Supplementary Information

Item	Food waste proportion 2050 [%]	SSR 2050 [%]	Losses 2050[%]
Alcoholic Beverages	6.0	55.953757	-
Animal fats	6.0	94.690265	0,48
Cereals - Excluding Beer	6.0	45.961438	0.74
Eggs	6.0	62.886598	2,27
Fish. Seafood	4.75	2.316234	0,00
Fruits - Excluding Wine	6.0	43.564356	2,19
Meat	4.75	84.521739	0,00
Milk - Excluding Butter	6.0	100.938848	0,00
Offals	4.75	150	2,34
Oilcrops	6.0	62.264151	1,18
Pulses	6.0	48.717949	1,47
Starchy Roots	6.0	93.920335	1,12
Stimulants	6.0	0	-
Sugar Sweeteners	6.0	68.435754	-
Sugar Crops	-	90.782123	1,54
Treenuts	6.0	7.317073	0,00
Vegetable Oils	6.0	32.677165	-
Vegetables	6.0	51.452785	1,57

Table 1: Food waste, self-sufficiency ratio (computed from [1]) and losses proportion for 2050

Item	Primary product	Quantity of primary product necessary	Primary product production [kt]	Processed primary product [kt]	Item production [kt]
			From [2]	From [1]	From [1]
Vegetable Oils	Oilcrops	1.48	-	123	83
Butter, Cream	Milk	18.15	-	799	44
Sugar (Raw Equivalent)	Sugar beet	4.96	-	1215	245
Wine	Grapes	1.27	141	-	111

Table 2: Quantity of primary product necessary to produce one unit of item

Item	Slaughtered or producing animals [head]	Source	Produced mass in 2018 [kt]	Yield 2018 [kg product / head]	Ratio of product with respect to the total mass produced within the category [%]		Proportion of organically farmed animals in 2050
			From [2]	*Computed*	Meat	Milk	*From linear extrapolation*
Dairy cows	564190.00	[2]	3913.00	6935.61	-	99.25	11.68
Non dairy cows	162686.00	[3]	49.78	306.01	9.61	-	27.82
Young cattle (-1 year)	217088.00	[3]	27.40	126.23	5.29	-	12.89
Other cattle	248179.00	[3]	70.81	285.33	13.67	-	15.46
Sheep (meat)	260693.00	[3]	5.56	21.33	0.16	-	25.86
Sheep (milk)	14476.00	[2]	6.50	449.02	-	0.16	27.88
Goats (meat)	49531.00	[3]	0.55	11.10	0.11	-	2.75
Goats (milk)	36821.00	[2]	23.20	630.08	-	0.59	11.23
Swine / pigs	2574989.00	[3]	231.00	89.71	44.60	-	11.16
Poultry (meat)	72361365.00	[3]	97.00	1.34	18.73	-	20.33
Egg chickens	3371329.00	[4]	61.00	18.09	-	-	4.60
Fish. Seafood	-	-	3.40	-	-	-	-
Total	79861347.00	-	-	-	92.17	100	

Table 3: Livestock: yields and proportions

Animal category	Feed 2018 [Mt DM]	Feed [kg DM/head]	Coarse fodder proportion [%]	Concentrated feed proportion [%]	Other feed proportion [%]
	From [5]	*Computed*	*From [5]*	*From [5]*	*From [5]*
Bovines	6.1	5116.83582	87.1	9.1	3.8
Caprines/Ovines	0.213	686.60065	75	5	20
Poultry	0.315	2.17657586	0	97.7	2.3
Swine	0.75	291.26338	10.7	74.7	14.6

Table 4: Feed informations for modelling

Item	Mass used for feed 2018 [kt]	Proportion out of total feed in 2018 [%]
Barley and products	186.00	11.03
Cereals, Other	48.00	2.85
Fish, Seafood	3.58	0.21
Fruits	0.00	0.00
Maize and products	261.00	15.47
Milk	684.00	40.55
Millet and products	3.00	0.18
Oats	48.00	2.85
Oilcrops	13.00	0.00
Peas	15.00	0.89
Pulses	19.00	0.00
Pulses, Other and products	4.00	0.24
Rape and Mustardseed	3.00	0.18
Rice and products	85.00	5.04
Rye and products	2.00	0.12
Soyabeans	0.00	0.00
Starchy roots (potatoes)	75.00	4.45
Sugar crops	3.00	0.18
Sunflower seed	3.00	0.18
Vegetables	0.00	0.00
Wheat and products	257.00	15.23
Total	2600.58	99.62

