

CHANGES CLASIFICACION: LAND COVER FLOWS

Land Cover Accounts summarize and interpret the $44 \times 43 = 1892$ possible one-to-one changes between the 44 CORINE land cover classes. The changes are grouped to so-called **flows of land cover** and are classified according to major land use processes:

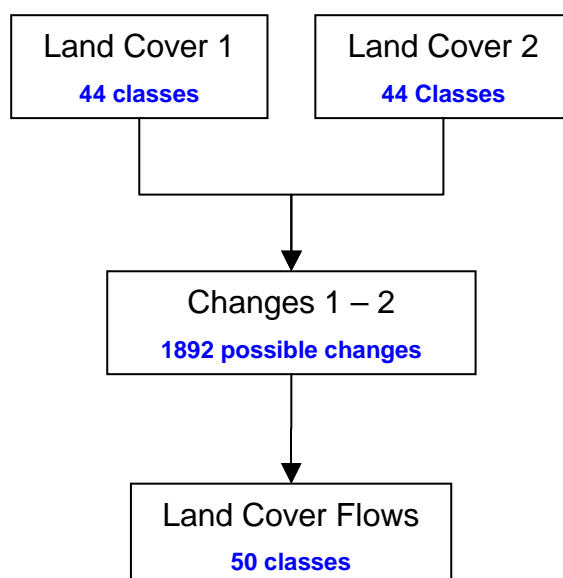
- lcf1 Urban land management
- lcf2 Urban residential sprawl
- lcf3 Sprawl of economic sites and infrastructures
- lcf4 Agriculture internal conversions
- lcf5 Conversion from forested & natural land to agriculture
- lcf6 Withdrawal of farming
- lcf7 Forests creation and management
- lcf8 Water bodies creation and management
- lcf9 Changes of Land Cover due to natural and multiple causes

The nomenclature of flows is organized on 3 levels. Flows are described in Annex 1.

The classification of land cover flows results from the feasibility studies and subsequent revisions after discussion with experts in agri-environment and forestry. Basically, the classification of land cover flows distinguishes change between broad land cover classes and changes internal to these classes. Analysis of land cover flows supplies a rapid vision of processes taking place.

In the LEAC database the Land Cover Flows are described in the FLATMATRIX table. This table can be modified according to new revisions of the nomenclature or aggregation. The changes on this table will affect the final results

Combination of two Land Cover Layers to produce a Change Database. In the case of CORINE land cover (44 classes) the intersection between two layers produces 1936 possible combinations. 1892 are classified as changes and 44 are classified as "No change". To interpret this amount of information, Land Cover Changes are classified according to major Land Use processes into about 50 Land Cover Flows.



Land Cover Flows hierarchy. Classification of Land Cover Changes Matrix into Land Cover Flows can be done in three levels of aggregation. An example of level hierarchy is shown below. Colors in the figure show the Level 1 classification. Go to the Annex 1 and 2 for a complete description of Land Cover Flow classification.

