW plant / mg g-1 DW soil	0.00023	2.80E-05	1.80E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (tuber vegetables) Cd	mg g-1 FW plant / mg g-1 DW soil	0.031	5.00E-03	1.10E-01	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (tuber vegetables) Pb	mg g-1 DW plant / mg g-1 DW soil	0.008	0.004	0.016	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (herbaceous fruit) BaP	mg g-1 FW plant / mg g-1 DW soil	0.000508	3.33E-06	2.07E-01	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (herbaceous fruit) As	mg g-1 FW plant / mg g-1 DW soil	0.00033	9.40E-05	2.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (herbaceous fruit) Cd	mg g-1 FW plant / mg g-1 DW soil	0.016	7.70E-04	1.00E+00	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (herbaceous fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (shrub fruit) BaP	mg g-1 FW plant / mg g-1 DW soil	0.00000563	5.63E-07	5.63E-05	In absence of literature values, min and max values based on an order of magnitude below and above the default value. (This range is consistent with the range for BaP in tree fruit)
Soil-to-plant concentration factor (shrub fruit) As	mg g-1 FW plant / mg g-1 DW soil	0.0002	5.40E-05	9.10E-04	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (shrub fruit) Cd	mg g-1 FW plant / mg g-1 DW soil	0.0031	1.70E-03	5.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (shrub fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (tree fruit) BaP	mg g-1 FW plant / mg g-1 DW soil	0.0000469	5.21E-06	4.22E-04	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (tree fruit) As	mg g-1 FW plant / mg g-1 DW soil	0.0011	7.10E-04	1.80E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (tree fruit) Cd	mg g-1 FW plant / mg g-1 DW soil	0.0014	3.20E-04	3.20E-02	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (tree fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Sub-surface soil to indoor air correction factor benzene	dimensionless	10	1.00E+00	1.00E+03	Minimum and maximum values based on Fig A2.1 in VOC handbook, CIRIA C682, 2009
Soil-to-dust transport factor	g g-1 DW	0.5	2.50E-01	8.00E-01	Minimum and maximum values considered to give a reasonable range to test uncertainty
Exposure duration / averaging time	years	6	6.00E+00	7.50E+01	6 years = Average ADE calculated for age classes 1 to 6. 75 years = Average ADE calculated for age classes 1 to 18. Note: no change for cadmium as lifetime averaging used for derivation of SGV.

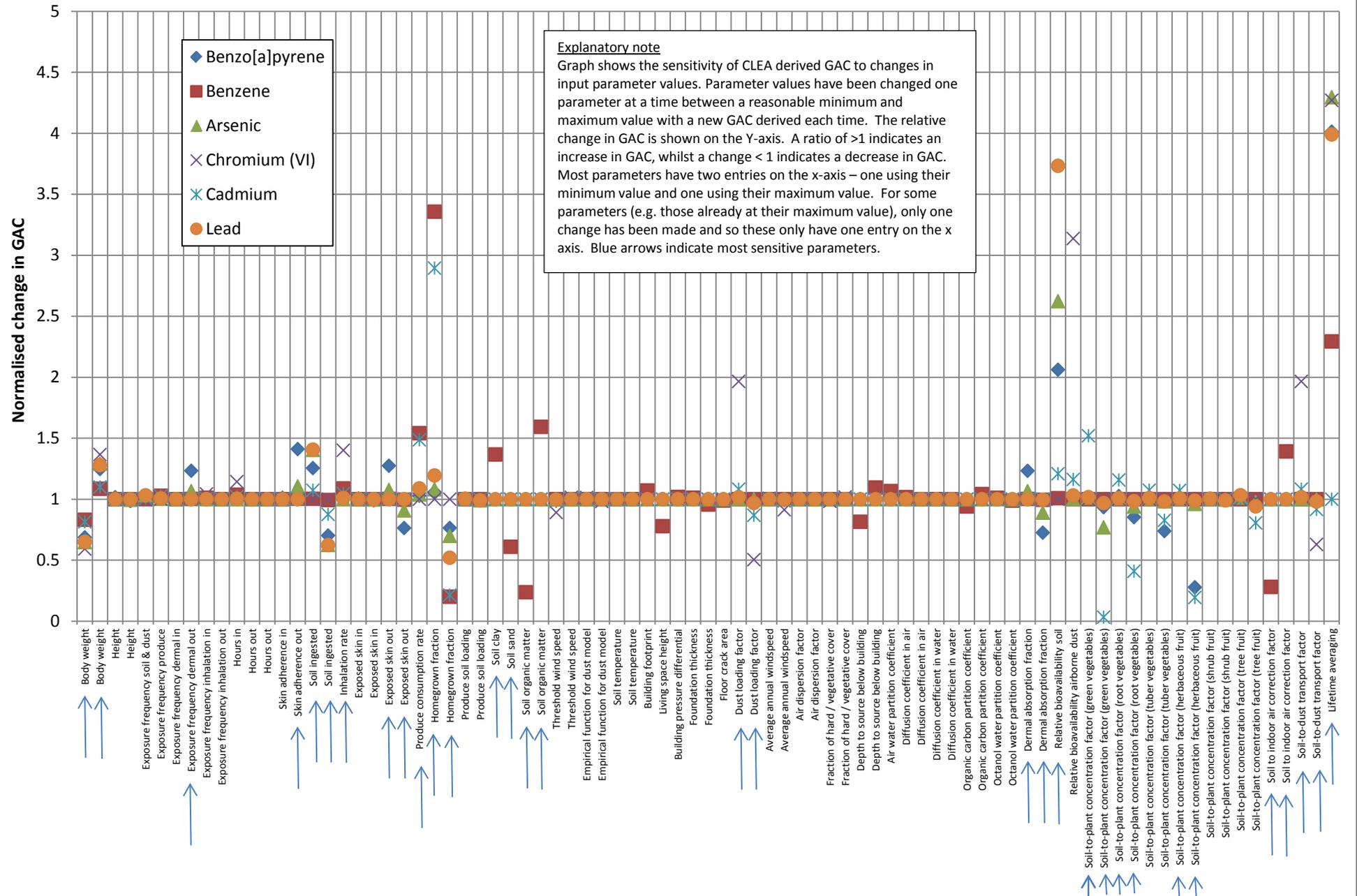


Figure A2.1: Results of sensitivity analysis for residential land-use

