

Supplement A: Harmonization scheme for data sets used in the HILDA approach.

<u>CLC</u>	<u>(CLC 90/2000/2006; BioPress)</u>					
<u>CLC Class Number</u>	<u>CLC Class Name</u>	<u>LCCS label</u>	<u>Classifiers</u>	<u>LCCS Code</u>	<u>IPPC Land use category</u>	<u>Notes</u>
111	Continuous urban fabric	High density urban areas	A4 Non Linear (Feature)	5003-13	Settlement	
			A13 Urban Areas			
			A14 High Density			
112	Discontinuous urban fabric	Medium density areas // Low density urban areas	A4 Non Linear (Feature)	5003-14 // 5003-15	Settlement	
			A13 Urban Areas			
			A15 Medium Density			
			A16 Low Density			
121	Industrial or commercial units	Industrial and/or other areas	A4 Non Linear (Feature)	5003-8	Settlement	
			A12 Industrial and/or other areas			
122	Road and rail networks and associated land	Roads // Railways // Industrial and/or other areas built-up object: other - installations associated to roads and railways	A3 Linear	5002-3 // 5002-6 // 5003-8- A44Zp122	Settlement	
			A7 Roads			
			A10 Railways			
			A4 Non Linear (Feature)			
			A12 Industrial and/or other areas			
			A44 Other			
			Zp122 Installations associated to roads and railways			
123	Port Areas	Industrial and/or other areas built up object: Port Area (including docks, shipyards, locks)	A4 Non Linear (Feature)	5003-8-A32	Settlement	
			A12 Industrial and/or other areas			
			A32 Port area (including docks, shipyard, locks)			
124	Airports	Industrial and/other areas built-up object: airport	A4 Non Linear (Feature)	5003-8-A21	Settlement	
			A12 Industrial and/or other areas			
			A21 Airport			
131	Mineral	Extraction Sites	A2 Non built up areas	5004-2	Settlement	

	extraction sites					
			A6 Extraction Sites			
132	Dump Sites	Waste Dumps/Deposits	A2 Non built up areas	5004-1	Settlement	
			A5 Waste Dumps/Deposits			
133	Construction Sites	Built up areas / Bare areas	A1 Built up areas	5001 / 0011	Settlement	
			B16 Bare areas			
141	Green urban areas	Vegetated urban areas	A6 Urban Vegetated Areas	11176	Settlement	
142	Sport and leisure facilities	Built up areas built up object: Sports and leisure facilities	A1 Built up areas	5001-A38	Settlement	
			A38 Sports and Leisure Facilities			
211	Non irrigated arable land	Herbaceous crops // shrub crops	A3 Herbaceous crops	10025 // 10013 (1) [Z211]	Cropland	
			A2 Shrub crops			
			Z211 Nurseries of fruit and trees and shrubs			
212	Permanently irrigated land	Surface irrigated herbaceous crops // surface irrigated shrub crops // surface irrigated tree crops	A3 Herbaceous crops	11500-13227 // 11495-13227 // 11491-13227	Cropland	
			D3 Irrigated (general)			
			D4 Surface irrigated			
			A2 Shrub crops			
			A1 Tree crops			
213	Rice fields	Graminoid crops dominant crop: cereals - rice (oryza spp.)	A4 Graminoid crops	10037-S0308	Cropland	
			S0380 Rice (Oryza spp.)			
			(Mode1: Terrestrial and/or Aquatic or regularly flooded)			
221	Vineyards	Broadleaved deciduous shrub crops dominant crop: fruits & nuts - grapes (Vitis vinifera)	A2 Shrub crops	10013-1891-S0610	Cropland	
			A7 Broadleaved			
			A10 Deciduous			
			S0610 Grapes (Vitis vinifera)			
222	Fruit trees and berry plantations	Broadleaved tree crops crop type: fruits & nuts // broadleaved shrub crops crop type: fruits & nuts // broadleaved shrub crops crop type: beverage	A1 Tree crops	10001-3781-S6 // 10013-3781-S6 // 10013-3781-S8	Cropland	
			A7 Broadleaved			

			S6 Fruits & Nuts			
			A2 Shrub crops			
			S8 Beverages			
223	Olive groves	Boradleaved evergreen tree crops dominant crop: industrial crops - olive (olea europaea L.) // fields of broadleaved evergreen tree crops (one additional crop)(shrub crop with simultaneous period). Dominant crop: industrial crops - olive (Olea europaea L.) Second crop: fruit & nuts -grapes (vitis vinifera)	A1 Tree crops	10001-1- S0910 // 11345-1275- S0910S0610	Cropland	
			A7 Broadleaved			
			A9 Evergreen			
			S0910 Olive (Olea europaea L.)			
			C2 Intercropped (Second crop)			
			C3 One additional crop			
			C6 Shrub crops (additional crop)			
			C17 With simultaneous period (second crop)			
			S0610 Grapes (Vitis vinifera)			
231	Pastures	Closed to open (100-40%) Grassland	A6 Gramnoids	21461- 121340	Grassland	
			A20 Closed to open (100-15%)			
			A21 Closed to open (100-40%)			
			(Mode2: Cultivated - managed and/or natural and semi-natural terrestrial vegetation)			
241	Annual crops associated with permanent crops	Fields of herbaceous crops (one additional crop) (tree crop with simultaneous period) // fields of herbaceous crops (one additional crop) (shrub crop with simultaneous period)	A3 Herbaceous crops	11370-12602 // 11370- 12614	Cropland	
			C2 Intercropped (Second crop)			
			C3 One additional crop			
			C5 Tree crop (additional crop)			
			C17 With simultaneous period (second crop)			
			C6 Shrub crops (additional crop)			
242	Complex Cultivation Patterns	Small sized fields of herbaceous crops // small sized fields of shrubs // small sized fields of tree crops // scattered urban areas	A3 Herbaceous crops	11250 // 11215 // 11195 // 5002-17	Cropland	
			B2 Small sized fields			