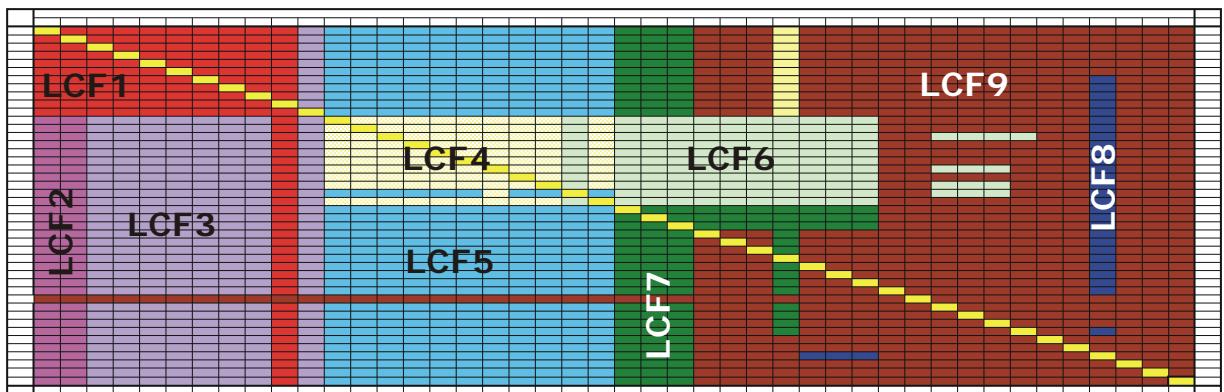
LCF4 Agriculture internal conversions



LCF41 Extension of set aside fallow land and pasture



LCF411 Uniform extension of set aside fallow land and pasture



ANNEX 1: MATRIX OF LAND COVER FLOWS

Part a – Formation of Artificial surfaces

		111	112	121	122	123	124	131	132	133	141	142
		Continuous urban fabric	Discontinuous urban fabric	Industrial or commercial units	Road and rail networks and associated land	Port areas	Airports	Mineral extraction sites	Dump sites	Construction sites	Green urban areas	Sport and leisure facilities
111	Continuous urban fabric		lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf13	lcf38
112	Discontinuous urban fabric	lcf11		lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf13	lcf38
121	Industrial or commercial units	lcf12	lcf12		lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf13	lcf38
122	Road and rail networks and associated land	lcf12	lcf12	lcf12		lcf12	lcf12	lcf12	lcf12	lcf12	lcf13	lcf38
123	Port areas	lcf12	lcf12	lcf12	lcf12		lcf12	lcf12	lcf12	lcf12	lcf13	lcf38
124	Airports	lcf12	lcf12	lcf12	lcf12	lcf12		lcf12	lcf12	lcf12	lcf13	lcf38
131	Mineral extraction sites	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12		lcf12	lcf12	lcf13	lcf38
132	Dump sites	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12		lcf12	lcf13	lcf38
133	Construction sites	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12	lcf12		lcf13	lcf38
141	Green urban areas	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11		lcf38
142	Sport and leisure facilities	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf11	lcf13	
211	Non-irrigated arable land	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
212	Permanently irrigated land	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
213	Rice fields	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
221	Vineyards	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
222	Fruit trees and berry plantations	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
223	Olive groves	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
231	Pastures	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
241	Annual crops associated with permanent crops	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
242	Complex cultivation patterns	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
243	Agriculture mosaics with significant natural vegetation	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
244	Agro-forestry areas	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
311	Broad-leaved forest	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
312	Coniferous forest	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
313	Mixed forest	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
321	Natural grassland	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
322	Moors and heathland	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
323	Sclerophyllous vegetation	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
324	Transitional woodland shrub	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
331	Beaches, dunes and sand plains	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
332	Bare rock	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
333	Sparsely vegetated areas	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
334	Burnt areas	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
335	Glaciers and perpetual snow	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99
411	Inland marshes	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
412	Peatbogs	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
421	Salt marshes	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
422	Salines	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
423	Intertidal flats	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
511	Water courses	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
512	Water bodies	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
521	Coastal lagoons	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
522	Estuaries	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38
523	Sea and ocean	lcf21	lcf22	lcf31	lcf32	lcf33	lcf34	lcf35	lcf36	lcf37	lcf13	lcf38

