

Nomenclature of the national 1:50.000 scale CORINE land cover mapping in Hungary

Introduction

This nomenclature forms the basis of the national CORINE land cover project at scale 1:50.000 (CLC50) in Hungary. The project was started in 1998 as part of the Acquis National Programme (ANP) of the Ministry of agriculture and Regional Policy. Later the Ministry of Environment has also joined the project. The evolution of the nomenclature is as follows:

- The basis is the European standard CORINE scale 1:100.000 (CLC100) nomenclature (CORINE Land Cover Technical Guide, EUR 12585EN, Luxembourg, 1993).
- The standard European nomenclature has been adapted to the geographic conditions of Hungary by dr. A. Horánszky and F. Horváth at 1992.
- Significant expertise has been obtained in the application of the nomenclature during the implementation of CLC100 project in Hungary between 1994 and 1996 within the frames of the Phare Regional Environmental Programme.
- The nomenclature has been extended to support an experimental 1:50.000 scale land cover mapping (Feranec, J., Otáhel, J., Pravda, J., 1995. Proposal for a methodology and nomenclature scale 1:50.000 CORINE Land Cover Project, Final Report, Institute of Geography, Slovak Academy of Sciences, Bratislava) executed in four Phare countries in 1996-1997.
- Experience gained during the implementation of various national CLC100 projects in European countries (Bossard, M.: Mapping criteria and generalisation rules; Revised illustrated guide, IGN France, Paris, Manuscript, 1998) has been evaluated and included.
- Adaptation of nomenclature developed for the European Environment Agency (EEA, Copenhagen) by Phare Topic Link Land Cover (PTL/LC): The CORINE land cover classes and their definitions at scale 1:50.000 for the Phare countries. Concerning natural / seminatural vegetation, modifications are based on the revision made by: Zs. Molnár and F. Horváth: CORINE Land Cover classes and definitions for mapping at scale 1:50.000; seminatural vegetation (FÖMI, Manuscript, 1999). Concerning arable land, proposals of J. Ángyán (University of Gödöllő) were followed.
- Further modifications were made on the nomenclature in the Photointerpreters' workshop, just before starting the CLC50 project in 1999. Definitions for grassland categories were modified using remarks by botanists and nature conservation experts. Definitions for forest categories were improved by I. Márkus (Sopron University).
- The latest minor modifications were introduced after finishing the 1st phase of the project in 2000.

Remarks:

- Definitions on level-2 and level-3 are practically repetitions of the standard CORINE Land Cover nomenclature, except the original 'pastures' (2.3.1) category, which was significantly modified. Features of definition, not characteristic of Hungary were omitted. Names of level-4 (and somewhere level-5) categories, which are actually used in the production of the database are printed in **bold**, while definitions are printed in *italics*.
- Elements of the original PTL/LC nomenclature that are not present in Hungary were omitted (e.g. 1.2.3.1 Military and naval ports).
- Categories marked with * were defined by the Hungarian team as a supplement to the PTL/LC nomenclature.
- Categories marked with † have been significantly modified by the Hungarian team compared to the original (standard CLC100 or PTL/LC nomenclature) definition.

1 Artificial surfaces

1.1 Urban fabric

1.1.1 Continuous urban fabric

Buildings, roads and artificially surfaced areas cover more than 80 % of the total surface. Non linear areas of vegetation and bare soils are exceptional.

1.1.1.1 Areas of urban centres

Areas of urban centres with public, administrative and commercial buildings, roads, parking lots and artificial surfaces (e.g. cemeteries without vegetation) cover more than 80% of the total surface.

Urban greenery is exceptional (insignificant).

1.1.1.2 Areas of ancient cores

Dense ancient cores (mainly residential buildings) with roads, parking lots, etc. Urban greenery is exceptional (insignificant).

1.1.2 Discontinuous urban fabric

Most of the land is covered by structures. Buildings, roads and artificially surfaced areas are associated with vegetated areas and bare soils, which occupy discontinuous but significant surfaces. The share of built up areas is at least 30%. If the share of built up area is less than 30%, 2.4.2 code has to be used. In case of non-permanent residence 1.4.2 has to be used (recreation area).

1.1.2.1 Discontinuous built-up areas with multiflat houses prevailing without gardens

Areas formed mainly by houses without more distinct representation of gardens. Also lawns, trees and shrubs, urban greenery, communications, parking lots, in lesser extent service buildings, cemeteries without vegetation, private family houses can be part of them. They are represented mainly by urban settlement with multistoried houses.

1.1.2.2 Discontinuous built-up areas with family houses with gardens

Areas, formed mainly by family houses connected with gardens and lawns. There are fruit trees, vegetable, eventually agricultural crops. Other elements of the class are communications, various service buildings, parking lots, small squares reaching approx. 20-50% of the area, cemeteries without vegetation. They are represented mainly by rural settlements and parts of urban settlements.

1.1.2.3 Discontinuous built-up areas with greenery

Areas mostly consisting of houses in forestland (dispersed houses in forest environment, e.g. Tapiola "Garden city").

1.2 Industrial, commercial and transport units

1.2.1 Industrial or commercial units

Artificially surfaced areas (cement, asphalt, tarmacadam or stabilised e.g. beaten earth) without vegetation occupy most of the area, which also contains building and insignificant vegetation.