			C2 Intercropped (Second crop)			
			A2 Shrub crops			
			A1 Tree crops			
			A4 Non Linear (Feature)			
			A13 Urban Areas			
			A17 Scattered Density			
243	Land principally occupied by agriculture, with significant areas of natural vegetation	Cultivated and Managed terrestrial areas / natural and semi-natural primarily terrestrial vegetation	A11 Cultivated and Managed terrestrial areas	0003 / 0004	Grassland	
			A12 Natural and semi-natural primarily terrestrial vegetation			
244	Agro forestry areas	Closed to open woodlamd with herbaceous layer // continuous closed to open trees + continuous fields of herbaceous crops	A3 Trees (Main layer)	21575(1)[Z24 4] // 2144710027	Cropland	
			A20 Closed to open (100-15%)			
			B2 >30-3m (trees height main layer)			
			C1 Continuous (vegetation main pattern)			
			F2 Second and/or third layer present			
			F4 Herbaceous vegetation (second or third layer)			
			F7 Closed (>70-60%) to open (70-60%) -(20-10%) (second or third layer)			
			G4 3-0.03m (Herbaceous height second or third layer)			
			Z244 Grazing land (pasture)			
			A3 Herbaceous crops			
			B5 Continuous			
311	Broad-leaved forest	Broadleaved closed to open (100-40%) Trees	A3 Trees (Main layer)	21495-121340	Forest	
			A20 Closed to open (100-15%)			
			B2 >30-3m (trees height main layer)			
			D1 Broadleaved			
			A21 Closed to open (100-40%)			
312	Coniferous forest	Needleleaved closed to open (100-40%) Trees	A3 Trees (Main layer)	21498-121340	Forest	
			A20 Closed to open (100-15%)			
			B2 >30-3m (trees height main layer)			

			D2 Needleleaved			
			A21 Closed to open (100-40%)			
313	Mixed Forest	Mixed closed to open (100-40%) Trees // Mixed closed to open (100-40%) Trees	A3 Trees (Main layer)	21497- 129398 // 21499- 129398	Forest	
			A20 Closed to open (100-15%)			
			B2 >30-3m (trees height main layer)			
			D1 Broadleaved			
			E2 Deciduous			
			A21 Closed to open (100-40%)			
			E3 Mixed			
			D2 Needleleaved			
			E1 Evergreen			
321	Natural grasslands	Herbaceous closed to open (100-40%) Vegetation	A2 Herbaceous Vegetation (Main Layer)	21453- 121340	Grassland	
			A20 Closed to open (100-15%)			
			A21 Closed to open (100-40%)			
322	Moors and heathland	Closed to open (100-40%) Shrubland (Thicket) // Closed to open (100-40%) Shrubland (thicket) / Herbaceous Closed to open	A4 Shrubs (Main Layer)	21450- 121340 // 21450- 121340 / 21453- 121340	Grassland	
			A20 Closed to open (100-15%)			
			B3 5-0.3m (Shrubs height main layer)			
			A21 Closed to open (100-40%)			
			A2 Herbaceous Vegetation (Main Layer)			
323	Sclerophyllous vegetation	Broadleaved evergreen closed to open (100- 40%) Thicket	A4 Shrubs (Main Layer)	21517- 121340	Grassland	
			A20 Closed to open (100-15%)			
			B3 5-0.3m (Shrubs height main layer)			
			D1 Broadleaved			
			E1 Evergreen			
			A21 Closed to open (100-40%)			
324	Transitional woodland-shrub	Closed to open (100-40%) woody vegetation // closed to open (100-40%) woody vegetation with herbaceous layer	A1 Woody vegetation (Main Layer)	21441- 121340 // 21548-	Forest	