Part b – Formation of Agricultural areas

		211	212	213	221	222	223	231	241	242	243	244
		Non-irrigated arable land	Permanently irrigated land	Rice fields	Vineyards	Fruit trees and berry plantations	Olive groves	Pastures	Annual crops associated with permanent crops	Complex cultivation patterns	Agriculture mosaics with significant natural vegetation	Agro-forestry areas
111	Continuous urban fabric	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
112	Discontinuous urban fabric	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
121	Industrial or commercial units	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
122	Road and rail networks and associated land	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
123	Port areas	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
124	Airports	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
131	Mineral extraction sites	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
132	Dump sites	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
133	Construction sites	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
141	Green urban areas	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
142	Sport and leisure facilities	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54	lcf54
211	Non-irrigated arable land		lcf421	lcf421	lcf451	lcf451	lcf452	lcf411	lcf453	lcf412	lcf62	lcf47
212	Permanently irrigated land	lcf422		lcf422	lcf451	lcf451	lcf452	lcf411	lcf453	lcf412	lcf62	lcf47
213	Rice fields	lcf422	lcf422		lcf451	lcf451	lcf452	lcf411	lcf453	lcf412	lcf62	lcf47
221	Vineyards	lcf442	lcf441	lcf441		lcf433	lcf432	lcf411	lcf444	lcf444	lcf62	lcf47
222	Fruit trees and berry plantations	lcf442	lcf441	lcf441	lcf433		lcf432	lcf411	lcf444	lcf444	lcf62	lcf47
223	Olive groves	lcf443	lcf441	lcf441	lcf431	lcf431		lcf411	lcf443	lcf443	lcf62	lcf47
231	Pastures	lcf462	lcf461	lcf461	lcf462	lcf462		lcf462		lcf463	lcf62	lcf47
241	Annual crops associated with permanent crops	lcf442	lcf441	lcf441	lcf451	lcf451	lcf452	lcf411		lcf412	lcf62	lcf47
242	Complex cultivation patterns	lcf463	lcf463	lcf463	lcf463	lcf463	lcf463	lcf412	lcf463		lcf62	lcf47
243	Agriculture mosaics with significant natural vegetation	lcf523	lcf523	lcf523	lcf523	lcf523	lcf523	lcf523	lcf523	lcf523		lcf47
244	Agro-forestry areas	lcf462	lcf461	lcf461	lcf462	lcf462	lcf462	lcf412	lcf462	lcf463	lcf62	
311	Broad-leaved forest	lcf511	lcf511	lcf511	lcf511	lcf511	lcf511	lcf512	lcf511	lcf512	lcf512	lcf512
312	Coniferous forest	lcf511	lcf511	lcf511	lcf511	lcf511	lcf511	lcf512	lcf511	lcf512	lcf512	lcf512
313	Mixed forest	lcf511	lcf511	lcf511	lcf511	lcf511	lcf511	lcf512	lcf511	lcf512	lcf512	lcf512
321	Natural grassland	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
322	Moors and heathland	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
323	Sclerophyllous vegetation	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
324	Transitional woodland shrub	lcf511	lcf511	lcf511	lcf511	lcf511	lcf511	lcf512	lcf511	lcf512	lcf512	lcf512
331	Beaches, dunes and sand plains	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
332	Bare rock	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
333	Sparsely vegetated areas	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
334	Burnt areas	lcf521	lcf521	lcf521	lcf521	lcf521	lcf521	lcf522	lcf521	lcf522	lcf522	lcf522
335	Glaciers and perpetual snow	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99
411	Inland marshes	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
412	Peatbogs	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
421	Salt marshes	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
422	Salines	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
423	Intertidal flats	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
511	Water courses	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
512	Water bodies	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
521	Coastal lagoons	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
522	Estuaries	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53
523	Sea and ocean	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53	lcf53

