



CLC2006 LAND COVER DATABASE OF THE NETHERLANDS. LAND COVER AND LAND COVER CHANGES 2000-2006.

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1. Background

The CLC2006 databases were produced by the Centre for Geo-Information (Alterra-WUR), the NRC Land cover for the Netherlands. The national CLC2006 project took place under the umbrella of the overall GMES Fast Track Service Precursor (FTSP) Land Monitoring. The basis for the production of the CLC2006 databases was the CLC2000 database that was also produced by the same team of Alterra. Alterra was also involved in the production of the CLC1990 database and the change database between 1990 and 2000. The national project was financed by the Ministry of Housing and Spatial Planning, the National Environmental Agency (MNP) and the European Environmental Agency (EEA).

The present document is an interim report accompanying the delivery of the CLC2006 databases to the EEA. The CLC2006 databases are the products 3 (CLC changes 2000-2006) and 4 (CLC2006) according to the Implementation plan of the GMES FTSP on Land Monitoring project (EEA, 2006). Those databases reflect the changes larger than 5 ha in land cover between the years 2000 and 2006 and the land cover according to the CORINE nomenclature for 2006, respectively. The databases are produced according to the technical guidelines (Bossard et al., 2000, Heymann et al., 1994, Büttner et al., 2002 and EEA, 2007) and CLC nomenclature (Büttner et al., 2006).

This report presents information on the national CLC2006 project. In Chapter 2 the databases used in the project are shortly described. The following chapter deals with the organisation of work at national level. The results of the project are briefly described in Chapter 4. The deliverables are presented in Chapter 5. The interim report finishes with some conclusions, references and the annexes containing the metadata at national and working unit level.

The report will be the basis for the final report to be produced after the national validation of the high resolution soil sealing (product 5). and forest/non forest map (product 6) that are also part of the GMES FTSP on Land Monitoring project. See Steenmans and Sousa (2007) for guidelines for qualitative validation of product 5. The final report will present also more detail on the statistics and possibly a validation of the national CLC2006 databases.



2. Databases used in the project

The following datasets were used in the national CLC2006 project:

- IMAGE2000
- IMAGE2006 (first coverage)
- CLC2000 (delivered by the EEA)
- Topographic maps (digital Top10 vector database: version 2006 (Top10vector_2006))
- Aerial photographs of 2000 and 2006
- Databases of Central Office of Statistics for 2000 and 2003 (BBG2000 and BBG2003)

The IMAGE2000 satellite mosaic was based on Landsat 7 TM images of the years 1999 and 2000. This mosaic was the basis for the production of the CLC2000 database. The IMAGE2006 satellite mosaic for the Netherlands is based on SPOT4, SPOT5 and IR06 images of 2005 and 2006. Both satellite mosaics were used during the interpretation of land cover changes between 2000 and 2006.

The CLC2000 delivered by the EEA was used as the basis for the visual interpretation of the land cover changes. This database was a slightly adapted version of the database delivered by the Dutch NRC. The border matching with Germany and Belgium changed some delineations. Furthermore, the sea (CLC-code 523) has been eliminated and some very small polygons were new in the database.

The Top10vector database and the BBG databases were used to help the interpretation in case of doubts during the interpretation of the land cover and land cover change.

The aerial photographs were used during the interpretation and delineation of the land cover changes. In some cases it appeared that the land cover on the aerial photographs of 2000 and/or 2006 already changed during the time gap between the acquisition time of the satellite mosaics and the aerial photographs. The aerial photographs of 2000 and 2006 were more recent then the satellite mosaics as they contain also images of 1999 and 2005. In those cases, the situation on the aerial photographs was taken as basis for the delineation of the land cover changes as they reflect better the situation for the years 2000 and 2006. In a highly dynamic country as the Netherlands, this can considerably influence the amount and type of changes. Figure 1 and 2 show examples of changes delineated on basis of aerial photographs that would not be detected or would be different when using the satellite mosaics IMAGE2000 and IMAGE2006.