Table A2.2: Range in parameter values used for Sensitivity Analysis - Allotments Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Body weight age classes 1-6	kg	5.6 - 19.7	2.4 - 12.1	8.8-28.7	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009.
Body height age classes 1-6	m	0.7-1.1	0.62-1	0.78-1.2	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009. Needed to calculate non-CLEA total skin area.
EF (soil and dust ingestion) age class 1	day yr ⁻¹	25	13	52	Original values based on Table 3.5 in SR3. Minimum and maximum values are based on 0.5 x and 2 x CLEA values.
EF (soil and dust ingestion) age classes 2-4	day yr ⁻¹	130	65	258	
EF (soil and dust ingestion) age classes 5-6	day yr ⁻¹	65	32	130	
EF (consumption of homegrown produce) age class 1	day yr ⁻¹	180	175	180	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays and a 0-1 year old child does not have solids for first 6 months of year.
EF (consumption of homegrown produce) age classes 2-6	day yr ⁻¹	365	350	365	
EF (skin contact, indoor) age classes 1-6	day yr ⁻¹	0	0	0	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays and a 0-1 year old child does not come into contact with surfaces for first 6 months of year.
EF (skin contact, outdoor) age class 1	day yr ⁻¹	25	13	52	Original values based on Table 3.5 in SR3. Minimum and maximum values are based on 0.5 x and 2 x CLEA values.
EF (skin contact, outdoor) age classes 2-4	day yr ⁻¹	130	65	258	
EF (skin contact, outdoor) age classes 5-6	day yr ⁻¹	65	32	130	
EF (inhalation of dust and vapour, indoor) age classes 1-6	day yr ⁻¹	0	0	0	No change for maximum values. Minimum values assume child is away from home for 2 weeks of the year, such as holidays
EF (inhalation of dust and vapour, outdoor) age class 1	day yr ⁻¹	25	13	52	Original values based on Table 3.5 in SR3. Minimum and maximum values are based on 0.5 x and 2 x CLEA values.
EF (inhalation of dust and vapour, outdoor) age classes 2-4	day yr ⁻¹	130	65	258	
EF (inhalation of dust and vapour, outdoor) age classes 5-6	day yr ⁻¹	65	32	130	
Occupancy Period (indoor) age classes 1-6	hr day ⁻¹	0	0	0	No change for maximum values. Minimum values are reasonable for representing majority of 0 to 6 year old children
Occupancy Period (outdoor) age classes 1-6	hr day ⁻¹	3	1.5	4	Min and max is a reasonable range for representing majority of 0 to 6 year old children
Soil to skin adherence factor (indoor) age classes 1-6	mg cm ⁻² day ⁻¹	0	0	0	No change for maximum value. Minimum value taken from US EPA (2004) for 1-13 year old children for indoor play . Based on the geometric mean of experimental studies.