			121340		
		A20 Closed to open (100-15%)			
		A21 Closed to open (100-40%)			
		B1 7-2m (Height for woody vegetation main layer)			
		F2 Second and/or third layer present			
		F4 Herbaceous vegetation (second or third layer)			
		F7 Closed (>70-60%) to open (70-60%) -(20-10%) (second or third layer)			
		G4 3-0.03m (Herbaceous height second or third layer)			
331	Beaches, dunes, sands	Loose and shifting sands // bare rock and/or coarse fragments - gravels	A6 Loose and shifting sands	6006 // 6002-8(1)[Z331]	Others
		A3 Bare rock and/or coarse fragments			
		A14 Gravel			
		Z331 Gravel accumulation along stream channels			
332	Bare rocks	Bare rock and/or coarse fragments // herbaceous sparse vegetation	A3 Bare rock and/or coarse fragments	6002 // 20058	Others
		A2 Herbaceous Vegetation (Main Layer)			
		A14 Sparse (20-10)-1% (Main Layer)			
333	Sparsely vegetated areas	Heraceous open (40-(20-10)) Vegetation	A2 Herbaceous Vegetation (Main Layer)	20037-3012	Others
		A11 Open General (70-60%) - (20-10%) (Main Layer)			
		A13 Very Open 40-(10-20%) (Main Layer)			
334	Burnt areas	Natural and semi-natural primarily terrestrial vegetation	A12 Natural and semi-natural primarily terrestrial vegetation	0004(3)[Z334]	Others
		Z334 Burnt			
335	Glaciers and perpetual snow	Perennial ice // perennial snow	A3 Ice	8009 // 8006	Others
		B1 Perennial			
		A2 Snow			
411	Inland marshes	Closed to open (100-40%) Herbaceous Vegetation	A2 Herbaceous Vegetation (Main Layer)	42155-60686	Grassland
		A20 Closed to open (100-15%)			
		A21 Closed to open (100-40%)			
412	Peat bogs	Closed to open herbaceous vegetation / closed to open lichens/mosses // Bare soil and/or other unconsolidated materials	A2 Herbaceous Vegetation (Main Layer)	42155 / 422606005(1) [Z412]	Grassland
		A20 Closed to open (100-15%)			
		A7 Lichens/Mosses			

			A5 Bare soil and other unconsolidated materials			
			Z412 Peat extracting areas			
421	Salt marshes	Closed to open herbaceous vegetation water quality: saline water	A2 Herbaceous Vegetation (Main Layer)	42155-R3	Grassland	
			A20 Closed to open (100-15%)			
			R3 Saline water			
422	Salines	Shallow Artificial Perennial waterbodies (standing) Salinity: Brine // shallow artificial non-perennial waterbodies (standing) (surface aspect: bare soil) salinity: brine	A1 Artificial Waterbodies	7013-5-V5 // 7019-7-V5	Others	
			B1 Perennial			
			C2 Shallow			
			A5 (Standing)			
			V5 Brine			
			B2 Non-Perennial			
			B4 (surface aspect: bare soil)			
423	Intertidal flats	Tidal area	A1 Inland Water	8004	Others	
			B3 Tidal area			
511	Water courses	Natural waterbodies (flowing) // Artificial waterbodies (flowing)	A1 Inland Water	8001-1 // 7001-1	Others	
			A4 (Flowing)			
			A1 Artificial Waterbodies			
512	Water bodies	Natural waterbodies (standing) // Artificial waterbodies (standing)	A1 Inland Water	8001-5 // 7001-5	Others	
			A5 (Standing)			
			A1 Artificial Waterbodies			
521	Coastal lagoons	Natural waterbodies (standing) // Artificial waterbodies (standing)	A1 Inland Water	8001-5(5)[Z521] // 7001-5(5)[Z521]	Others	
			A5 (Standing)			
			A1 Artificial Waterbodies			
			Z521 Coastal lagoons, salt or brackish water			
522	Estuaries	Tidal area (flowing) Salinity: slightly Saline	A1 Inland Water	8004-1-V2	Others	
			B3 Tidal area			
			A4 (Flowing)			
			V2 Slightly Saline			

523	Sea and ocean	Perennial natural waterbodies salinity: moderately saline // perennial natural waterbodies salinity: very saline // perennial natural waterbodies salinity: brine	A1 Inland Water	8002-V3 // 8002-V4 // 8002-V5	Others	
			B1 Perennial			
			V3 Moderately saline			
			V4 Very Saline			
			V5 Brine			
UMD Class Number	UMD Class Name	LCCS label	Classifiers	LCCS Code	IPPC Land use category	Notes
0	Water Bodies	Artificial waterbodies // Natural waterbodies	A1 Artificial Waterbodies	7001 // 8001	Others	
			A1 Inland water			
1	Evergreen Needleleaf Forests	Needleleafed Evergreen Trees	A3 Trees (Main layer)	20092	Forest	
			A10 Closed > (70-60%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			D2 Needleleaved			
			E1 Evergreen			
2	Evergreen Broadleaved Forests	Broadleaved Evergreen Trees	A3 Trees (Main layer)	20089	Forest	
			A10 Closed > (70-60%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			D1 Broadleaved			
			E1 Evergreen			
3	Deciduous Needleleaved Forests	Needleleaved Deciduous Trees	A3 Trees (Main layer)	20093	Forest	
			A10 Closed > (70-60%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			D2 Needleleaved			
			E1 Evergreen			
4	Deciduous Broadleaved Forests	Broadleaved Deciduous Trees	A3 Trees (Main layer)	20090	Forest	
			A10 Closed > (70-60%) (Main Layer)			
			B2 >30-3m (trees height main layer)			