1.2.1.1 Industrial and commercial areas

1.2.1.1.1 Industrial and commercial units*

Areas of industrial enterprises, store houses, supermarkets, fair and exhibition sites, power plants and industrial areas with associated unbuilt-up areas. Includes also abandoned industrial areas.

1.2.1.1.2 Agro-industry*

Agricultural production centres (former co-operative and state farm centres and their associated land) livestock farming centres (e.g. cattle-, pig-, poultry-, etc.), slaughter houses, cold-storage/packaging plants.

1.2.1.1.3 Education and health facilities*

Hospitals, sanatoria, old-people's homes, children's homes, educational establishments, university or school campuses, research institutions with their associated parks and green areas.

1.2.1.2 Areas of special installations

Areas of technical infrastructure e.g. sewage plants, transformers, test fields of civil and military production industry, military bases (except airports), communication stations, etc. Military test grounds without fence are classified according to their actual land cover (usually 3.2.1.x).

1.2.2 Road and rail networks and associated land

Motorways and railways, including associated installations (stations, platforms, embankments).

1.2.2.1 Road network and associated land

Road network and associated areas. Lines of roads with a minimum width of 50 m with associated transport facilities (parking lots along the motorways, maintenance activities for roads, trenches, etc.).

If a road and rail lines run parallel and neither the road nor the rail line exceeds the 50 m width, the area has to be classified as 1.2.2.2 (rail network).

1.2.2.2 Rail network and associated land

Rail network and associated areas. Lines of railroads with a minimum width of 50 m with associated transport facilities (station buildings, maintenance activities for trains, trenches, etc.).

If a road and rail lines run parallel and neither the road nor the rail line exceeds the 50 m width, the area has to be classified as 1.2.2.2 (rail network).

1.2.3 Port areas

Infrastructure of port areas, including quays, dockyards and marinas.

1.2.3.2 River and lake ports

Areas of ports situated on the lake shores or river banks with associated infrastructure of buildings and communications.

1.2.3.3 Shipyards

Areas formed by infrastructure of production and assembly halls with the associated water surface and communications.

1.2.3.4 Sport and recreation ports

Areas of sport and recreation ports with piers and associated infrastructure.

1.2.4 Airports

Airport installations : runways, buildings and associating lands.

1.2.4.1 Airports with artificial surfaces of runways

Areas of airports with artificial surface of runways with associated grass areas and infrastructure of airport buildings. Includes military airports and helicopter fields.

1.2.4.2 Airports with grass surfaces of runways

Areas of airports with grass surface of runways with associated airport buildings.

1.3 Mine, dump and constructions sites

1.3.1 Mineral extraction sites

Areas with open-pit-extraction of construction materials (sand pit, quarries) or other minerals (open-cast mines). Includes flooded gravel pits, except for river-bed extraction.

1.3.1.1 Open cast mines

Areas of open cast coal mines, oil-shale mines, gravel, sand, and clay pits.

Gravel pits are frequently holes filled with water, with extracted gravel along the shores. If the extracted gravel covers less than 4 ha, but together with the water the area exceeds 4 ha, the whole area has to be classified as 1.3.1.1.

Abandoned mines have to be classified according to the actual land cover.

Small (<4 ha) mines associated to industrial areas will be classified as industry.

Recreational areas next to abandoned gravel pits are classified as 1.4.2.3.

1.3.1.2 Quarries

Areas of quarries.

Abandoned queries has to be classified according to the actual land cover (e.g.3.2.4.3. or 3.3.2.1).

1.3.2 Dump sites

Public, industrial or mine dump sites.

1.3.2.1 Solid waste dump sites

Areas of public and industrial waste and dump sites of raw materials.

1.3.2.2 Liquid waste dumps

Areas of dumpsites of liquid waste originating in mainly chemical industry. Includes also liquid manure storages and sewage deposition works.

1.3.3 Construction sites

Spaces under construction development, soil or bed rock excavations, earthworks.

1.3.3.1 Construction sites

Areas under construction development for which earthworks and different stages of building constructions are typical. Includes also highway construction.

1.4 Artificial, non agricultural vegetated areas**1.4.1 Green urban areas**

Areas with vegetation within the urban fabric, including parks, cemeteries with vegetation.

1.4.1.1 Parks

Areas of parks occurring within the settlements, formed mainly by lawns, trees and shrub greenery, strips of lanes and paths. Includes also parks associated to castles, botanical gardens, zoos and forests inside settlements.

1.4.1.2 Cemeteries

Areas of cemeteries with vegetation associated to settlements.

1.4.2 Sport and leisure facilities

Camping grounds, sport grounds, leisure parks, golf courses, race courses, etc. Includes formal parks outside urban areas.

1.4.2.1 Sport facilities

Areas of sport grounds within or outside the urban fabric, stadiums, running tracks, race-courses, ski resorts, golf grounds, etc.

1.4.2.2 Leisure areas¹

Camping grounds, castles outside settlements with their park, other parks outside settlements, park-forests and zoos, open-air museums and theatres, skanzens, historical and religious monuments (cathedrals, cloisters) outside settlements, etc.

1.4.2.3 Recreation settlements^{*}

Built-up areas used for recreation with temporary residence, spas (e.g. lake Balaton shore, abandoned gravel pits, mountain resorts).