Soil to skin adherence factor (outdoor) age classes 1-6	mg cm ⁻² day ⁻¹	1	0.2	1	No change for maximum value. Minimum value taken from US EPA (2004) for 8-12 year old children for wet soil (the more conservative scenario). Based on the geometric mean of experimental studies.
Soil and dust ingestion rate age classes 1-6	g day ⁻¹	0.1	0.04	0.175	Minimum value based on 70% of mean values in USEPA, 2008 (assumes that 30% of 100 mg soil ingested is from off-site sources). Maximum value based on SR3 which notes that a reasonable worst-case estimate is 150-200mg/day.
Inhalation rate age classes 1-6	m ³ day ⁻¹	10.3-24.9	4.32-6.72	20.16-30.72	Minimum values based on mean inhalation rates for a sedentary and passive activity, maximum values based on a moderate intensity activity, Table 4.13 in SR3.
Max exposed skin fraction (indoor) age classes 1-6	m ² m ⁻²	0.32-0.35	0.17-0.18	0.52-0.59	Minimum values assume face, hands and feet exposed. Maximum values assume face, hands, arms, legs and feet exposed (Values taken from USEPA, 2008 for age classes 1 to 6)
Max exposed skin fraction (outdoor) age classes 1-6	m ² m ⁻²	0.25-0.28	0.1-0.11	0.45-0.52	Minimum values assume face and hands exposed. Maximum values assume face, hands, arms and legs exposed (Values taken from USEPA, 2008 for age classes 1 to 6)
Produce consumption rate	g FW kg ⁻¹ BW day ⁻¹	1	5.00E-01	1.00E+00	No change in maximum values, i.e.90th percentile rates. Minimum values are half the maximum values.
Homegrown fraction	dimensionless	high	average	high	No change in maximum value. Minimum value assumes that an allotment produces average produce for consumption.
Produce soil loading	g g ⁻¹ DW	0.001	5.00E-04	2.00E-03	Min and max values based on 0.5 x and 2 x CLEA value
Porosity, air-filled	cm ³ cm ⁻³	0.2	0.12	0.3	Minimum values assume clay type soil. Maximum values assume sand type soil. Values used taken from Table 4.4 in SR3.
Porosity, water-filled	cm ³ cm ⁻³	0.33	0.47	0.24	
Residual soil water Content	cm ³ cm ⁻³	0.12	0.24	0.07	
Saturated hydraulic conductivity	cm s ⁻¹	0.00356	9.93E-04	7.36E-03	

Table A2.2: Range in parameter values used for Sensitivity Analysis - Allotments Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
van Genuchten shape parameter (m)	dimensionless	0.3201	0.2972	0.3509	
Bulk density	g cm ⁻³	1.21	1.07	1.18	
Soil organic matter	%	6	1.00E+00	1.00E+01	Minimum and maximum values considered to give a reasonable range to test uncertainty
Threshold value of wind speed at 10m	m s ⁻¹	7.2	3.6	14.4	Min and max values based on 0.5 x and 2 x CLEA value
Empirical function (Fx) for dust model	dimensionless	1.22	0.26	2.55	Minimum and maximum values calculated using minimum and maximum threshold values of wind speed at 10m and Equation 9.4 in SR3.
Ambient soil temperature	K	283	280	284	Minimum and maximum values taken from range given in Section 4.3.1 in SR3.
Mean annual windspeed (10 m)	m s ⁻¹	5	4.1	9.3	Minimum and maximum values taken from range given in Section 9.2.2 in SR3.
Air dispersion factor at height of 0.8 m	g m ⁻² s ⁻¹ per kg m ⁻³	120	120	270	Minimum and maximum values taken from Table 9.1 in SR3.
Fraction of site with hard or vegetative cover	m ² m ⁻²	0.5	0	0.75	Minimum and maximum values considered to give a reasonable range to test uncertainty
Default soil gas ingress rate	cm ³ s ⁻¹	0	0	0	No change
Depth to top of source (beneath building)	cm	50	30	100	Minimum and maximum values considered to give a reasonable range to test uncertainty
Air-water partition coefficient (Kaw) benzene	cm ³ cm ⁻³	0.116	0.09	0.116	No change in the maximum value. Minimum value based on lowest henry's law constant value given in Table A4, SR7.
Air-water partition coefficient (Kaw) benzo(a)pyrene	cm ³ cm ⁻³	0.00000176	1.76E-06	1.91E-06	No change in the minimum value. Maximum value highest henry's law constant value given in Table A4, SR7.