Table 5: Proportion of items for "other feed"

	Housing and infrastructure [ha]	Unproduc area [ha]	Forest area [ha]	Vineyards, orchards and horticulture [ha]	Arable land [ha]	Semi-natural grassland [ha]	Farm pastures [ha]	Alpine meadows and pastures (including sheep grazing pastures) [ha]
1979/1985	249479	1091194	1126726	7394	437949	401494	150169	598265
1992/97	281950	1083118	1159887	61562	428434	375309	162898	575912
2004/09	309000	1075847	1177946	50746	404247	360728	185762	564794
2013/18	327121	1070128	1195091	48094	389391	349962	195611	553672
2050	404107	1049745	1261253	20262	342285	298612	242226	510581

Table 7: Land use - Data [6] and linear extrapolation results

Item category	Item	Produced mass in 2018 [kt]	Proportion of item within its category in 2018 [%]
Cereals	Barley and products	182	20.6
	Cereals, Other	49	5.6
	Maize and products	135	15.3
	Millet and products	1	0.1
	Oats	8	0.9
	Rye and products	10	1.1
	Wheat and products	497	56.3
Fruits	Apples and products	222	74.5
	Citrus, Other	3	1.0
	Fruits, other	73	24.5
Nuts	Nuts and products		
Pulses	Pulses, Other and products	3	15.8
	Peas	16	84.2
Seeds	Rape and Mustardseed	87	83.7
	Sunflower seed	17	16.3
Soyabeans	Soyabeans	-	1
Starchy roots	Potatoes and products	-	1
Sugar	Sugar beet	-	1
Vegetables	Onions	38	8.9
	Tomatoes and products	43	10.1
	Vegetables, other	344	80.9
Wine	Grapes and products (excl wine)	-	1

Table 6: Crop production - Proportion of item within each category

Item	LCA item - Conventional production	Source	LCA item - Organic production	Source
Apples and products	Apple, conventional, national average, at orchard/FR U	Agribalyse	Apple, organic, national average, at orchard/kg	Agribalyse
Barley and products	Barley grain {FR}| barley production | Cut-off, U	Ecoinvent	Barley grain, organic {CH}| barley production, organic | Cut-off, U	Ecoinvent
Cereals, Other	Barley grain {FR}| barley production | Cut-off, U	Ecoinvent	Barley grain, organic {CH}| barley production, organic | Cut-off, U	Ecoinvent
Fruits, other	Pear, conventional, at orchard/kg	Agribalyse	Pear, organic, at farm gate/kg	Agribalyse
Grapes and products (excl wine)	Grape, at plant	Agribalyse	Grape, organic, variety mix, Languedoc-Roussillon, at vineyard/kg	Agribalyse
Maize and products	Maize grain {RoW}| production | Cut-off, U	Ecoinvent	Maize grain, organic {CH}| production | Cut-off, U	Ecoinvent
Millet and products	Millet, consumption mix	Agribalyse	Millet, organic - computed	computed
Nuts and products	Almond, consumption mix	Agribalyse	Almond, organic - computed	computed
Oats	Oat, consumption mix	Agribalyse	Oat, organic - computed	computed
Onions	Onion, national average, at farm/FR U	Agribalyse	Onion, organic - computed	computed
Peas	Protein pea {FR}| production | Cut-off, U	Ecoinvent	Protein pea, organic {CH}| production | Cut-off, U	Ecoinvent
Potatoes and products	Ware potato, conventional, variety mix, national average, at farm gate/FR U	Agribalyse	Potato, organic {CH}| production | Cut-off, U	Ecoinvent
Pulses, Other and products	Lentil {RoW}| lentil production | Cut-off, U	Ecoinvent	Lentil, organic - computed	computed
Rape and Mustardseed	Rapeseed, conventional, 9% moisture, national average, animal feed, at farm gate	Agribalyse	Rape seed, organic {CH}| production | Cut-off, U	Ecoinvent
Rye and products	Rye grain {RER}| rye production | Cut-off, U	Ecoinvent	Rye grain, organic {CH}| rye production, organic | Cut-off, U	Ecoinvent
Soyabeans	Soybean {CH}| soybean production | Cut-off, U	Ecoinvent	Soybean, organic {CH}| production | Cut-off, U	Ecoinvent
Sugar beet	Sugar beet {CH}| production | Cut-off, U	Ecoinvent	Sugar beet, organic - computed	computed
Sunflower seed	Sunflower seed {FR}| sunflower production | Cut-off, U	Agribalyse	Sunflower seed, organic - Computed	computed
Tomatoes and products	Tomato, conventional, greenhouse production, national average, at greenhouse	Agribalyse	Tomato, organic, greenhouse production, national average, at greenhouse/FR U	Agribalyse
Vegetables, other	Carrot, conventional, national average, at farm gate/FR U	Agribalyse	Carrot, organic, Lower Normandy, at farm gate	Agribalyse
Wheat and products	wheat production - FR	Agribalyse	wheat grain, organic {CH} wheat production, organic	Agribalyse