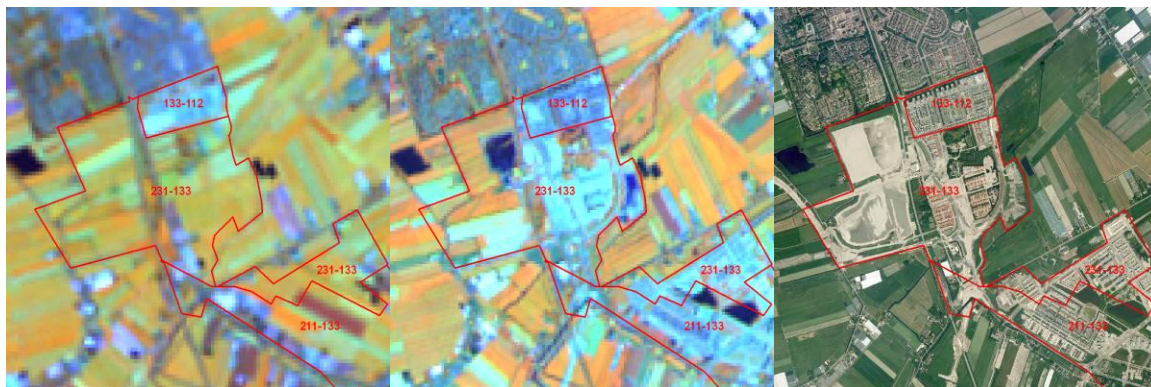


Figure 1. The delineation of a land cover change from 231 - 133 on basis of aerial photographs that would not entirely be detected by using the IMAGE2006 mosaic. Pasture (231) on IMAGE2000 (left), no change and partly still pasture on IMAGE2006 (middle) and a change into a construction site (133) on aerial photograph of 2006 (right).



Figure 2. The delineation of a land cover change from 133-112 on basis of aerial photographs while on basis of the IMAGE2000 mosaic it would be a land cover change from 231-112. Pasture (231) on IMAGE2000 (left), construction site (133) on aerial photograph of 2000 (middle) and discontinuous urban fabric (112) on IMAGE2006 (right).

For different reasons the following datasets were not used:

- LUCAS 2001 / 2006 data (possibly as validation source)
- DMC mosaic (too late)
- Second coverage (not useful – first and second coverage are not of the same year)

The LUCAS data were not used as the other data sources were of sufficient detail to produce the CLC2006 databases. The other databases are covering entire areas with useful information while LUCAS data are restricted to point information. Possibly, the LUCAS data can be used in the validation of the datasets.

The DMC mosaic is delivered after finalisation of the database so it could not be used in the production of the databases. It will be verified what is the quality and usefulness with regards to the production of a CLC database in the future.

The second coverage of satellite imagery was not used in this project for the following reasons:

- the data were delivered too late for the eastern part of the country (the production of that part was already finished,
- the satellite data were in some cases of 2005 while the first coverage contained data of 2006,
- the second coverage was not useful for multi-temporal analysis of agricultural land as it almost did not contain images of different seasons for the acquisition year of the first coverage. In the Netherlands, the land cover changes between pastures and arable land changes between years or even within years.



3. Organisation of the work at national level

3.1 General

The project started in February 2007 with the delivery of the images of the first coverage. A national project plan was written (Hazeu, 2007). Milestones in this project plan were the first and second verification mission and the final delivery of the CLC2006 databases before the End of March 2008. A CLC2006 training by the ETC-LUSI was not organised as the same expert as in CLC2000 were doing the interpretation. The experts involved in the CLC2006 projects were:

- Gert van Dorland – digitalisation and interpretation of changes
- Rini Schuiling – installation JTX, job descriptions and geodatabase
- Gerard Hazeu – project manager, internal control, identification of changes

Due to the small team a national steering committee was not needed. The results of the CLC2006 update will be communicated to the different ministries that financed the update and the Dutch National Focal Point (NFP) to disseminate the databases. The validation of the CLC datasets have not taken place. Possibly, they will be validated on basis of the LUCAS datasets.

3.2 Processing methodology

3.2.1 Preparation

The CLC2006 project was started with importing the CLC2000 database into a geodatabase (ArcGIS9.2). New fields as CLC2006, CLC2000new, CLC2000, change type and remarks were generated. Topology rules were established to indicated gaps and overlaps in the database. Furthermore, domains were generated for the CLC fields so that only existing CLC codes could be selected. Non-existing codes are therefore impossible to introduce. Also a domain was created for the interpretation labels. It contained five codes for the following situations:

- no change (UN)
- improvement (IM)
- technical change (TC)
- change (CH)
- change and improvement (CI)

Jobs were created at working unit level (provinces) and for each job a work flow was generated with the JTX application. The workflow consisted of identification of changes, delineation of changes, internal control, improvement of change delineation. The last two action were repeated until an internal qualitative quality standard was reached for the working unit.

3.2.2 Interpretation

The first step was to identify the land cover changes between the years 2000 and 2006 and the major improvements needed for the CLC2000 database. This rough identification of changes (type and location) was based on the comparison of satellite images (IMAGE2000 and IMAGE2006)(Figure 3b) and resulted in a database with points that the next interpreter had to take into account for the delineation of changes.