Diffusion coefficient in air benzene	m ² s ⁻¹	0.00000877	7.98E-06	8.80E-06	Minimum value from table E1, SR7. Maximum value from J&E database
Diffusion coefficient in air benzo(a)pyrene	m ² s ⁻¹	0.00000438	4.16E-06	4.60E-06	Maximum value fromtable E1, SR7. Minimum value assumes that CLEA default value is a median based on max
Diffusion coefficient in water benzene	m ² s ⁻¹	6.64E-10	5.78E-10	7.5E-10	Average absolute error between calculateed and experimental values reported as 13%. Minimum and maximum values reflect this error.
Diffusion coefficient in water benzo(a)pyrene	m ² s ⁻¹	3.67E-10	3.19E-10	4.15E-10	Average absolute error between calculateed and experimental values reported as 13%. Minimum and maximum values reflect this error.
Koc benzene	Log (cm ³ g ⁻¹)	1.83	1.8	1.85	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR7
Koc benzo(a)pyrene	Log (cm ³ g ⁻¹)	5.11	4.99	5.12	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR8
Kow benzene	Log (dimensionless)	2.13	2.1	2.16	Minimum value from Table A7, SR7. Maximum value given assumes that CLEA default value is a median based on min
Kow benzo(a)pyrene	Log (dimensionless)	6.18	6.04	6.2	Minimum and maximum values from Table A7, SR7.
Dermal absorption fraction benzene	dimensionless	0.1	0.05	0.2	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction benzo(a)pyrene	dimensionless	0.13	0.065	0.26	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction arsenic	dimensionless	0.03	0.015	0.06	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction chromium (VI)	dimensionless	0.01	0.005	0.02	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction cadmium	dimensionless	0.001	0.0005	0.002	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction lead	dimensionless	0	0	0.001	No change in the minimum value. Reasonable maximum value given.
Soil-to-plant concentration factor (green vegetables) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.000412	5.24E-05	3.90E-03	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (green vegetables) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00043	1.60E-05	1.10E-02	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (green vegetables) Cd	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.052	1.10E-03	4.4	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (green vegetables) Pb	mg g ⁻¹ DW plant / mg g ⁻¹ DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (root vegetables) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00178	2.73E-05	1.39E-02	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (root vegetables) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.0004	6.00E-05	3.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (root vegetables) Cd	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.029	5.40E-04	3.30E-01	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (root vegetables) Pb	mg g ⁻¹ DW plant / mg g ⁻¹ DW soil	0.008	0.004	0.016	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (tuber vegetables) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.000889	7.33E-06	4.57E-02	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (tuber vegetables) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00023	2.80E-05	1.80E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (tuber vegetables) Cd	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.031	5.00E-03	1.10E-01	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (tuber vegetables) Pb	mg g ⁻¹ DW plant / mg g ⁻¹ DW soil	0.008	0.004	0.016	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (herbaceous fruit) BaP	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.000508	3.33E-06	2.07E-01	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (herbaceous fruit) As	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.00033	9.40E-05	2.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (herbaceous fruit) Cd	mg g ⁻¹ FW plant / mg g ⁻¹ DW soil	0.016	7.70E-04	1.00E+00	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd

Table A2.2: Range in parameter values used for Sensitivity Analysis - Allotments Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Soil-to-plant concentration factor (herbaceous fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (shrub fruit) BaP	mg g-1 FW plant / mg g-1 DW soil	0.00000563	5.63E-07	5.63E-05	In absence of literature values, min and max values based on an order of magnitude below and above the default value. (This range is consistent with the range for BaP in tree fruit)
Soil-to-plant concentration factor (shrub fruit) As	mg g-1 FW plant / mg g-1 DW soil	0.0002	5.40E-05	9.10E-04	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (shrub fruit) Cd	mg g-1 FW plant / mg g-1 DW soil	0.0031	1.70E-03	5.60E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (shrub fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Soil-to-plant concentration factor (tree fruit) BaP	mg g-1 FW plant / mg g-1 DW soil	0.0000469	5.21E-06	4.22E-04	Minimum and maximum ranges taken from Table 2.7 of EA, 2011 - Draft supp info on PAHs
Soil-to-plant concentration factor (tree fruit) As	mg g-1 FW plant / mg g-1 DW soil	0.0011	7.10E-04	1.80E-03	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on As
Soil-to-plant concentration factor (tree fruit) Cd	mg g-1 FW plant / mg g-1 DW soil	0.0014	3.20E-04	3.20E-02	Minimum and maximum ranges taken from Table 3.1 of EA, 2009 - Supp SGV info on Cd
Soil-to-plant concentration factor (tree fruit) Pb	mg g-1 DW plant / mg g-1 DW soil	0.012	0.006	0.024	Min and max values based on 0.5 x and 2 x CLEA value
Relative Bioavailability soil	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given
Relative Bioavailability airborne dust	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given
Exposure duration / averaging time	years	6	6.00E+00	7.50E+01	6 years = Average ADE calculated for age classes 1 to 6. 75 years = Average ADE calculated for age classes 1 to 18. Note: no change for cadmium as lifetime averaging used for derivation of SGV.