Table 8: LCA item for plants

Item	Weight [kg/head]	Life span [y]	LCA item - Conventional production	LCA item - Organic production
	From Agribalyse	*From [7] [8]*		
Dairy cows	670.05	8	Cull cow, conventional, lowland milk system, silage maize 5 to 10%, at farm gate	Cull cow, organic, lowland milk system, silage maize 5 to 10%, at farm gate
Non dairy cows	650	2	Beef cattle, national average, at farm gate/kg	Beef cattle, organic - Computed
Young cattle (-1 year)	79.56	<1	Calf, conventional, lowland milk system, silage maize 5 to 10%, at farm gate	Calf, organic, lowland milk system, silage maize 5 to 10%, at farm gate
Other cattle	650	2	Beef cattle, national average, at farm gate/kg	Beef cattle, organic - Computed
Sheep (meat)	35	<1	Lamb, conventional, indoor production system, at farm gate	Lamb, organic, system n°1, at farm gate
Sheep (milk)	65	4	Cull ewe, conventional, indoor production system, at farm gate	Cull ewe, organic, system n°1, at farm gate
Goats (meat)	9	<1	Kid goat, conventional, intensive forage area, at farm gate	Kid goat, organic - Computed
Goats (milk)	70	4	Cull goat, conventional, intensive forage area, at farm gate	Cull goat, organic - Computed
Swine / pigs	115.4	<1	Pig, conventional, national average, at farm gate	Pig, organic, at farm gate
Egg chickens	1.9	<1	Cull hen, conventional, national average, at farm gate/kg	Cull hen, organic, at farm gate
Poultry (meat)	2.04	<1	Broiler, conventional, at farm gate	Broiler, organic, at farm gate

Table 9: LCA item for animals, weights and life spans

Item (FBS)	Yield CH 2012 [t/ha]	Yield FR increase 2012-2050	Yield CH 2050 [t/ha]	Organic yield 2050 [t/ha]	Yield difference from C to O (%)	Reference for yield difference
Apples and products	56.4418	1.13433446	64.0238786	48.2610345	31	[9]
Barley and products	6.4715	1.13355282	7.33578707	4.53140041	31	[9]
Cereals, Other	4.79643333	1.34911463	6.47093839	3.47970968	20.4	computed
Citrus, Other	23.8386067	1.34605404	32.0880529	17.0387201	26.5	computed
Fruits, other (incl citrus, other)	23.8386067	1.13433446	27.0409529	17.0387201	26.5	computed
Grapes and products (excl wine)	8.5223	1.13433446	9.66713854	7.59376378	22	[9]
Maize and products	10.8279	1.30929169	14.1768795	8.805221	11	[10]
Millet and products	2.3667	1.34911463	3.1929496	4.0086	20.4	computed
Nuts and products	1.4175	1.03741093	1.47052999	1.15334687	0	computed
Oats	5.338	1.34911463	7.2015739	4.48126905	15	[9]
Onions	12.1522	1.24462501	15.124932	34.70717	23	[9]
Peas	3.7835	1.27220167	4.813375	2.77657206	15	[9]
Potatoes and products	41.1034	1.37285133	56.4288572	31.9474551	22	[11] [10]
Pulses, Other and products	3.1018	1.27220167	3.94611512	2.53611046	7.5	computed
Rape and Mustardseed	3.1216	1.09417902	3.41558924	2.7923754	18	[9]
Rye and products	5.9215	1.34911463	7.98878229	4.37270737	24	[9]
Soyabeans	2.8111	1.27220167	3.5762861	2.0766241	0	[11]
Sugar beet	87.0731	1.23117126	107.201899	71.3951281	-5	[9]
Sunflower seed	2.6051	1.27795839	3.3292094	2.38324089	23	[9]
Tomatoes and products	190.4936	1.24462501	237.093099	195.903364	19	[9]
Vegetables, other	28.8120333	1.24462501	35.8601772	23.6464318	21	computed
Wheat and products	5.7763	1.12593783	6.50375472	4,6802124	21	[11]

Table 10: Yields: projected, conventional and organic

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