Part c – Formation of Forested or open natural surfaces

	311	312	313	321	322	323	324	331	332	333	334	335
	Broad-leaved forest	Coniferous forest	Mixed forest	Natural grassland	Moors and heathland	Sclerophyllous vegetation	Transitional woodland shrub	Beaches, dunes and sand plains	Bare rock	Sparsely vegetated areas	Burnt areas	Glaciers and perpetual snow
Continuous urban fabric	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Discontinuous urban fabric	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Industrial or commercial units	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Road and rail networks and associated land	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Port areas	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Airports	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Mineral extraction sites	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Dump sites	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Construction sites	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Green urban areas	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Sport and leisure facilities	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf911	lcf911	lcf92	lcf99
Non-irrigated arable land	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Permanently irrigated land	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Rice fields	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Vineyards	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Fruit trees and berry plantations	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Olive groves	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Pastures	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Annual crops associated with permanent crops	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Complex cultivation patterns	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Agriculture mosaics with significant natural vegetation	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Agro-forestry areas	lcf61	lcf61	lcf61	lcf62	lcf62	lcf62	lcf61	lcf62	lcf62	lcf62	lcf92	lcf99
Broad-leaved forest		lcf73	lcf73	lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf92	lcf99
Coniferous forest	lcf73		lcf73	lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf92	lcf99
Mixed forest	lcf73	lcf73		lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf74	lcf92	lcf99
Natural grassland	lcf72	lcf72	lcf72		lcf912	lcf912	lcf72	lcf912	lcf912	lcf912	lcf92	lcf99
Moors and heathland	lcf72	lcf72	lcf72	lcf912		lcf912	lcf72	lcf912	lcf912	lcf912	lcf92	lcf99
Sclerophyllous vegetation	lcf72	lcf72	lcf72	lcf912	lcf912		lcf72	lcf912	lcf912	lcf912	lcf92	lcf99
Transitional woodland shrub	lcf71	lcf71	lcf71	lcf911	lcf911	lcf911		lcf911	lcf911	lcf911	lcf92	lcf99
Beaches, dunes and sand plains	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72		lcf912	lcf912	lcf92	lcf99
Bare rock	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf912		lcf912	lcf92	lcf912
Sparsely vegetated areas	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf912	lcf912		lcf92	lcf912
Burnt areas	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf912	lcf912	lcf912		lcf99
Glaciers and perpetual snow	lcf99	lcf99	lcf99	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf99	
Inland marshes	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99
Peatbogs	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf99	lcf99	lcf99	lcf92	lcf99
Salt marshes	lcf72	lcf72	lcf72	lcf912	lcf912	lcf912	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99
Salines	lcf72	lcf72	lcf72	lcf911	lcf911	lcf911	lcf72	lcf911	lcf99	lcf911	lcf99	lcf99
Intertidal flats	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99	lcf93	lcf99	lcf99	lcf99
Water courses	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99
Water bodies	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf82	lcf82	lcf82	lcf99	lcf99
Coastal lagoons	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99
Estuaries	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99
Sea and ocean	lcf72	lcf72	lcf72	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99	lcf99

Part d – Formation of Wetlands and Water surfaces

	411	412	421	422	423	511	512	521	522	523
	Inland marshes	Peatbogs	Salt marshes	Salines	Intertidal flats	Water courses	Water bodies	Coastal lagoons	Estuaries	Sea and ocean
Continuous urban fabric	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Discontinuous urban fabric	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Industrial or commercial units	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Road and rail networks and associated land	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Port areas	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Airports	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf99	lcf99	lcf93	lcf93
Mineral extraction sites	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Dump sites	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Construction sites	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Green urban areas	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Sport and leisure facilities	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Non-irrigated arable land	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Permanently irrigated land	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Rice fields	lcf62	lcf62	lcf62	lcf62	lcf93	lcf913	lcf81	lcf62	lcf93	lcf93
Vineyards	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Fruit trees and berry plantations	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Olive groves	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Pastures	lcf62	lcf62	lcf62	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Annual crops associated with permanent crops	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Complex cultivation patterns	lcf62	lcf62	lcf62	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Agriculture mosaics with significant natural vegetation	lcf62	lcf62	lcf62	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Agro-forestry areas	lcf62	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Broad-leaved forest	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Coniferous forest	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Mixed forest	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Natural grassland	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Moors and heathland	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Sclerophyllous vegetation	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Transitional woodland shrub	lcf911	lcf911	lcf911	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Beaches, dunes and sand plains	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Bare rock	lcf99	lcf99	lcf99	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Sparsely vegetated areas	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Burnt areas	lcf912	lcf912	lcf912	lcf99	lcf93	lcf913	lcf81	lcf99	lcf93	lcf93
Glaciers and perpetual snow	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94	lcf94
Inland marshes		lcf912	lcf912	lcf99	lcf93	lcf913	lcf912	lcf912	lcf93	lcf93
Peatbogs	lcf912		lcf912	lcf99	lcf93	lcf913	lcf912	lcf912	lcf93	lcf93
Salt marshes	lcf99	lcf912		lcf99	lcf93	lcf913	lcf912	lcf912	lcf93	lcf93
Salines	lcf99	lcf99	lcf911		lcf93	lcf913	lcf81	lcf911	lcf93	lcf93
Intertidal flats	lcf99	lcf912	lcf912	lcf99		lcf913	lcf99	lcf93	lcf93	lcf93
Water courses	lcf912	lcf912	lcf912	lcf99	lcf99		lcf912	lcf912	lcf93	lcf93
Water bodies	lcf912	lcf912	lcf912	lcf99	lcf93	lcf99		lcf99	lcf93	lcf93
Coastal lagoons	lcf912	lcf912	lcf912	lcf99	lcf93	lcf99	lcf99		lcf93	lcf93
Estuaries	lcf912	lcf912	lcf912	lcf99	lcf93	lcf99	lcf99	lcf99		lcf93
Sea and ocean	lcf912	lcf912	lcf912	lcf99	lcf99	lcf99	lcf99	lcf912	lcf912	