			D1 Broadleaved			
			E2 Deciduous			
5	Mixed Forests	Mixed Trees // Mixed Trees	A3 Trees (Main layer)	20090-15045 // 20092-15045	Forest	
			A10 Closed > (70-60%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			D1 Broadleaved			
			E2 Deciduous			
			E3 Mixed			
			D2 Needleleaved			
			E1 Evergreen			
6	Woodlands	((70-60)-40%) Woodland with herbaceous layer // ((70-60)-40%) Woodland with shrubs	A3 Trees (Main layer)	20317-1 // 20314-1	???	Overlapping with forests AND grasslands. Not possible to separate
			A11 Open General (70-60%) - (20-10%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			F2 Second and/or third layer present			
			F4 Herbaceous vegetation (second or third layer)			
			F7 Closed (>70-60%) to open (70-60%) -(20-10%) (second or third layer)			
			G4 3-0.03m (Herbaceous height second or third layer)			
			A12 Open (70-60)-40% (Main Layer)			
			F6 Shrubs (second or third layer)			
			G3 5-0.3m (shrubs height second or third layer)			
7	Wooded grasslands / shrubland	(40-(20-10%)) Woodland with herbaceous layer // (40-(20-10%)) woodland with shrubs	A3 Trees (Main layer)	20317-3012 // 20314-3012	Grassland	
			A11 Open General (70-60%) - (20-10%) (Main Layer)			
			B2 >30-3m (trees height main layer)			
			F2 Second and/or third layer present			
			F4 Herbaceous vegetation (second or third layer)			
			F7 Closed (>70-60%) to open (70-60%) -(20-10%) (second or third layer)			
			G4 3-0.03m (Herbaceous height second or third layer)			
			A13 Very Open 40-(10-20%) (Main Layer)			
			F6 Shrubs (second or third layer)			

			G3 5-0.3m (shrubs height second or third layer)			
8	Closed Bushlands or shrublands	Closed to open (100-40%) Shrubland (Thicket)	A4 Shrubs (Main Layer)	21449-121340	Grassland	
			A20 Closed to open (100-15%)			
			A21 Closed to open (100-40%)			
9	Open Shrubland	Open (40-(20-10%) Medium High shrubs (shrubland)	A4 Shrubs (Main Layer)	20022-4439	Grassland	
			A11 Open General (70-60%) - (20-10%) (Main Layer)			
			B3 5-0.3m (Shrubs height main layer)			
			A13 Very Open 40-(10-20%) (Main Layer)			
			B9 Medium High 3-0.5m (Shrubs height main layer)			
10	Grasslands	Continuous Closed to Open Herbaceous Vegetation	A2 Herbaceous Vegetation (Main Layer)	21455	Grassland	
			A20 Closed to open (100-15%)			
			B4 3-0.03m (Herbaceous Height Main Layer)			
			C1 Continuous (vegetation main pattern)			
11	Croplands	Continuous Fields of herbaceous Crops	A3 Herbaceous crops	10027	Cropland	(note: perennial woody crops will be classified as the appropriate forest or shrubs land cover type!)
			B5 Continuous (field spatial distribution)			
12	Barren	Bare areas // snow // ice	B16 Bare areas	0011 // 8005 // 8008	Others	
			A2 Snow			
			A3 Ice			
13	Urban and Built up	Built up Areas	A1 Built up areas	5001	Settlement	

Harmonization without LCCS, due to poor class descriptions, too broad classes, etc. Harmonization for a data set was partly done by cross comparison with the other used data sets, to check the consistency in reporting scheme and trends over time.

GlobCorine Class Number	GlobCorine Class Name	IPPC Land use category	Notes
10	Urban and associated areas	Settlement	(note: includes CLC classes; Continuous urban fabric (111), Discontinuous urban fabric (112), Industrial or commercial units (121), Road and rail networks and associated land (122), Port areas (123), Airports (124), Mineral extraction sites (131), Dump sites (132), Construction sites (133), Green urban areas (141), Sport and leisure facilities (142))
20	Rainfed cropland	Cropland	(note: includes CLC classes; Non-irrigated arable land (211), Vineyards (221), Fruit trees and berry plantations (222), Olive groves (223))

30	Irrigated cropland	Cropland	(note: includes CLC classes; Permanently irrigated land (212), Rice fields (213))
40	Forest	Forest	(note: includes CLC classes; Broadleaved forest (311), Coniferous forest (312), Mixed forest (313))
50	Heathland and sclerophyllous vegetation	Grassland	(note: includes CLC classes; Moors and heathland (322), Sclerophyllous vegetation (323))
60	Grassland	Grassland	(note: includes CLC classes; Pastures (231), Natural grasslands (321))
70	Sparingly vegetated area	Others	(note: includes CLC classes; Sparingly vegetated areas (333))
80	Vegetated low-lying areas on regularly flooded soil	Grassland	(note: includes CLC classes; Inland marshes (411), Peat bogs (412), Salt marshes (421), Intertidal flats (423))
90	Bare areas	Others	(note: includes CLC classes; Bare rocks (332), Beaches, dunes, sands (331))
100	Complex cropland	Cropland	(note: includes CLC classes; Annual crops associated with permanent crops (241), Complex cultivation patterns (242))
110	Mosaic cropland / natural vegetation	Cropland	(note: includes CLC classes; Land principally occupied by agriculture, with significant areas of natural vegetation (243), Agro-forestry areas (244))
120	Mosaic of natural (herbaceous, shrub, tree) vegetation	Forest	(note: includes CLC classes; Transitional woodland-shrub (324))
200	Water bodies	Others	(note: includes CLC classes; Water courses (511), Water bodies (512), Coastal lagoons (521), Estuaries (522), Sea and ocean (523))
210	Permanent snow and ice	Others	(note: includes CLC classes; Glaciers and perpetual snow (335))
Eurostat Class Number	Eurostat Class Name	IPPC Land use category	Notes
L0001	Arable Land	Cropland	
L0002	Permanent grassland	Grassland	
L0003	Land under permanent crops	Cropland	
L0004	Kitchen gardens	Cropland	
L0005	Utilized agricultural areas (UAA)	---	(note: this class is an aggregation of: Arable land (L0001), Permanent grassland (L0002), Land under permanent crops (L0003) and Kitchen gardens (L0004))
L0006	Wooded area	Forest	
L2410	Vineyards	Cropland	
L2450	Olives	Cropland	
L2610	Fodder from arable land	---	
L2696	Fallow and green manures	---	
FAOStat Class Number	FAOStat Class Name	IPPC Land use category	Notes
	Arable land and Permanent crops	Cropland	
	Forest area	Forest	
	Permanent meadows and pastures	Grassland	
	Other land & Inland Water	Other land & Settlements	