In the next step, the interpreter delineated the changes with help the aerial photographs. A copy of the CLC2000 database was the starting point. At the same time, he revised the CLC2000 database and recorded the land cover for the years 2000, 2006 and the type of change in an attribute table. The land cover in the CLC2006, CLC2000new and CLC2000 fields is equal to each other if there was no



change or improvement detected. During the delineation of the changes the interpreter had to keep in mind the mapping rules of a minimum mapping unit of 5ha and a width distance of minimal 100m. This interpretation step involved also additional delineation of changes missed in the first identification. Questions or doubts on interpretations were indicated in the remark field.

The third step concerned the internal verification. It involved the following actions:

- delineated changes and the change codes were verified,
- changes/improvements with remarks were checked and adjusted,
- too small changes, questionable changes and/or unreal changes were removed,
- missed changes and/or improvements were added.

If there were too many mistakes the job was returned to the interpreter with remarks on what has to be improved.

Finally, combinations of CLC codes for the attribute fields CLC2006, CL2000new, CLC2000 and CODE_00 (i.e. the original CLC2000 code) were compared with the code in the change type field. For example, polygons with different CLC2006 and CLC2000new codes with no change code in the change type field were checked again and corrected.

After internal acceptance, the working unit (province) was ready for external verification by the Technical Team of the ETC-LUSI.

3.2.3. Verification

The verification missions took place in September 27th-28th, 2007 and February 6th-7th, 2008 (Kosztra & Mari, 2007; Buttner, 2008). The first verification mission dealt with the provinces Groningen, Drenthe, Noord-Holland, Zuid-Holland, Zeeland and Utrecht. Those six provinces occupy nearly 50% of the country. The second mission dealt with the remaining 6 provinces (working units) like Friesland, Flevoland, Overijssel, Gelderland, Noord-Brabant and Limburg.

The mission reports describe the verification methodology, the progress and main problems encountered during both verifications. The remarks made by the Technical Team were taken into account and incorporated into the final CLC2006 databases. For example, the various size and merge errors detected by the verification mission in the intermediate CLC2000 product were corrected. These 'errors' were due to more accurate delineation of land cover and land cover changes and were removed in the final processing stage of the production of the CLC2006 databases.

3.2.4 Processing

The 'production' CLC2006 database has to be processed to produce the CLC06 and CHA06 databases. Figure 3a shows the 'production' database with CLC2006 labels that is the basis for the resulting CLC06 (middle) and CLC-change (CHA06) (right). The interpretation results are presented in Figure 3b. All polygons of the production database are shown with different label for the years represented by the year of acquisition of the images and/or aerial photographs (AP).