ANNEX 2: DEFINITION OF LAND COVER FLOWS

- LCF1 Urban land management:** Internal transformation of urban areas.
- lcf11 Urban development/ infilling** : Conversion from discontinuous urban fabric, green urban areas and sport and leisure facilities to dense urban fabric, economic areas and infrastructures.
 - lcf12 Recycling of developed urban land:** Internal conversions between residential and/or non-residential land cover types. Construction of urban greenfields is not considered here but as lcf11.
 - lcf13 Development of green urban areas:** Extension of green urban areas over developed land as well as, in the periphery of cities, over other types of land uses.
- LCF2 Urban residential sprawl:** Land uptake by residential buildings altogether with associated services and urban infrastructure (classified in CLC 111 & 112) from non urban land (extension over sea may happen).
- lcf21 Urban dense residential sprawl:** Land uptake by continuous urban fabric (CLC 111) from non urban land
 - lcf22 Urban diffuse residential sprawl:** Land uptake by discontinuous urban fabric (CLC 112) from non urban land.
- LCF3 Sprawl of economic sites and infrastructures:** Land uptake by new economic sites and infrastructures (including sport and leisure facilities) from non urban land (extension over sea may happen).
- lcf31 Sprawl of industrial & commercial sites:** Non urban land uptake by new industrial and commercial sites
 - lcf32 Sprawl of transport networks:** Non urban land uptake by new transport networks (note that linear features narrower than 100 m are not monitored by CLC).
 - lcf33 Sprawl of harbours:** Development of harbours over non urban land and sea.
 - lcf34 Sprawl of airports:** Development of airports over non urban land and sea.
 - lcf35 Sprawl of mines and quarrying areas:** Non urban land uptake by mines and quarries.
 - lcf36 Sprawl of dumpsites:** Non urban land uptake by waste dumpsites.
 - lcf37 Construction:** Extension over non-urban land of areas under construction during the period (note: covers mainly construction of economic sites and infrastructures).
 - lcf38 Sprawl of sport and leisure facilities:** Conversion from developed as well as non-urban land to sport and leisure facilities.
- LCF4 Agriculture internal conversions:** Conversion between farming types. Rotation between annual crops is not monitored by CLC.
- lcf41 Extension of set aside fallow land and pasture:** Conversion from crop land to grassland as an agricultural rotation or for cattle husbandry.
 - lcf411 Uniform extension of set aside fallow land and pasture:** Large parcels conversion from crop land to grassland.
 - lcf412 Diffuse extension of set aside fallow land and pasture:** Conversion from crop land to complex cultivation patterns (with grassland) and from mixed agriculture to large pasture parcels.
 - lcf42 Internal conversions between annual crops:** Conversions between irrigated and non-irrigated agriculture
 - lcf421 Conversion from arable land to permanent irrigation perimeters:** Extension of permanent irrigation (incl. rice fields) over arable land
 - lcf422 Other internal conversions of arable land:** Other conversions between arable land and irrigated perimeters, incl. rice fields