Year of FRA Report	FRA Class Name	IPPC Land use category	Notes
1992	Forest and other wooded land (O.W.L.) (1000 ha)	Forest	
1992	Non-forest land; other land (1000 ha) + Inland Waters (1000ha)	Settlement & Other Land	
1992	Non-forest land; agricultural land (1000 ha)	Cropland & Grassland	
1985	Forest and other wooded land (1000 ha)	Forest	
1985	Non-forest land: area of other land; including built up and related land (land under transport and communication facilities; etc.) (1000 ha)	Settlement & Other Land	
1985	Non-forest land; agricultural land (1000 ha)	Cropland & Grassland	
1976	Forest and other wooded land (1000 ha)	Forest	
1976	Non-forest land: Other (mil. ha)	Settlement & Other Land	
1976	Non-forest land: Agricultural (mil. ha) + Other wooded land (1000 ha)	Cropland & Grassland	
1963	Total - Forest land - Terres forestières - Tierras forestales	Forest	
1963	Water - Other - Non-forest land - Terres non forestières - Tierras no forestales	Settlement & Other Land	
1963	Agricultural - Non-forest land - Terres non forestières - Tierras no forestales	Cropland & Grassland	
1953/1958	Total forests (1000 ha)	Forest	
1953/1958	Non-forest land: other (1000 ha)	Settlement & Other Land	
1953/1958	Non-forest land: agricultural land (1000 ha) + Non-forest land: brush land (1000 ha)	Cropland & Grassland	
1946	Forested Land - Total Forest	Forest	
1946	Other Lands	Settlement & Other Land	
1946	Cultivated Lands and Grassland	Cropland & Grassland	

Supplement B: Input data and order of the approximation function used for land reconstruction on country level

Legend:

FRA = Data of FRA-report
minus POP-CLC

FAO = Data of FAOSTAT

EUST = Data of EUROSTAT

"S&O"-PC = Value obtained by FAO class "Settlement & Others"

POP-CLC = Value obtained by data of Lahmeyer populations statistics and CORINE Land Cover 2000 ("area of settlement class/inhabitant" was used as factor together with the population data of each year to calculate the total settlement area per country for each year)

TREND = Value obtained by using overlapping years of FAO "grassland" and "cropland" together with FRA "cropland & grassland" to calculate the area relation of FAO classes compared to FRA class. The trend of this relation over time was used to separate the FRA class where FAO was not available

Polynomial Degree = Degree which was used to interpolate the data by the use of the various sources used for each class

Country	IPCC class	Data	Polynomial degree	Notes
Austria	Settlement	2010,2005,2001-1950 (POP-CLC)	2	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Forest	2010 (FRA); 2008-1998 (FAO); 1997-1974 (EUST); 1963,1958,1953 (FRA)	5	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	16	
Belgium	Settlement	2010,2005,2002-1950 (POP-CLC)	5	
	Cropland	2008-2007 (EUST); 2006-2005 (FAO); 2004-1995 (EUST); 1993-1974 (EUST); 1963,1958,1953 (TREND)	5	
	Forest	2010 (FRA); 2008-2000 (FAO); 1992,1990,1985,1976,1963,1958,1953 (FRA)	2	
	Grassland	2008-2007 (EUST); 2006-2005 (FAO); 2004-1995 (EUST); 1993-1974 (EUST); 1963,1958,1953 (TREND)	2	
	Other Land	2005,2001-2000,1985,1976,1963,1958,1953 ("S&O"-PC)	3	
Bulgaria	Settlement	2010,2005,2003-1950 (POP-CLC)	3	
	Cropland	2007,2003-1999 (EUST); 1992,1985,1976,1963,1958,1953 (TREND)	2	
	Forest	2010, 2005,2000,1992,1990,1985,1976,1963,1958,1953 (FRA)	5	
	Grassland	2007,2003-1995 (EUST); 1992,1985,1976,1963,1958,1953 (TREND)	2	
	Other Land	1992,1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Cyprus	Settlement	2010,2005,2001-1950 (POP-CLC)	6	
	Cropland	2008-1961 (FAO);1958,1953 (TREND)	2	