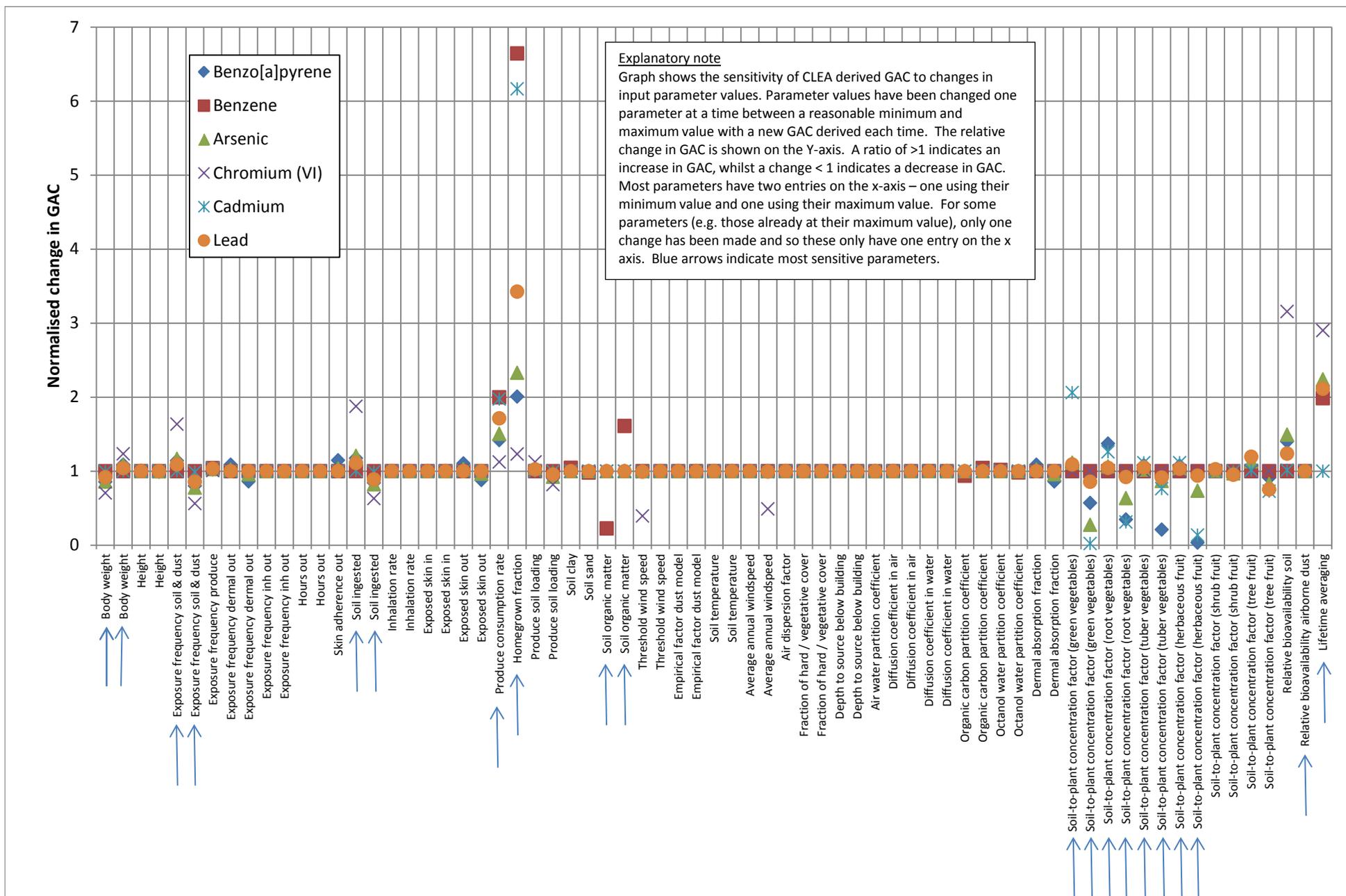


Figure A2.2: Results of sensitivity analysis for allotments land-use

Table A2.3: Range in parameter values used for Sensitivity Analysis - Commercial Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Body weight age class 17	kg	70	39	101	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009.
