

S7: Data basis 2020,2030 and 2050 for exploratory quantitative analysis

Table S3: Data basis 2020,2030 and 2050 for exploratory quantitative analysis with minimum (min) and maximum (max) values

Drivers	Basis for calculation (base year)	2020 min	2020 max	2030 min	2030 max	2050 min	2050 max	Unit	Sources	Data base for Driver (ID)
Biogenic residues and side products		10.216.000	137.550.000	10.216.000	137.550.000	10.216.000	137.550.000	Mg _{dm} /a	[87]	D1
Potential for fruit and vegetable production in llotment gardens and controlled urban agricultural practices		0	0	2.766	14.306	5.532	28.612	ha	[90]	D2
Vertical farming approaches (area needed for production of whole German vegetable production)		0	0	0	0	50.937	23.332	ha	[92,93]	D2
Sum of abandoned, degraded areas, old industrial sites and marginal areas		3.420.000	3.470.000	3.989.140	4.533.550	4.372.971	5.371.906	ha	[64,97]	D3
Abandoned, degraded areas, old industrial sites (urban areas)		120.000	170.000	114.001	152.461	47.832	90.817	ha	[97]	D3
Marginal areas		3.300.000	3.300.000	3.300.000	3.300.000	3.300.000	3.300.000	ha	[64]	D3
Areas getting free due to change restriction for energy plants		0	0	450.000	900.000	900.000	1.800.000	ha	[44,92]	D5
Areas getting free due to change of vegetable/fruit cultivation systems		0	0	125.139	181.089	125.139	181.089	ha	[89–91,93]	D5
Short rotation coppice on agricultural areas		33.000	118.800	158.400	1.758.240	510.000	5.400.000	Mg _{dm} /a	[83,102,102,103]	D5, D15, D16
Short rotation coppice on marginal areas		0	0	11.967.419	48.962.337	13.118.912	58.016.582	Mg _{dm} /a	[103]	D5, D15, D16
Short rotation coppice on previously used		0	0	1.350.000	9.720.000	2.700.000	19.440.000	Mg _{dm} /a	[44,103]	D5, D15, D16
Miscanthus on agricultural areas		27.600	119.600	126.720	1.693.120	408.000	5.200.000	Mg _{dm} /a	[83,104,105]	D5, D15, D16
Miscanthus on marginal areas		0	0	9.573.935	47.148.917	10.495.130	55.867.820	Mg _{dm} /a	[83,104,105]	D5, D15, D16
Miscanthus on agricultural areas previously used		0	0	1.080.000	9.360.000	2.160.000	18.720.000	Mg _{dm} /a	[44,83,104,105]	D5, D15, D16
Paludiculture		0	0	324.000	4.080.000	3.060.000	917.714	Mg _{dm} /a	[70,108]	D6, D15, D16
Algae		0	0	96.990	193.980	291.000	582.000	Mg _{dm} /a	[66,100]	D4, D16
Forest raw materials for material usage_Deciduous		-	28	-	24	0.7	12	Mio. m ³ /a	[110]	D7

Forest raw materials for material usage_Coniferous		40	58	35	61	31	43	Mio. m³/a	[110]	D7
Agricultural yields	Exemplified for total cereals (Excluding other cereals (millet, sorghum, etc.)), 2020	43.265	43.265	43.481	46.510	43.698	49.755	in 1000 Mg	[74,115,117,118]	D9
Agricultural water usage		300	300	270	263	240	225	Mio m³/a	[119]	D9
Agricultural N₂O emissions		126	126	119	104	113	83	in 1000 Mg	[120]	D9
Agricultural plant protection		27.000	35.000	25.515	19.250	24.030	3.500	Mg	[121]	D9
Ecological farming (ha)	Base Year 2019	1.613.834	1.613.834	2.165.823	2.165.823	3.412.087	3.412.087	in ha	[124]	<u>D10</u>
Digitilisation connection rate to networks with >1000 Mbit		20	77	100	100	100	100	%	[136]	D13
Plastic market demand of Germany of 2020 Food wastes	12.269.400	195.083	5.889.312	195.279	5.889.312	195.083	5.889.312	Mg/a	[145,146]	D15
Plastic market demand of Germany of 2020 and production potentials of lignocellulosic materials	12.269.400	2.239.686	81.266.688	7.732.138	169.455.322	9.495.369	217.499.041	Mg/a	[144,145,147,148]	D15
Bioethanol production 2019, and production potentials from lignocellulosic materials	1.187.400	381.990	29.294.878	2.919.197	76.701.881	3.733.711	102.528.437	Mg/a	[144,154–158]	D16
Biodiesel consumption, 2018 and production potentials from Algae	2.291.700	0	0	23.520	56.448	70.568	169.362	Mg/a	[151,159]	D16
Population development		82.902.000	82.902.000	78.451.000	83.451.000	74.000.000	84.000.000	in Pers	[160]	D17
Feed consumption cows/female cattle	Base year 2017	45.421	45.421	34.975	45.421	34.975	45.421	in 1000 Mg	[84,164]	D18
Feed consumption cattle	Base year 2017	30.243	30.243	24.194	14.001	24.194	14.001	in 1000 Mg	[84,164]	D18
Feed consumption pigs	Base year 2017	13.684	13.684	10.810	8.032	10.810	8.032	in 1000 Mg	[84,164]	D18
Feed consumption poultry	Base year 2017	9.314	9.314	7.079	4.564	7.079	4.564	in 1000 Mg	[84,164]	D18
Feed consumption other (calves/sheep/horses)	Base year 2017	16.329	16.329	16.329	16.329	16.329	16.329	in 1000 Mg	[84,164]	D18
Areas used for feed production for cows/female cattle	Base year 2017	3.680	3.680	2.834	3.680	2.834	3.680	in 1000 ha	[84,164]	D18
Areas used for feed production for cattle	Base year 2017	2.450	2.450	1.960	1.134	1.960	1.134	in 1000 ha	[84,164]	D18
Areas used for feed production for pigs	Base year 2017	1.109	1.109	876	651	876	651	in 1000 ha	[84,164]	D18
Areas used for feed production for poultry	Base year 2017	755	755	574	370	574	370	in 1000 ha	[84,164]	D18

Areas reduced for feed production for other (calves/sheep/horses)	Base year 2017	1.323	1.323	1.323	1.323	1.323	1.323	in 1000 ha	[84,164]	D18
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