- lcf43 Internal conversions between permanent crops:** Conversions between vineyards, orchards and/or olive groves
- lcf431 Conversion from olives groves to vineyards and orchards:** Conversion from olives groves to vineyards and orchards
- lcf432 Conversion from vineyards and orchards to olive groves:** Conversion from vineyards and orchards to olive groves
- lcf433 Other conversions between vineyards and orchards:** Other conversions between vineyards and orchards
- lcf44 Conversion from permanent crops to arable land:** Conversion from vineyards, orchards and olive groves to irrigated and/or non-irrigated arable land
- lcf441 Conversion from permanent crops to permanent irrigation:** Conversion from permanent crops (incl. when associated with arable land - CLC 241) to permanent (large) irrigation perimeters and rice fields
- lcf442 Conversion from vineyards and orchards to non-irrigated arable land:** Conversion from vineyards and orchards to non-irrigated arable land and from associations of annual and permanent crops to uniform arable land.
- lcf443 Conversion from olive groves to non-irrigated arable land:** Conversion from olive groves to non-irrigated arable land, incl. conversions to associations of annual and permanent crops (CLC241) and of crops and pasture (CLC242).
- lcf444 Diffuse conversion from permanent crops to arable land:** Conversion from vineyards and orchards to associations of annual and permanent crops (CLC241) and of crops and pasture (CLC 242: complex cultivation patterns).
- lcf45 Conversion from arable land to permanent crops:** Plantation of vineyards, orchards and olive groves on arable land.
- lcf451 Conversion from arable land to vineyards and orchards:** Plantation of vineyards, orchards on arable land.
- lcf452 Conversion from arable land to olive groves:** Plantation of olive groves on arable land.
- lcf453 Diffuse conversion from arable land to permanent crops:** Conversion from uniform arable land to associations of permanent crops and annual crops (CLC241).
- lcf46 Conversion from pasture to arable and permanent crops:** Conversion from pasture to arable and permanent crops
- lcf461 Conversion from pasture to permanent irrigation perimeters:** Conversion of uniform pasture areas to permanent irrigation perimeters
- lcf462 Intensive conversion from pasture to non-irrigated arable land and permanent crops:** Conversion of uniform pasture areas to non-irrigated annual and permanent crops
- lcf463 Diffuse conversion from pasture to arable and permanent crops:** Conversion from complex cultivation patterns including pasture (CLC242) to uniform arable land and permanent crops as well as to associations of the last two (CLC241) and conversion of uniform pasture (CLC231) to complex cultivation patterns.
- lcf47 Extension of agro-forestry:** Conversion of cultivated land and open pasture to agro-forestry systems such as dehesas (note: conversion from 243, where natural vegetation is important, is recorded under lcf522)
- lcf48 Other conversions from agriculture mosaics to arable land and permanent crops:** This land cover class is used only when changes are detected from a Corine land cover matrix combining classification of level2 for the initial year and level 3 for the final year. Agriculture mosaic classes being grouped in clc 24 only, it is not possible to differentiate the processes according to the type of land consumed. It includes in particular the sub-class lcf523, Conversions from agriculture-nature mosaics to continuous agriculture, not isolated in this case.
- lcf481 Other conversions from agriculture mosaics to permanent crops:** clc level2xlevel3 only. It includes conversion of agriculture-nature mosaics to arable land (see lcf48)
- lcf482 Other conversions from agriculture mosaics to arable land (including conversion of agriculture-nature mosaics to permanent crops):** clc level2xlevel3 only. It includes conversion of agriculture-nature mosaics to arable land (see lcf48)