2 Agricultural areas

2.1 Arable land

2.1.1 Non-irrigated arable land

Cereals, legumes, fodder crops, root crops and fallow land. Includes flowers and trees (nurseries) and vegetables cultivation, whether open field or under plastic or glass (includes market gardening). Includes aromatic, medicinal and culinary plants. Excludes include permanent pasture.

2.1.1.1 Arable land with large fields ^{*)}

Arable land consisting of fields characteristically larger than 10 ha size. Cereals, legumes, industrial crops, root crops and fodder crops, semi-permanent crops as strawberries, market gardens, kitchen gardens, flowers can be grown. This class includes fallow lands (abandoned 3-4 years) as well. They can be seasonally irrigated.

Arable land abandoned for 3-4 years will be classified as 2.3.1.x (fallow land). If the arable land has been abandoned for more than 6-8 years and regeneration of natural vegetation is in an advanced stage, it will be classified according to its actual land cover (3.2.1.x or 3.2.4.3).

(The length of abandoned status could be estimated using multitemporal satellite imagery.)

2.1.1.2 Arable land with small fields ^{*)}

Arable land consisting of fields characteristically smaller than 10 ha size. Cereals, legumes, industrial crops, root crops and fodder crops, semi-permanent crops as strawberries, market gardens, kitchen gardens, flowers can be grown. This class includes fallow lands (abandoned 3-4 years) as well. They can be seasonally irrigated.

Arable land abandoned for 3-4 years will be classified as 2.3.1.x (fallow land). If the arable land has been abandoned for more than 6-8 years and regeneration of natural vegetation is in an advanced stage, it will be classified according to its actual land cover (3.2.1.x or 3.2.4.3).

(The length of abandoned status could be estimated using multitemporal satellite imagery.)

2.1.1.3 Greenhouses

Areas of glass or plastic greenhouses.

2.1.2 Permanently irrigated arable land

Crops irrigated permanently or periodically, using a permanent infrastructure (irrigation channels, drainage network). Most of these crops could not be cultivated without an artificial water supply. Excludes sporadically irrigated land.

2.1.2.1 Permanently irrigated arable land

Crops irrigated permanently or periodically, using a permanent infrastructure (irrigation channels, drainage network).

2.1.3 Rice fields

Land prepared for rice cultivation. Flat surfaces with irrigation channels. Surfaces periodically flooded.

2.1.3.1 Rice fields

Areas of rice fields. Periodically inundated areas with permanent irrigation channels. Abandoned rice fields (irrigation infrastructure is out of work) will be classified according to their actual land cover (usually 2.1.1.x or 2.3.1.x). Rice fields are usually left fallow from time to time, which have to be considered during their classification. Images taken in subsequent years can help.

2.2 Permanent crops

Surfaces occupied by crops not under rotation system.

Includes woody crops cultivated for fruit production such as extensive fruit orchards, olive groves, chestnut groves, walnut groves, shrub orchards such as vineyards and some specific low-system orchard plantations, espaliers and climbers.

2.2.1 Vineyards

Areas planted with vines.

2.2.1.1 Vineyards

2.2.1.1.1 Vineyards with large fields *

Areas of industrial wine production (vineyards with espaliers). On the satellite image they appear as homogeneous fields with access roads inside.

2.2.1.1.1 Vineyards with small fields *

Areas of traditional wine production with small fields. Also includes heterogeneous areas with dominant vine cover (exceeding 60% of the area), where fruit trees, arable land, meadows could also be present.

2.2.2 Fruit trees and berry plantations

Parcels planted with fruit trees and/or shrubs: single or mixed fruit species, fruit trees associated with permanently grassed surfaces. Includes chestnut and walnut groves.

2.2.2.1 Orchards

Areas of fruit orchards (apples, plums, pears, cherries, peaches, apricots, etc.) and ligneous crops (walnut, chestnut, hazel, almond, etc.). Abandoned orchards will be classified according to their actual land cover, e.g. 3.2.4.3.

2.2.2.2 Berry fruit plantations

Areas of berry fruit plantations (black and red currants, raspberries, gooseberries, etc.).

2.2.2.3 Hop plantations

Areas of hop plantations.

2.2.2.6 Wild willow plantations

Areas of wild willow plantations (used mainly for furniture manufacturing). Does not include natural willow stands on flood plains (3.1.1.2 or 3.1.1.4)..

2.3 Pastures

2.3.1 Pastures ¹

Sown, over-sown, fertilised grass surfaces, degraded grassland and fallow land. They are utilised by intensive grazing and/or mowing. They could be fertilised, irrigated, ameliorated, but crop rotation is not characteristic. Sometimes the signs of intensive usage can be seen: fences, animal pens, drinking fountains, channels and the dissimilarity of biomass compared to natural grassland (e.g. large biomass with homogeneous appearance in case of sown, irrigated and fertilised grasses, small biomass around animal farms, because of trampling). Mowing alone is not considered as intensive utilisation. The average level of grazing is more extensive in Hungary than in Western-Europe, therefore a grassland can not be classified as pasture (2.3.1) because of grazing alone. However, parts with signs of intensive animal breeding inside extended areas of natural grassland have to be classified as 2.3.1.

This category includes:

- sown, over-sown, fertilised herbaceous surfaces (usually fields with rectangle shape),
- degraded grass plots next to settlements, roads, channels and fish ponds (usually small or narrow in size),
- abandoned arable land (after 3 years),
- abandoned rice fields (after 3 years).