Body height age class 17	m	1.6	1.48	1.72	Minimum values calculated assuming 2 standard deviations below mean weight, thus inclusive of approximately 5% of population. Maximum values Calculated assuming 2 standard deviations above mean weight, thus inclusive of approximately 95% of population. Taken from Jeffries 2009. Needed to calculate non-CLEA total skin area.
EF (soil and dust ingestion) age class 17	day yr ⁻¹	230	178	282	Minimum value assumes employees works for 4 days a week at workplace (with 6 weeks annual leave). Maximum value assumes that employee works 6 days a week at workplace (with 6 weeks annual leave).
EF (consumption of homegrown produce) age class 17	day yr ⁻¹	0	0	0	No change
EF (skin contact, indoor) age class 17	day yr ⁻¹	230	178	282	Minimum value assumes employees works for 4 days a week at workplace (with 6 weeks annual leave). Maximum value assumes that employee works 6 days a week at workplace (with 6 weeks annual leave).
EF (skin contact, outdoor) age class 17	day yr ⁻¹	170	89	282	Minimum value assumes half of minimum days at workplace. Maximum value assumes maximum days at workplace
EF (inhalation of dust and vapour, indoor) age class 17	day yr ⁻¹	230	178	282	Minimum value assumes employees works for 4 days a week at workplace (with 6 weeks annual leave). Maximum value assumes that employee works 6 days a week at workplace (with 6 weeks annual leave).
EF (inhalation of dust and vapour, outdoor) age class 17	day yr ⁻¹	170	89	282	Minimum value assumes half of minimum days at workplace. Maximum value assumes maximum days at workplace
Occupancy Period (indoor) age class 17	hr day ⁻¹	8.3	6	12	Minimum and maximum values considered to give a reasonable range to test uncertainty
Occupancy Period (outdoor) age class 17	hr day ⁻¹	0.7	0	3	Minimum and maximum values considered to give a reasonable range to test uncertainty
Soil to skin adherence factor (indoor) age class 17	mg cm ⁻² day ⁻¹	0.14	0.06	0.3	Minimum value based on indoor residential adult (Table 8.1, SR3). Maximum value based on outdoor residential adult.
Soil to skin adherence factor (outdoor) age class 17	mg cm ⁻² day ⁻¹	0.14	0.06	0.3	Minimum value based on indoor residential adult (Table 8.1, SR3). Maximum value based on outdoor residential adult.
Soil and dust ingestion rate age class 17	g day ⁻¹	0.05	0.025	0.1	Min and max values based on 0.5 x and 2 x CLEA value
Inhalation rate age class 17	m ³ day ⁻¹	14.8	6.72	34.08	Minimum values based on mean inhalation rate for a sedentary and passive activity, maximum values based on a moderate intensity activity, Table 4.13 in SR3.
Max exposed skin fraction (indoor) age class 17	m ² m ⁻²	0.08	0.026	0.27	Minimum values assume face exposed (US EPA, 2004, exhibit C1). Maximum values assume face, hands, forearms and lower legs exposed (Table 4.8, SR3)
Max exposed skin fraction (outdoor) age class 17	m ² m ⁻²	0.08	0.026	0.27	Minimum values assume face exposed (US EPA, 2004, exhibit C1). Maximum values assume face, hands, forearms and lower legs exposed (Table 4.8, SR3)
Porosity, air-filled	cm ³ cm ⁻³	0.2	0.12	0.3	Minimum values assume clay type soil. Maximum values assume sand type soil. Values used taken from Table 4.4 in SR3.
Porosity, water-filled	cm ³ cm ⁻³	0.33	0.47	0.24	
Residual soil water Content	cm ³ cm ⁻³	0.12	0.24	0.07	
Saturated hydraulic conductivity	cm s ⁻¹	0.00356	9.93E-04	7.36E-03	
van Genuchten shape parameter (m)	dimensionless	0.3201	0.2972	0.3509	
Bulk density	g cm ⁻³	1.21	1.07	1.18	
Soil organic matter	%	6	1.00E+00	1.00E+01	Minimum and maximum values considered to give a reasonable range to test uncertainty
Threshold value of wind speed at 10m	m s ⁻¹	7.2	3.6	14.4	Min and max values based on 0.5 x and 2 x CLEA value
Empirical function (Fx) for dust model	dimensionless	1.22	0.26	2.55	Minimum and maximum values calculated using minimum and maximum threshold values of wind speed at 10m and Equation 9.4 in SR3.