	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1963,1958,1953 (FRA)	5	
	Grassland	2008-1961 (FAO);1958,1953 (TREND)	2	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Czech Republic	Settlement	2010,2005,2001-1959,1950 (POP-CLC)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Cropland	2008-1993 (FAO);1992,1985,1976,1963 (TREND)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Forest	2010 (FRA); 2008-1993 (FAO); 1990 (FRA)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Grassland	2008-1993 (FAO);1992,1985,1976,1963 (TREND)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Other Land	2005,2001-1992,1985,1976,1963 ("S&O"-PC)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
Denmark	Settlement	2010,2005,2003-1950 (POP-CLC)	3	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	4	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	2	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	9	
	Other Land	2005,2003-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	5	
Estonia	Settlement	2010,2005,2003-1950 (POP-CLC)	5	
	Cropland	2008-1992 (FAO)	2	
	Forest	2010 (FRA); 2008-1992 (FAO); 1990 (FRA)	2	
	Grassland	2004, 2002-1990 (EUST)	2	
	Other Land	2005,2001-1992 ("S&O"-PC)	2	
Finland	Settlement	2010,2005,2000-1950 (POP-CLC)	2	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	3	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	3	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2005,2000-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	6	

France	Settlement	2010,2005,2001-1950 (POP-CLC)	5	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	4	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	6	
	Grassland	2008-1971,1969-1961 (FAO); 1958,1953 (TREND)	9	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Germany	Settlement	2010,2005,2001-1950 (POP-CLC)	8	Data before 1990 was added together from eastern and western part
	Cropland	2008 (EUST) 2007-2005 (FAO) 2004-1991 (EUST) 1990-1961 (FAO); 1958,1953 (TREND)	2	Data before 1990 was added together from eastern and western part
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	2	Data before 1990 was added together from eastern and western part
	Grassland	2008 (EUST) 2007-2005 (FAO) 2004-1990 (EUST) 1989-1961 (FAO); 1958,1953 (TREND)	2	Data before 1990 was added together from eastern and western part
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	Data before 1990 was added together from eastern and western part
Greece	Settlement	2010,2005,2001-1950 (POP-CLC)	5	
	Cropland	2004 (FAO) 2002-1961 (FAO); 1958,1953 (TREND)	2	
	Forest	2010 (FRA); 2008-1990 (FAO); 1963,1958,1953 (FRA)	4	Large deviations of forest values among the data sources, several high peaks could be seen: probably due to the fact that the shrub vegetation was either accounted to forest or other land for different years, depending on the definitions, Eurostat values of Greece forest are not plausible
	Grassland	2002-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2001-1990,1963,1958,1953 ("S&O"-PC)	2	
Hungary	Settlement	2010,2005,2001-1950 (POP-CLC)	13	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	6	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	3	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	3	
Ireland	Settlement	2010,2005,2002-1950 (POP-CLC)	4	
	Cropland	2009 (EUST); 2008-1961 (FAO); 1958,1953 (TREND)	5	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	2	
	Grassland	2008-1991 (FAO); 1985,1976,1963,1958,1953 (TREND)	5	

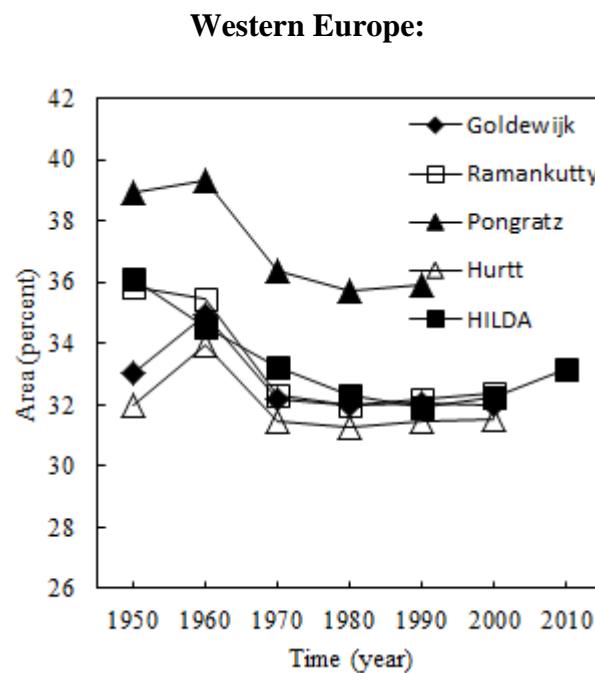
	Other Land	2005,2002-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	6	
Italy	Settlement	2010,2005,2001-1950 (POP-CLC)	4	
	Cropland	2008-1971 (FAO); 1958,1953 (TREND)	4	
	Forest	2010 (FRA); 2008-1990 (FAO); 1963,1958,1953 (FRA)	2	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Latvia	Settlement	2010,2005,2001-1950 (POP-CLC)	2	
	Cropland	2008-1992 (FAO)	2	Large deviations of values from FAO around 1995 (probably new way of measurements)
	Forest	2010 (FRA); 2008-1992 (FAO); 1990 (FRA)	5	
	Grassland	2008-1992 (FAO)	2	
	Other Land	2008-1992 ("S&O"-PC)	2	
Lithuania	Settlement	2010,2005,2001-1950 (POP-CLC)	7	
	Cropland	2008-1992 (FAO)	2	Large deviations of values from FAO & Eurostats around 2000 (probably new way of measurements)
	Forest	2010 (FRA); 2008-1992 (FAO); 1990 (FRA)	2	
	Grassland	2008-1992 (FAO)	2	Large deviations of values from FAO & Eurostats around 2000 (probably new way of measurements)
	Other Land	2005, 2001-1992 ("S&O"-PC)	2	
Luxembourg	Settlement	2010,2005,2001-1950 (POP-CLC)	16	
	Cropland	2006-2001, 1999-1991, 1989-1974 (EUST)	8	
	Forest	2010 (FRA); 2008-2000 (FAO); 1992,1990, 1985, 1976, 1963, 1958, 1953 (FRA)	2	
	Grassland	2006-1974 (EUST)	4	
	Other Land	2005, 2001-2000, 1992, 1985, 1976, 1963, 1958, 1953 ("S&O"-PC)	2	
Malta	Settlement	2010,2005,2002-1950 (POP-CLC)	4	
	Cropland	2008-1961 (FAO)	2	
	Forest	2008-1990 (FAO)	2	
	Grassland	---	---	
	Other Land	2005, 2001-2000, 1992, 1985, 1976, 1963, 1958, 1953 ("S&O"-PC)	2	
Netherlands	Settlement	2010,2003-1950 (POP-CLC)	3	