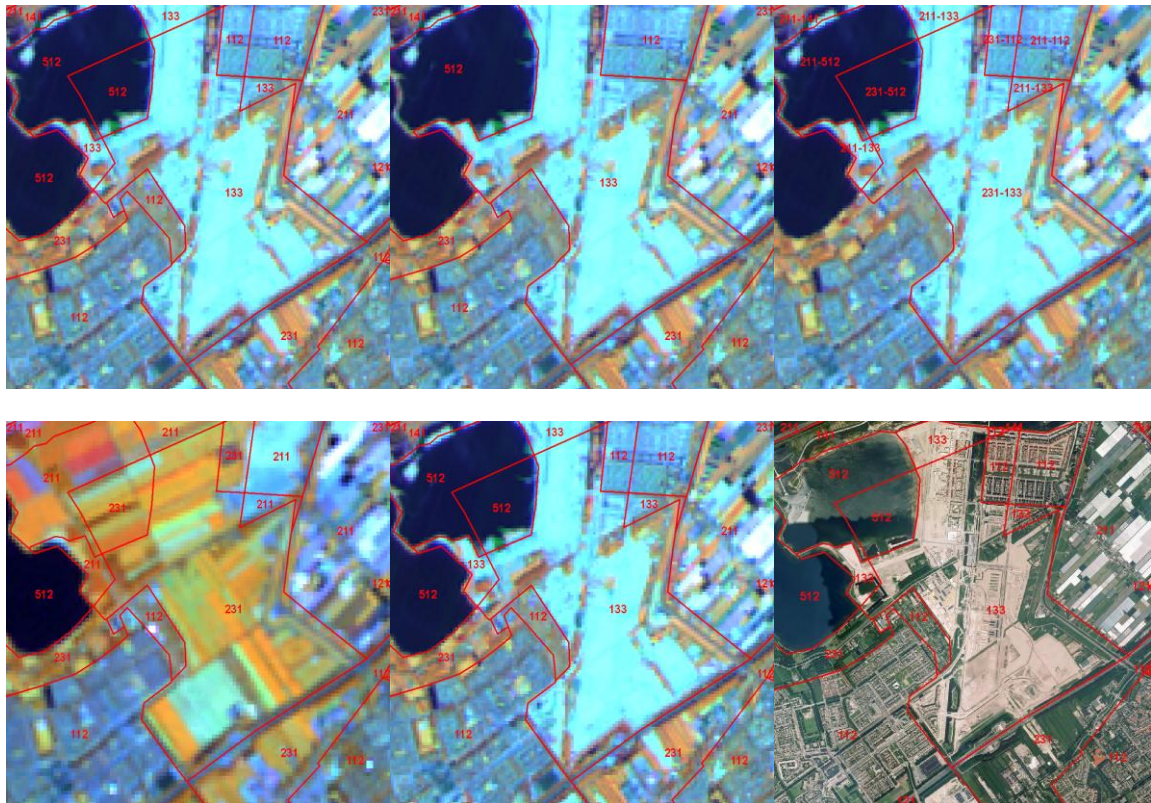


Figure 3a. The 'production' database for CLC2006 with all polygons drawn (left). The CLC06 (middle) and CHA06 (right) were produced by selection, dissolve and merging commands. Figure 3b. The CLC2006 'production' database with on the background IMAGE2000 with CLC2000new codes (left), IMAGE2006 with CLC20006 codes (middle) and the final with AP2006 on the background (right).

The CLC06 database is produced out of the 'production' database by dissolving the database on the CLC2006 attribute. After this dissolve processing step a lot of small polygons (<25ha) were still existing in the database. To eliminate these small polygons the database was converted into a coverage to merge the small polygons to a neighbour polygon on basis of the priority table. An AML was used with a threshold of 25ha for merging those small polygons (Pataki, 2008). Figure 4 shows the result of the merge of some small 121, 142, 133 polygons (<25ha)(left) into their neighbouring polygons (middle) on basis of the priority table (see Annex 5). The CHA06 database can have a different CLC2006-code then in the CLC06 database (see middle and right figure). Before merging the small polygons the polygons between 23 and 25 ha were manually checked and if needed corrected in size and/or attribute value. The result of this merge action resulted in some small polygons that have been manually merged with their neighbouring polygons. A sea polygon was manually added as in the original CLC2000 delivered by the EEA the sea has disappeared. The attribute fields (names) were checked and redundant fields were eliminated. The CLC_06 database was imported into the new file geodatabase CLC2006_NL.

The changes (CH/CI) were selected and type of changes were verified on their code pairs. Changes smaller than 5ha were verified if they were isolated or neighbouring other changes. These last changes were called composite or mixed changes. For these composite changes a restriction was that they must have a similar



CLC2000new or CLC2006 code and together be larger than 5ha. The isolated changes and composite changes with different CLC2000new and CLC2006 codes were removed. A multiple dissolve on both CLC2000new and CLC2006 codes removed superfluous boundaries. The attribute fields (names) were checked and redundant fields were eliminated. The CHA_06 database was imported into the new file geodatabase CLC2006_NL.