Ambient soil temperature	K	283	280	284	Minimum and maximum values taken from range given in Section 4.3.1 in SR3.
Building footprint	m ²	424	424	1914	No change for minimum value. Maximum value assumes post 1970 warehouse building type, table 4.21 in SR3.
Living space air exchange rate	hr ⁻¹	1	1	1	No change
Living space height (above ground)	m	9.6	4.6	12.8	Minimum value assumes pre 1970 warehouse building type and maximum value assumes post 1970 office building type, table 4.21 in SR3.

Table A2.3: Range in parameter values used for Sensitivity Analysis - Commercial Land-Use

Parameter	Units	CLEA default	Minimum	Maximum	Justification
Living space height (below ground)	m	0	0	0	No change
Pressure difference (soil to enclosed space)	Pa	4.4	3.2	5.1	Minimum value assumes pre 1970 warehouse building type and maximum value assumes post 1970 office building type, table 4.21 in SR3.
Foundation thickness	m	0.15	0.075	0.3	Min and max values based on 0.5 x and 2 x CLEA value
Floor crack area	cm ²	1647.3	1647.3	3499.9	No change for minimum value. Maximum value assumes a post 1970 warehouse building type, table 4.21 in SR3.
Dust loading factor	µg m ⁻³	100	50	200	Min and max values based on 0.5 x and 2 x CLEA value
Mean annual windspeed (10 m)	m s ⁻¹	5	4.1	9.3	Minimum and maximum values taken from range given in Section 9.2.2 in SR3.
Air dispersion factor at height of 0.8 m	g m ⁻² s ⁻¹ per kg m ⁻³	68	68	170	No change in minimum value. Maximum value taken from Table 9.1 in SR3.
Air dispersion factor at height of 1.6 m	g m ⁻² s ⁻¹ per kg m ⁻³	120	120	270	No change in minimum value. Maximum value taken from Table 9.1 in SR3.
Fraction of site with hard or vegetative cover	m ² m ⁻²	0.8	0.5	1	Minimum and maximum values considered to give a reasonable range to test uncertainty
Depth to top of source (beneath building)	cm	65	30	100	Minimum and maximum values considered to give a reasonable range to test uncertainty
Air-water partition coefficient (Kaw) benzene	cm ³ cm ⁻³	0.116	0.09	0.116	No change in the maximum value. Minimum value based on lowest henry's law constant value given in Table A4, SR7.
Air-water partition coefficient (Kaw) benzo(a)pyrene	cm ³ cm ⁻³	0.00000176	1.76E-06	1.91E-06	No change in the minimum value. Maximum value highest henry's law constant value given in Table A4, SR7.
Diffusion coefficient in air benzene	m ² s ⁻¹	0.00000877	7.98E-06	8.80E-06	Minimum value from table E1, SR7. Maximum value from J&E database
Diffusion coefficient in air benzo(a)pyrene	m ² s ⁻¹	0.00000438	4.16E-06	4.60E-06	Maximum value from table E1, SR7. Minimum value assumes that CLEA default value is a median based on max
Diffusion coefficient in water benzene	m ² s ⁻¹	6.64E-10	5.78E-10	7.5E-10	Average absolute error between calculated and experimental values reported as 13%. Minimum and maximum values reflect this error.
Diffusion coefficient in water benzo(a)pyrene	m ² s ⁻¹	3.67E-10	3.19E-10	4.15E-10	Average absolute error between calculated and experimental values reported as 13%. Minimum and maximum values reflect this error.
Koc benzene	Log (cm ³ g ⁻¹)	1.83	1.8	1.85	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR7
Koc benzo(a)pyrene	Log (cm ³ g ⁻¹)	5.11	4.99	5.12	Minimum and maximum values estimated by linear regression from log Kow ranges, using estimation method in Table 2.12, SR8
Kow benzene	Log (dimensionless)	2.13	2.1	2.16	Minimum value from Table A7, SR7. Maximum value given assumes that CLEA default value is a median based on min
Kow benzo(a)pyrene	Log (dimensionless)	6.18	6.04	6.2	Minimum and maximum values from Table A7, SR7.
Dermal absorption fraction benzene	dimensionless	0.1	0.05	0.2	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction benzo(a)pyrene	dimensionless	0.13	0.065	0.26	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction arsenic	dimensionless	0.03	0.015	0.06	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction chromium (VI)	dimensionless	0.01	0.005	0.02	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction cadmium	dimensionless	0.001	0.0005	0.002	Minimum and maximum values are half and double the CLEA default value.
Dermal absorption fraction lead	dimensionless	0	0	0.001	No change in the minimum value. Reasonable maximum value given.