This category does not include:

- extended (>100 ha) natural grasslands (3.2.1),
- military exercise grounds (3.2.1),
- pastures abandoned for more than 7 years (3.2.1),
- lawns associated to sport and recreation area (1.4.2),
- fodder crops (class 211),
- strong wet meadows where hygrophylous plant species cover at least 25 % of the parcel (class 4.1.1).

2.3.1.1 Intensive pastures, degraded grassland without trees and shrubs ¹

Areas of grassland (secondary and/or degraded) prevailing without trees and shrubs (less than 15%).

2.3.1.2 Intensive pastures, degraded grassland with trees and shrubs ¹

Areas of grassland (secondary and/or degraded) with trees and shrubs (between 15-40%).

2.4 Heterogeneous agricultural areas**2.4.2 Complex cultivation patterns**

Juxtaposition of small parcels of diverse annual crops, pasture and/or permanent crops.

2.4.2.1 Complex cultivation patterns without scattered houses

Juxtaposition of small plots of diverse annual crops, pastures and/or permanent crops (fruit trees, vineyards, berry plantations) without scattered houses (settlements).

2.4.2.2.1 Complex cultivation patterns with scattered houses

Juxtaposition of small plots of diverse annual crops, pastures and/or permanent crops (fruit trees, vineyards, berry plantations) with scattered houses (settlements).

2.4.2.2.2 Farmsteads*

Complex agricultural environment with scattered houses, characteristic of the Great Hungarian Plain. Generalisation rule: if two farmsteads, each less than 4 ha, separated by a distance of max. 200 meters could be joined.

2.4.3 Land principally occupied by agriculture, with significant areas of natural formations

Areas principally occupied by agriculture, interspersed with significant natural areas (group of forest trees, grass, lakes, each less than 4 ha).

2.4.3.1 Agricultural areas with significant share of natural vegetation, and with prevalence of arable land

Agriculturally cultivated areas with prevalence of arable land (over 50%) with a pronounced representation of natural vegetation, especially strips and patches of forest, grasslands and sporadic occurrence of water areas (artificial and natural).

2.4.3.2 Agricultural areas with significant share of natural vegetation, and with prevalence of grasslands

Agriculturally cultivated areas with prevalence of grasslands (over 50%) with representation of arable land, strips and patches of forest, grass communities and water areas (artificial and natural).

2.4.3.3 Agricultural areas with significant share of natural vegetation, and with prevalence of scattered vegetation

Agriculturally cultivated areas with prevalence of scattered greenery (woodland patches and bushes over 50%) with representation of arable land, grasslands and water areas.

2.4.3.4 Agricultural areas with significant share of ponds, and with presence of scattered vegetation

Agriculturally cultivated areas with prevalence of ponds (over 50%) with representation of arable land, grassland, strips and patches of forests.

2.4.3.5 Agricultural areas with significant share of permanent crops, and with presence of scattered vegetation

Agricultural areas with vineyards and orchards (to 50%) with representation of grasslands and strips of forests.

3 Forest and semi-natural areas

3.1 Forests

3.1.1 Broad-leaved forests

Vegetation formation composed principally of trees, including shrub and bush under storeys, where broad-lived species predominate. Canopy closure is at least 30%. Tree height is larger than 5-6 meters. In case of a plantation, the density is at least 500 subjects / ha. Broad-lived trees represent more than 75 % of the formation.

This category includes:

- natural (woods native to Hungary, regenerated naturally) and semi-natural (woods native to Hungary, artificially produced - planted) broad-leaved forests,
- plantations of deciduous trees,
- sparse broad-leaved forests (30 – 60% crown closure)..

This category excludes:

- burnt areas inside forest areas (classes 3.2.x or 3.3.4),
- woodland areas composed of broad-leaved trees with less than 30% crown closure or with height less than 5-6 m (3.2.4),
- forest nurseries for commercial purposes outside forests (2.1.1),
- wooded parks (1.4.1).

3.1.1.1 Broad-leaved forests with continuous canopy in dry area ¹

Areas of broad-leaved woods forming continuous canopy (crown of trees overlap one another - canopy closure is more than 80%) in dry area.

3.1.1.2 Broad-leaved forests with continuous canopy in wet area ¹

Areas of broad-leaved woods forming continuous canopy (crown of trees overlap one another - canopy closure is more than 80%) in wet area. Includes forested backwater areas, forests growing along shore lines of rivers, creeks, lakes and fish ponds and swamp-woodlands.

3.1.1.3 Broad-leaved forests with discontinuous canopy in dry area ¹

Areas of broad-leaved woods forming discontinuous canopy (crown of trees do not overlap one another - canopy closure is less than 80%) in dry area.

3.1.1.4 Broad-leaved forests with discontinuous canopy on wet area ¹

Areas of broad-leaved woods forming discontinuous canopy (crown of trees do not overlap one another – canopy closure is less than 80%) in wet area.

3.1.1.5 Plantation of broad-leaved forests ¹

Artificially planted areas of the same species of broad-leaved wood, e.g. poplar, etc. These plantations are clear-felled and replanted at regular interval.

All forest areas having homogeneous patterns on the Great Hungarian Plain must be included. On hilly areas and in the mountains only highly homogeneous stands are considered as plantations (acacias, poplars), therefore local knowledge and field visits are important.