	Cropland	2009-2007,2005-1988 (EUST); 1987-1961 (FAO); 1958,1953 (TREND)	5	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	3	
	Grassland	2009-1974 (EUST); 1973-1961 (FAO); 1958,1953 (TREND)	3	
	Other Land	2003-1990, 1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Poland	Settlement	2010,2005,2001-1950 (POP-CLC)	4	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	7	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	4	
	Other Land	2005,2001-1990, 1985,1976,1963,1958,1953 ("S&O"-PC)	4	
Portugal	Settlement	2010,2005,2001-1950 (POP-CLC)	3	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	3	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	3	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	
	Other Land	2005,2001-1990, 1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Romania	Settlement	2010,2005,2001-1950 (POP-CLC)	4	
	Cropland	2009 (EUST); 2008-1961 (FAO); 1958,1953 (TREND)	19	
	Forest	2010 (FRA); 2008-1990 (FAO); 1985,1976,1963,1958,1953 (FRA)	9	
	Grassland	2009 (EUST); 2008-1961 (FAO); 1958,1953 (TREND)	5	
	Other Land	2005,2001-1990, 1985,1976,1963,1958,1953 ("S&O"-PC)	4	
Slovakia	Settlement	2010,2005,2001-1950 (POP-CLC)	10	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Cropland	2008-1993 (FAO)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Forest	2010 (FRA); 2008-1993 (FAO); 1990 (FRA)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Grassland	2008-1993 (FAO)	2	Data was used back until 1990, before that data of Czechoslovakia was used on the area of Czech Republic and Slovakia
	Other Land	2005,2001-1993 ("S&O"-PC)	2	Data was used back until 1990, before that data of

				Czechoslovakia was used on the area of Czech Republic and Slovakia
Slovenia	Settlement	2010,2005,2001-1950 (POP-CLC)	3	
	Cropland	2008-1992 (FAO)	3	
	Forest	2010 (FRA); 2008-1993 (FAO)	2	
	Grassland	2008-1992 (FAO)	2	
	Other Land	2005,2001-1992 ("S&O"-PC)	2	
Spain	Settlement	2010,2005,2001-1950 (POP-CLC)	6	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	3	
	Forest	2010 (FRA); 2008-1998 (FAO); 1997-1974 (EUST); 1963,1958,1953 (FRA)	4	Large deviations of forest values among the data sources, several high peaks could be seen: probably due to the fact that the shrub vegetation was either accounted to forest or other land for different years, depending on the definitions
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	5	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	
Sweden	Settlement	2010,2005,2001-1950 (POP-CLC)	3	
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	4	
	Forest	2010 (FRA); 2008-1990 (FAO) 1985,1976,1963,1958,1953 (FRA)	6	
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	6	
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	5	
Switzerland	Settlement	2010,2005,2001-1950 (POP-CLC)	3	CLC Data was obtained from the Swiss Corine Program available at EEA
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	4	Baseline map is based on Swiss CLC data
	Forest	2010 (FRA); 2008-1990 (FAO) 1985,1976,1963,1958,1953 (FRA)	3	Baseline map is based on Swiss CLC data
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	4	Baseline map is based on Swiss CLC data
	Other Land	2005,2001-1990,1985,1976,1963,1958,1953 ("S&O"-PC)	2	Baseline map is based on Swiss CLC data
United Kingdom	Settlement	2010,2005,2001-1950 (POP-CLC)	2	
	Cropland	2008-1961 (FAO)	7	
	Forest	2010 (FRA); 2008-1990 (FAO) 1985,1976, 1946, 1939, 1929, 1924, 1919, 1914 (FRA)	5	Values from 1914-1946 are derived from Unasylva 1946 special report on UK forests
	Grassland	2008-1961 (FAO)	7	
	Other Land	2005,2001-1990,1985 ("S&O"-PC)	3	