- LCF5 Conversion from forested & natural land to agriculture:** Extension of agriculture land use
- lcf51 Conversion from forest to agriculture:** Deforestation for agriculture purpose, including agricultural conversion of transitional woodland shrub
- lcf511 Intensive conversion from forest to agriculture:** Deforestation, including agricultural conversion of transitional woodland shrub, for cultivation of annual and permanent crops (incl. in association, CLC241).
- lcf512 Diffuse conversion from forest to agriculture:** Conversion from uniform forest to complex cultivation patterns, mosaic agricultural landscape and agro-forestry. Due to possible uncertainties in monitoring extension of pasture vs. recent fellings, conversion from forests to pasture land (CLC231) is recorded here.
- lcf52 Conversion from semi-natural land to agriculture:** Conversion from dry semi-natural land (except CLC324, grouped with forests) to agriculture
- lcf521 Intensive conversion from semi-natural land to agriculture:** Conversion from dry semi-natural land (except CLC324, grouped with forests) to annual crops, permanent crops and their association.
- lcf522 Diffuse conversion from semi-natural land to agriculture:** Conversion from dry semi-natural land (except CLC324, grouped with forests) to pasture and mixed agriculture with pasture.
- lcf523 Conversions from agriculture-nature mosaics to continuous agriculture:** Conversion from clc243, where natural areas are distinctive feature of the land systems to continuous agriculture. This is an over-estimation from an agriculture perspective but is justified in terms of analysis of ecological potentials of complex land systems
- lcf53 Conversion from wetlands to agriculture:** Conversion of wetlands to any type of farmland (CLC2)
- lcf54 Conversion from developed areas to agriculture:** Conversion of urban land to any type of farmland (CLC2)
- LCF6 Withdrawal of farming:** Farmland abandonment and other type of withdrawal of agriculture activity in favour of forests or natural land
- lcf61 Withdrawal of farming with woodland creation:** Forest and woodland creation (incl. transitional woodland shrub) from all CLC agriculture types. Withdrawal of farming with woodland creation is a broader concept than farmland abandonment with woodland creation, which results more from decline of agriculture than afforestation programmes. Additional information is necessary to identify an abandonment process (type of agriculture, landscape type, socio-economic statistics...).
- lcf62 Withdrawal of farming without significant woodland creation:** Farmland abandonment in favour of natural or semi-natural landscape (except forests and transitional woodland shrub), as long as they are a possible transition. Some odd cases are provisionally recorded as lcf99 Other changes and unknown.
- LCF7 Forests creation and management:** Creation of forests and management of the forest territory by felling and replanting. Due to the CLC cycle of 10 years, only one part of the shrubs are tall enough to be identified as trees. In order to taking stock of all recent plantations, conversions of semi-natural land to CLC324 are conventionally recorded as afforestation (although some natural colonisation may take place). In the case of conversion from farmland, see lcf61.
- lcf71 Conversion from transitional woodland to forest:** Conversion from transitional woodland to broadleaved, coniferous or mixed forest, taking place when shrubs can be detected as trees.
- lcf72 Forest creation, afforestation:** Forest creation and afforestation take place on all previously non agricultural landscapes where new forests can be identified. Extension of transitional woodland shrub over non-agricultural land is recorded as afforestation. Conversion from transitional woodland to broadleaved, coniferous or mixed forest are not a creation of forest territory and are therefore registered separately (lcf71).
- lcf73 Forests internal conversions:** Conversions between broadleaved, coniferous and/or mixed forest (CLC311, 312 and 313)
- lcf74 Recent felling and transition:** Conversion from broadleaved, coniferous and/or mixed forest to open semi-natural and natural dry land resulting more likely from felling. The main

transition is towards CLC324 Transitional woodland shrub, although some other types can be detected. Due to uncertainties, all are provisionally considered as transitional states of forests.

- LCF8 Water bodies creation and management:** Creation of dams and reservoirs and possible consequences of the management of the water resource on the water surface area.
- lcf81 Water bodies creation:** Extension of water surfaces resulting from the creation of dams and reservoirs
- lcf82 Water bodies management:** Consequences of the management of the water resource on the water surface area of reservoirs
- LCF9 Changes of Land Cover due to natural and multiple causes:** Changes in land cover resulting from natural phenomena with or without any human influence.
- lcf91 Semi-natural creation and rotation:** Changes in natural and semi-natural land cover due to natural factors
- lcf911 Semi-natural creation:** Natural colonisation of land previously used by human activities. Note that extension of CLC324 is considered as the result of farmland abandonment or direct afforestation.
- lcf912 Semi-natural rotation:** Rotation between the dry semi-natural and natural land cover types of CLC (except forest and transitional woodland shrub).
- lcf913 Extension of water courses:** Extension of water course results from natural erosion and artificial works. Due to the very incomplete detection of rivers with CLC, the lcf913 flow item has to be used very carefully.
- lcf92 Forests and shrubs fires:** Forest and shrub fires. Due to the short cycle of recovery of vegetation from fire, burnt areas (which are well identified on satellite images) cannot be compared in a 10 years interval, except for very aggregated statistics.
- lcf93 Coastal erosion:** Conversion of all land cover types to intertidal flats, estuaries or sea and ocean. The tide level when the satellite image is shot being unknown of the photointerpreters, the coastal erosion flow has to be used very carefully.
- lcf94 Decrease in permanent snow & glaciers cover:** Decrease of permanent snow and glaciers due to climate change to semi-natural and natural land covers, mainly to bare rock, sparsely vegetated areas and water systems.
- lcf99 Other changes and unknown:** In this category are recorded land cover changes that are rare or more likely improbable.