3.1.2 Coniferous forests

Vegetation formation composed principally of trees, including shrub and bush under storey, where coniferous species predominate. Canopy closure is at least 30%. Tree height is larger than 5-6 meters. In case of a plantation, the density is at least 500 subjects / ha. Coniferous trees represent more than 75% of the formation.

This category includes:

- natural (woods native to Hungary, regenerated naturally) and semi-natural (woods native to Hungary, artificially produced - planted) coniferous forests,
- non-evergreen coniferous forests (Larix) (rather rare in Hungary);
- plantations of coniferous trees,
- plantations of Christmas trees,
- forest nurseries situated inside coniferous woods to produce coniferous reproduction materials.

This category excludes:

- burnt areas inside coniferous forest areas (classes 3.2.x or 3.3.4),
- woodland areas composed of coniferous trees with less than 30% crown closure, or with height less than 5-6 m (3.2.4).

3.1.2.1 Coniferous forests with continuous canopy¹

Areas of coniferous woods forming continuous canopy (crown of trees overlap one another - canopy closure is more than 80%). Such woods exist in Hungary only along the Western border: Őrség, Hetés, Vas-hills and Göcsely regions and in the Bakony mountains: Fenyőfő. Stands with 100% coniferous trees in these regions are excluded from this category (3.1.2.5).

3.1.2.5 Plantation of coniferous forests

Artificially planted areas of the same species of coniferous woods, e.g. pine, larch, spruce, etc. These plantations are cleared and replanted in regular intervals. All stands with 100% coniferous trees are included in this category. Except Western Hungary, stands with 75-95% conifers are also included here.

Conifers plantations with sparse (but greater than 30%) canopy closure, planted on very poor quality soil are also included (e.g. plantations on sandy soils of the Great Hungarian Plain and on dolomite in the mountains). If crown closure is less than 30%, 3.2.1.2 is the right category.

Small (<4 ha) coniferous stands planted in (semi)natural broad-leaved forest are included here with generalisation (and not in 3.1.3.9).

3.1.3 Mixed forests

Vegetation formation composed principally of trees, including shrub and bush under storeys, where neither broad-leaved nor coniferous species predominate. Canopy closure is at least 30%. Tree height is larger than 5-6 meters. In case of a plantation, the density is at least 500 subjects / ha.

This category includes:

- natural (woods native to Hungary, regenerated naturally) and semi-natural (woods native to Hungary, artificially produced - planted) forests,
- plantations of mixed forests.

This category excludes:

- burnt areas inside forest areas (classes 3.2.x or 3.3.4),
- woodland areas composed of broad-leaved and coniferous trees with less than 30% crown closure or with height less than 5-6 m (3.2.4).

3.1.3.1 Mixed forests created by alternation of single trees with continuous canopy¹

Areas of forest formed by alternation of the broad-leaved and coniferous woods (crown of trees overlap one another - canopy closure is more than 80%). In Hungary we can find it only along the Western border: Őrség, Hetés, Vas hills and Göcsely regions.

3.1.3.5 Mixed forests created by alternation of stands of trees with continuous canopy¹

Areas of forest formed by alternation of the groups of broad-leaved and coniferous woods (crown of trees overlap one another - canopy closure is more than 80%). In Hungary we can find it only along the Western border: Őrség, Hetés, Vas hills and Göcsely regions.

3.1.3.9 Mixed forest plantations^{*}

Plantations consisting of broad-leaved and coniferous trees. These plantations can include stands of coniferous and deciduous woods with size less than 4 ha, or alternating lines of coniferous and deciduous woods (either with continuous or discontinuous canopy). All mixed forests outside the Western border region (Őrség, Hetés, Vas hills and Göcsely) are included in this category.

Small (<4 ha) coniferous stands planted in (semi)natural broad-leaved forest are not included here, but in 3.1.2.5 category with generalisation.

3.2 Scrub and/or herbaceous vegetation associations

3.2.1 Natural grasslands

Usually low productivity grasslands. Includes dry or low productivity herbaceous vegetation of lowland areas and steep slopes in the mountains. The latter can be mixed with rock outcrops and shrubs.

Natural grasslands are areas where herbaceous vegetation (maximum height is 150 cm and gramineous species are prevailing) constitutes at least 75 % of the vegetation cover.

This category includes:

- natural grassland where the trees and shrubs cover less than 30% of the surface,
- saline grasslands grown on temporally wet areas of saline soils,
- humid meadows where sedges, rushes, thistles, nettles cover less than 25 % of the parcel,
- former arable lands, vineyards and orchards abandoned long ago, and not yet colonised,
- herbaceous military training areas,
- grasslands which are grazed, but not over-sown and otherwise managed (application of fertilisers, pesticides, drainage) except burning,
- grasslands dotted with bare rock areas which represent less than 25 % of the surface.
- grasslands mowed with machine (e.g. Lake Kolon).

This category excludes :

- swampy grasslands (class 4.1.1),
- fallow-lands (arable land abandoned 2-3 years before is 2.1.1).
- inside extended areas of natural grassland, parts with signs of intensive animal breeding (2.3.1).

3.2.1.1 Natural grassland prevailingly without trees and shrubs

Areas of natural grasslands without trees and shrubs (less than 15%). They are formed mainly but not exclusively by grasslands of protected areas, military exercise grounds and low productivity pastures.

3.2.1.2 Natural grassland with trees and shrubs

Areas of natural grassland with trees and shrubs (between 15-30%). They are formed mainly but not exclusively by grasslands of protected areas, military exercise grounds and low productivity pastures with trees and shrubs.