Sub-surface soil to indoor air correction factor benzene	dimensionless	10	1.00E+00	1.00E+03	Minimum and maximum values based on Fig A2.1 in VOC handbook, CIRIA C682, 2009
Soil-to-dust transport factor	g g ⁻¹ DW	0.5	2.50E-01	8.00E-01	Minimum and maximum values considered to give a reasonable range to test uncertainty
Relative Bioavailability soil	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given
Relative Bioavailability airborne dust	dimensionless	1	1.00E-01	1.00E+00	No change in maximum value. Reasonable minimum value given

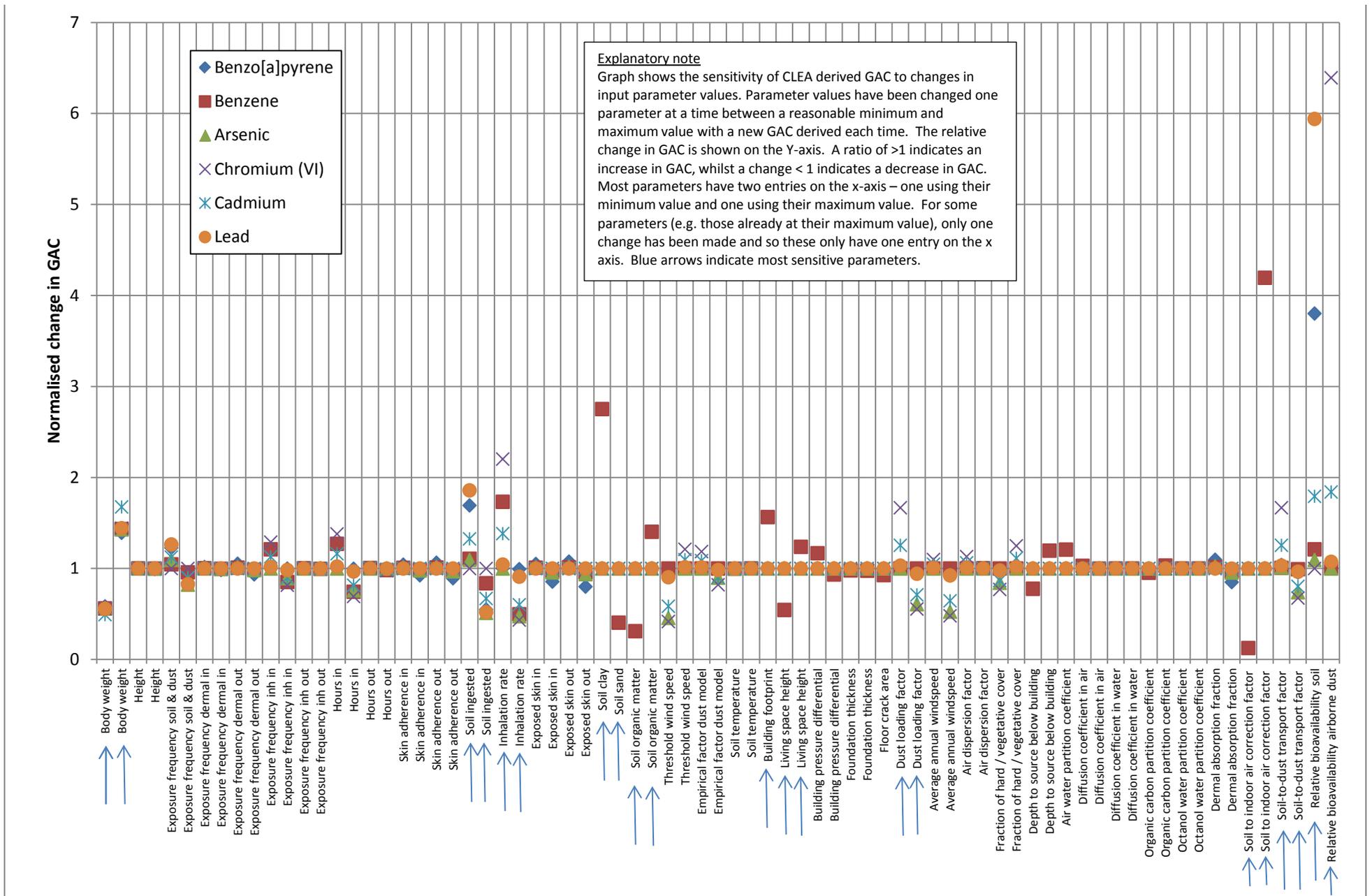


Figure A2.3: Results of sensitivity analysis for commercial land-use