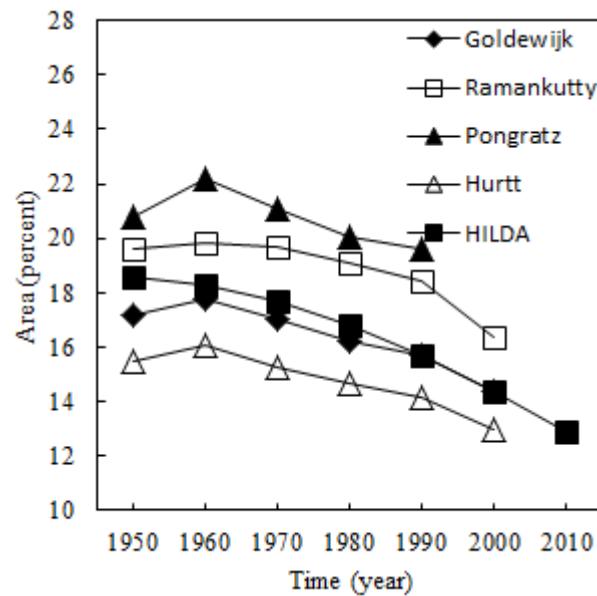
Czechoslovakia	Settlement	2010,2005,2001-1959,1950 (POP-CLC)	2	Data was used since 1990, after that data of Czech Republic & Slovakia was used for each country area
	Cropland	2008-1961 (FAO); 1958,1953 (TREND)	2	Data was used since 1990, after that data of Czech Republic & Slovakia was used for each country area
	Forest	2010 (FRA); 2008-1991 (FAO) 1990,1985,1976,1963,1958,1953 (FRA)	4	Data was used since 1990, after that data of Czech Republic & Slovakia was used for each country area
	Grassland	2008-1961 (FAO); 1958,1953 (TREND)	2	Data was used since 1990, after that data of Czech Republic & Slovakia was used for each country area
	Other Land	2005,2001-1990,1985 ("S&O"-PC)	3	Data was used since 1990, after that data of Czech Republic & Slovakia was used for each country area

Supplement C: Model Comparison for European Regions



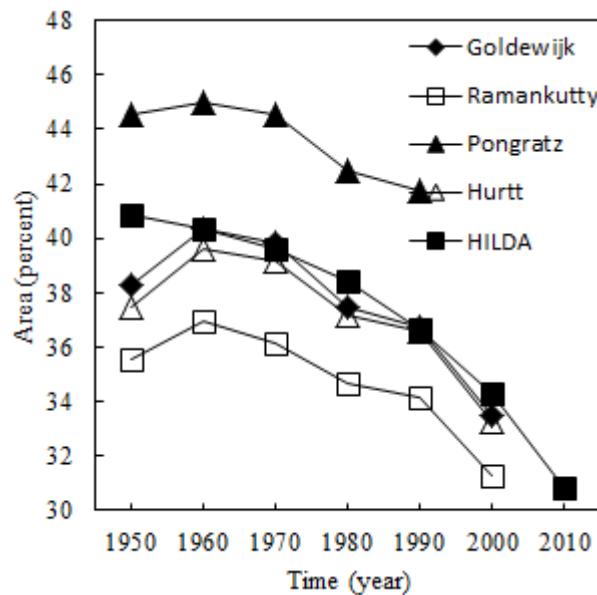
Area fractions for cropland, compared in decadal time steps from 1950 to 2010 for Western Europe.

Northern Europe:



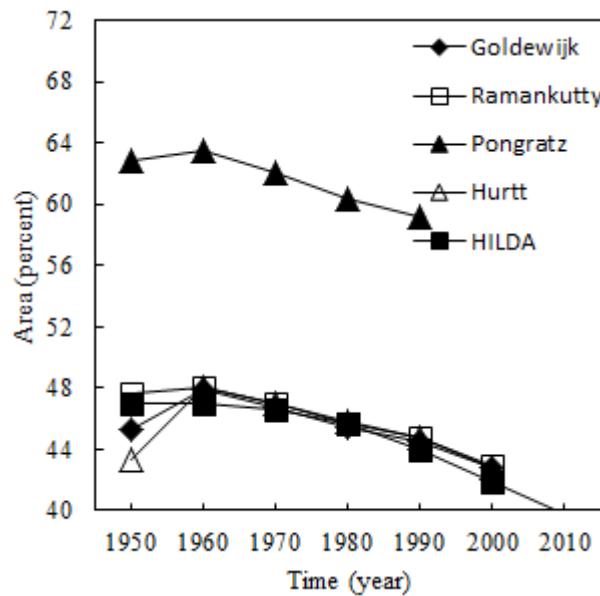
Area fractions for cropland, compared in decadal time steps from 1950 to 2010 for Northern Europe.

Southern Europe:



Area fractions for cropland, compared in decadal time steps from 1950 to 2010 for Southern Europe.

Eastern Europe:



Area fractions for cropland, compared in decadal time steps from 1950 to 2010 for Eastern Europe.