3.2.4 Transitional woodland-scrub

Bushy or herbaceous vegetation with scattered trees. Can represent either woodland degradation or forest regeneration/recolonization.

This category includes:

- agricultural lands (classes 2.x.x) under recolonization process with occurrence of forest trees which cover more than 30 % of the surface (scattered trees or small plots of forests),
- abandoned fruit trees plantations and orchards,
- clear cuts in forest areas,
- natural grassland areas with small forests, which cover more than 30 % of the surface,
- open cleared-felled or regeneration areas with regrowing during transition stage, which lasts for maximum 5-8 years,
- former forest fire areas (no black tone on the satellite image visible),
- heavily damaged forests by wind, snow-brake or acid rains with more than 50 % dead trees,
- bare rocks with scattered trees that cover more than 10% of the surface,
- forest nurseries situated inside forestry area.

This category excludes:

- agricultural lands (classes 2.x.x) with occurrence of forest vegetation with an overgrowing rate less than 50 % (class 2.4.3),
- newly (within three years) burnt forests (3.3.4).

3.2.4.1 Young stands and clearcuts¹

Areas of young stands planted after cutting, fire or other natural disaster, clear-cut areas (without vegetation), new plantations (e.g. on plots of former arable land). Average height of trees is less than 5 meters.

3.2.4.3 Natural regeneration areas¹

Areas of natural recolonization / regeneration. They could be abandoned pastures, orchards, arable land and filled-up and drying wetlands. These areas are covered by grassland and more than >30% shrubs (Junipers, blackthorn, hawthorn, wild roses). Average height of vegetation is less than 5 meters. It is typical, that before their recent status they were not forested.

3.2.4.4 Forest nurseries

Areas of forest nurseries (production areas of young forest trees) inside forestry areas.

3.2.4.5 Damaged forests

Areas of forests strongly affected by air pollution, biotic injurious agents or natural disasters. Areas of forest fires are excluded (3.3.4.1).

3.3 Open spaces with little or no vegetation**3.3.1 Beaches, dunes, sands**

Beaches, dunes and expanses of sand or pebble in coastal or continental locations, including beds of stream channels with torrential regime.

3.3.1.3 River banks

Belts of riverbanks formed mainly by deposits of sands and gravel usually with rather sparse vegetation.

3.3.2 Bare rocks¹

Screes, cliffs, rock outcrops. Percentage of vegetation cover is max. 25%.

3.3.2.1 Bare rocks¹

Areas of different rock outcrops, e.g. cliffs, screes, rock-face surfaces. Includes abandoned material extraction sites without vegetation and sparsely vegetated areas with minimum 75% rock surface.

3.3.3 Sparsely vegetated areas¹

Includes steppes, tundra and bad lands, scattered high-altitude vegetation. In Hungary: low productivity areas with sparse vegetation on the Great Hungarian Plain and in mountain areas. The scattered sparse vegetation is composed of gramineous and/or ligneous and semi-ligneous species, covering 25-75% of the surface.

This category includes :

- sparsely vegetated parts inside military training exercise grounds,
- karstic areas of gramineous, ligneous and semi-ligneous vegetation
- semi-desertic vegetation on sand, salt-affected soils and rocky surfaces.

This category excludes :

- areas where bare soil (rock) covers more than 75% of the surface (class 3.3.2),
- areas where gramineous vegetation covers more than 75% of the surface (class 3.2.1),

3.3.3.1 Sparse vegetation on sands or loess

Areas of sand plains covered by sparse vegetation.

3.3.3.2 Sparse vegetation on rocks¹

Areas of xerothermic grasses and shrubs of karstic terrain.

3.3.3.3 Sparse vegetation on salines

Areas of salines covered by sparse halophyl vegetation.

3.3.4 Burnt areas

Areas affected by recent fires, still mainly black.

3.3.4.1 Burnt areas

Areas of recent fires including forests and shrubs.

This category includes:

- all burnt areas that are younger than 3 years and the result of fire is black on the satellite image,
- all burnt natural and seminatural ligneous vegetation.

This category excludes:

- human farm management by burning stubble (class 2.1.1.x),
- burned natural grassland (3.2.1.x) or pasture (2.3.1.x),
- former burnt areas (more than three years before the satellite image was taken). The result of fire is still visible on the image but not in black colour.

4 Wetlands

4.1 Inland wetlands

Areas flooded or floodable during a large part of the year by fresh, brackish or standing water with a specific vegetation coverage made of low shrub, semi-ligneous or herbaceous species.

4.1.1 Inland marshes

Low-lying land usually flooded in early spring by snow melt, and more or less saturated by water all year round.

Non-forested areas, flooded or floodable by fresh, stagnant or flowing water. Covered by a specific low ligneous, semi-ligneous or herbaceous vegetation.

This category includes:

- water-fringe vegetation (reeds, sedges, rushes),
- high floating vegetation (rare in Hungary),
- inland saline (alkali) marshes.

This category excludes:

- humid meadows (water logging between 10 and 30 cm),
- rice fields (class 2.1.3),
- free water spaces in wetlands (class 5.1.1, 5.1.2)
- humid forests with a crown cover of more than 30% (class 3.1.x),
- low floating aquatic vegetation (class 512),

4.1.1.1 Fresh-water marshes ¹

Areas of swamps with reed beds, sedges, rushes and other aquatic plants without significant peat deposition. Seasonally or permanently waterlogged areas with low mineral content.

4.1.1.3 Saline (alkali) inland marshes ¹

Areas of swamps with reeds, salt-rushes and other aquatic plants without significant peat deposition. Seasonally or permanently waterlogged areas without an outlet with higher mineral content.

4.1.2 Peat bogs

Peatland consisting mainly of decomposed moss and vegetable matter. These areas are permanently influenced by moisture, so theoretically never dry out. They may or may not be exploited. (Peat bogs in Hungary are very much different from those in Western and Northern Europe.)

This category includes :

- peat bogs,
- peat extraction areas,
- transitional bogs (swamps) on peaty soil,
- abandoned peat extraction sites.

4.1.2.1 Explored peat bogs

Areas of peat-bogs with extraction. Includes those abandoned peat extraction sites where vegetation is not significant. If vegetation is dominant on the abandoned peat extraction site, it has to be classified according to the actual cover type, i.e. 4.1.2.2.

4.1.2.2 Natural peat bogs with scattered trees and shrubs ¹

Natural peat bogs and transitional bogs with scattered trees and shrubs (<30%).

5 Water bodies

5.1 Inland waters

5.1.1 Water courses

Natural or artificial water courses serving as water drainage channels.

5.1.1.1 Rivers

Water streams of natural origin. A river will be interpreted if the width of water surface together with the sand or gravel deposit on the shores, and the neighbouring linear vegetation (grass, line of trees, bushes) have a width of at least 50 m.

5.1.1.2 Channels

Artificial water channels or significantly regulated water streams of minimum 50 m width (including low aquatic vegetation and accompanying trees, bushes and embankment), prevailing straight.

5.1.2 Water bodies

Natural or artificial stretches of water.

This category includes:

- low floating aquatic vegetation with species such as Nuphar, Nymphaea, Potamogeton and Lemna,
- archipelago of lakes inside land areas,
- water surfaces used for fresh-water fish-breeding activities.

This category excludes:

- high plant species characteristic of standing water (e.g. Typha latifolia, Carex riparia, Glyceria maxima, Sparganium erectum and Phragmites communis (class 4.1.1),
- liquid wastes (class 1.3.2).

5.1.2.1 Natural water bodies

Water areas of natural origin.

5.1.2.1.1 Natural water bodies with continuous water supply *

Natural water bodies having a continuous water supply, consequently a permanent water surface. Limit of interpretation is 1 hectare.

5.1.2.1.2 Natural, temporary, salt affected water bodies *

Natural water bodies having no continuous water supply. The saline content is high and the lake is shallow. In case of long drought, the lake surface is temporarily covered by grass vegetation. Limit of interpretation is 1 hectare.

5.1.2.2 Artificial reservoirs

Water areas created by man with prevailing regular shape.

5.1.2.2.1 Artificial lakes, reservoirs *

Water areas created by man with prevailing regular shape. Includes also abandoned gravel extraction lakes. Artificial lakes used for fish breeding are classified as 5.1.2.2.2. Limit of interpretation is 1 hectare.

5.1.2.2.2 Fish ponds *

Artificial lakes created for fish breeding. Sometimes the fish pond does not contain water at the time of the satellite image (because the water has been removed as part of the cultivation). Limit of interpretation is 1 hectare.

standard level-1	standard level 2	standard level-3	Hungarian level-4	Hungarian level-5
1. ARTIFICIAL SURFACES	1.1. Urban fabric	1.1.1 Continuous urban fabric	1.1.1.1. Areas of urban centres 1.1.1.2. Areas of ancient cores	
		1.1.2 Discontinuous urban fabric	1.1.2.1. Discontinuous built-up areas with multiflat houses prevailing without gardens	
			1.1.2.2. Discontinuous built-up areas with family houses with gardens 1.1.2.3. Discontinuous built-up areas with greenery	
	1.2. Industrial, commercial and transport units	1.2.1. Industrial, commercial and transport units	1.2.1.1. Industrial and commercial areas	1.2.1.1.1 Industrial and commercial units 1.2.1.1.2 Agro-industry 1.2.1.1.3 Education and health facilities
			1.2.1.2. Areas of special installations	
		1.2.2. Road and rail network and associated land	1.2.2.1. Road network and associated land 1.2.2.2. Rail network and associated land	
		1.2.3. Port areas	1.2.3.2. River and lake ports 1.2.3.3. Shipyards 1.2.3.4. Sport and recreation ports	
		1.2.4. Airports	1.2.4.1. Airports with artificial surfaces of runways 1.2.4.2. Airports with grass surfaces of runways	
	1.3. Mine, dump and construction sites	1.3.1. Mine, dump and construction sites	1.3.1.1. Open cast mines 1.3.1.2. Quarries	
		1.3.2. Dump sites	1.3.2.1. Solid waste dump sites 1.3.2.2. Liquid waste dump sites	
		1.3.3. Construction sites	1.3.3.1. Construction sites	
	1.4. Artificial, non-agricultural vegetated areas	1.4.1. Green urban areas	1.4.1.1. Parks 1.4.1.2. Cemeteries	
		1.4.2 Sport and leisure facilities	1.4.2.1 Sport facilities 1.4.2.2 Leisure areas 1.4.2.3 Recreation settlements	

standard level-1	standard level 2	Standard level-3	Hungarian level-4	Hungarian level-5
2. AGRI- CULTURAL AREAS	2.1. Arable land	2.1.1. Non irrigated arable land	2.1.1.1. Arable land with large fields 2.1.1.2. Arable land with small fields 2.1.1.3. Greenhouses	
		2.1.2. Permanently irrigated arable land	2.1.2.1. Permanently irrigated arable land	
		2.1.3. Rice fields	2.1.3.1. Rice fields	
	2.2. Permanent cultures	2.2.1. Vineyards	2.2.1.1. Vineyards	2.2.1.1.1 Vineyards with large fields 2.2.1.1.2 Vineyards with small fields
		2.2.2. Fruit trees and berry plantations	2.2.2.1. Orchards 2.2.2.2. Berry fruit plantations 2.2.2.3. Hop plantations 2.2.2.6. Wild willow plantations	
		2.2.3. Olive groves		
	2.3. Pastures	2.3.1. Intensive pastures, degraded grasslands	2.3.1.1. Intensive pastures, degraded grasslands without trees and shrubs 2.3.1.2. Intensive pastures, degraded grasslands with trees and shrubs	
	2.4. Heterogeneous agricultural areas	2.4.1. Annual crops associated with permanent crops		
		2.4.2. Complex cultivation patterns	2.4.2.1 Complex cultivation patterns without scattered houses	
			2.4.2.2. Complex cultivation patterns with scattered houses	2.4.2.2.1. Complex cultivation patterns with scattered houses 2.4.2.2.2. Farmsteads
		2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation	2.4.3.1. Agricultural areas with significant share of natural vegetation and with prevalence of arable land 2.4.3.2 Agricultural areas with significant share of natural vegetation and with prevalence of grasslands 2.4.3.3. Agricultural areas with significant share of natural vegetation and with prevalence of scattered natural vegetation 2.4.3.4. Agricultural areas with significant share of ponds and with prevalence of scattered natural vegetation 2.4.3.5. Agricultural areas with significant share of permanent crops and with presence of scattered natural vegetation	
		2.4.4. Agro-forestry areas		

standard level-1	standard level 2	standard level-3	Hungarian level-4	Hungarian level-5
3. FOREST AND SEMI- NATURAL AREAS	3.1. Forests	3.1.1. Broad-leaved forest	3.1.1.1. Broad-leaved forest with continuous canopy in dry area	
			3.1.1.2. Broad-leaved forest with continuous canopy in wet area	
			3.1.1.3. Broad-leaved forest with discontinuous canopy in dry area	
			3.1.1.4. Broad-leaved forest with discontinuous canopy in wet area	
			3.1.1.5. Plantations of broad-leaved forests	
		3.1.2. Coniferous forest	3.1.2.1. Coniferous forests with continuous canopy	
		3.1.2.5. Plantations of coniferous forests		
		3.1.3. Mixed forest	3.1.3.1. Mixed forests created by alternation of single trees with continuous canopy	
			3.1.3.5. Mixed forests created by alternation of stands of trees with continuous canopy	
	3.1.3.9. Plantations of mixed forests			
	3.2. Scrub and/or herbaceous vegetation associations	3.2.1. Natural grasslands	3.2.1.1. Natural grassland prevailingly without trees and shrubs	
			3.2.1.2. Natural grassland with trees and shrubs	
		3.2.2. Moors and heathland		
		3.2.3. Sclerophyllous vegetation		
	3.2.4. Transitional woodland-scrub		3.2.4.1. Young stands and clear-cuts	
			3.2.4.3. Natural regeneration areas	
			3.2.4.4. Forest nurseries	
		3.2.4.5. Damaged forests		
3.3. Open spaces with little or no vegetation	3.3.1. Beaches, dunes, sands	3.3.1.3. River banks		
	3.3.2. Bare rocks	3.3.2.1. Bare rocks		
	3.3.3. Sparsely vegetated areas	3.3.3.1. Sparse vegetation on sands or loess		
		3.3.3.2. Sparse vegetation on rocks		
	3.3.3.3. Sparse vegetation on salines			
3.3.4. Burnt areas	3.3.4.1. Burnt areas			
3.3.5. Glaciers and perpetual snow				

standard level-1	standard level 2	standard level-3	Hungarian level-4	Hungarian level-5
4. WETLANDS	4.1. Inland wetlands	4.1.1. Inland marshes	4.1.1.1. Fresh-water marshes 4.1.1.3. Saline (alkali) inland marshes	
		4.1.2. Peatbogs	4.1.2.1. Explored peat bogs 4.1.2.2. Natural peat bogs with scattered trees and shrubs	
	4.2. Coastal wetlands	4.2.1. Salt marshes		
		4.2.2. Salines		
		4.2.3. Intertidal flats		
5. WATER BODIES	5.1. Inland waters	5.1.1. Water courses	5.1.1.1. Rivers 5.1.1.2. Channels	
		5.1.2. Water bodies	5.1.2.1. Natural water bodies	5.1.2.1.1. Natural water bodies with continuous water supply 5.1.2.1.2. Natural, temporary, salt affected water bodies
			5.1.2.2. Artificial reservoirs, fish ponds	5.1.2.2.1. Artificial reservoirs 5.1.2.2.2. Fish ponds
	5.2. Marine waters	5.2.1. Coastal lagoons		
		5.2.2. Estuaries		
		5.2.3. Sea and ocean		