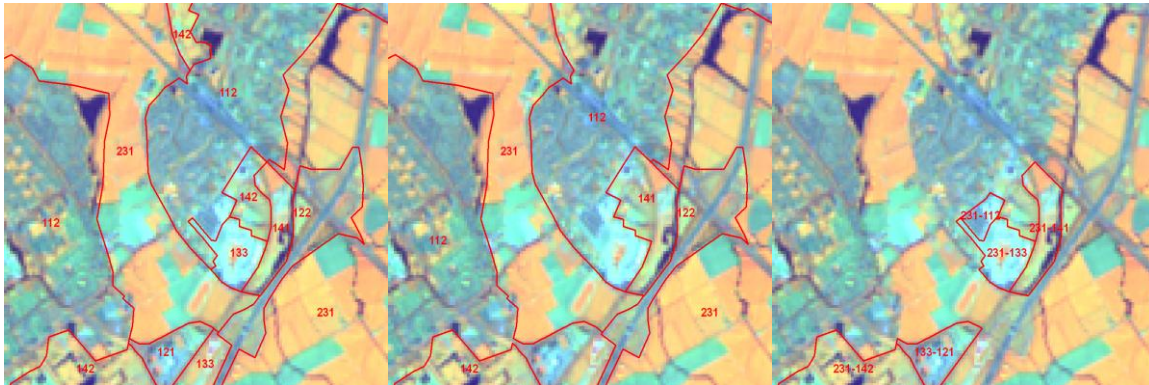


Figure 4. Merging of small (<25ha) polygons into neighbouring polygons on basis of the priority table (Annex 5). The 'production' database after dissolving on the CLC06 attribute as input for the merging AML (left). The final CLC06 database after execution of the AML (middle) with some small 121, 133 and 142 polygons merged with their neighbouring 112 and 141 polygons. The changes of the CHA06 database (right) with the 231-112 change that is already dissolved into the 112 polygon on the left figure.

3.2.5 Delivery

The CLC06_NL and CHA_NL database were delivered as a file geodatabase to GISAT. Metadata for the working units and national metadata for the CLC06_NL and CHA06_NL databases were delivered together with a shapefile containing the working units. After some small adaptations the databases were accepted. See Soukup (2007) for guidelines and Soukup (2008) for the delivery acceptance report.

3.3 Main difficulties and solutions

In both verification reports most of the technical difficulties are mentioned (Kosztra & Mari, 2007 and Büttner, 2008). However, we want to mention some more general difficulties encountered.

3.3.1 IMAGE2006

The following difficulties were encountered regarding the delivered images:

1. The production of CLC2006 was delayed by the late delivery of the images (images of 2005/2006 were delivered in April 2007). Better communication on the expected delivery of images could improve the planning of activities on national level. Direct delivery with the right geodetic datum parameters would also save time to start production.
2. The importation via xml into a format so it could be used in a RS-software programme was laborious. A better manual, an accompanying programme or delivery in a standard format (tiff, img) would be helpful with the importation of the images.



3. The delivery of the second coverage was far too late to be used in the project (eastern part of the Netherlands was already finished). Furthermore, a part of the second coverage were acquired in 2005 which was later than the first coverage. Multi-temporal analysis of agricultural land was not possible as the 2nd coverage did not contain a lot of images of another season within the same year as the 1st coverage.
4. The use of aerial photographs of 2000 and 2006 for the delineation of land cover causes some difficulties in the verification missions. They used only the IMAGE2000 and IMAGE2006 material. In a highly dynamic country as the Netherlands that can cause some discrepancies (see section 2) as the IMAGE2000 and IMAGE2006 mosaic are also based on satellite images from 1999 respectively 2005.

3.3.2 CLC2006 and changes

The following difficulties were encountered during the production of CC06 and CHA06 databases:

1. A partly revision of CLC2000 was needed as an exact delineation of changes did require it. This revision took a considerable part of the time during the production of the change database and consequently the CLC2006 database. Every time doing a change mapping or an update on basis of an old CLC version, will require geometric but also thematic correction. The production of a new CLC database in the future mainly (geometrically) based on a new exercise and integrated with national datasets will improve the geometric and thematic quality. It will also increase the use of CLC at national level.
2. Special attention was given to the composite or mixed changes. The single changes smaller than 5ha of those composite or mixed changes are only taken into account if they have the same land cover in 2000 or 2006 and if they exceed together the 5ha size limit.
3. Specific changes:
 - a. Pastures/arable land (231/211) into natural grasslands (321)

Natural grassland (321) are characterized by low human impact. The parcel structure and an homogeneous structure should be absent. The transformation of 231/211 into 321 is a common phenomena in The Netherlands that was already present in the CLC2000 update (Hazeu, 2003). Figure 5 shows an excellent example of the transformation of pastures into natural land. Agricultural land is transformed into nature protection sites as compensation for urban expansion or agricultural land is taken out of production due to fallow subsidies of the government. However, the transformation process is a gradual process and it is difficult to say exactly when agricultural land (pastures) have been transformed into natural grassland (321). Aerial photographs in combination with additional information (subsidy and nature protection information) will help with the interpretation of natural grasslands. Some additional considerations were taken into account during the interpretation of natural grasslands (see Büttner, 2008):

- Grass covered areas inside agricultural land with parcel structure should be mapped as 231, complex cultivation patterns (242) or land principally occupied by agriculture with significant areas of natural vegetation (243) depending on real land cover.
- Grass covered areas attached to built-up and not under nature protection should be mapped as 141 or 142 depending on the use.



- Grass covered areas – no parcel structure – along rivers, lakes and sea coast. Large areas with no specific human use. They can be artificially created (see also point c.).
- Grass covered areas under some kind of nature protection.



Figure 5. The transformation of arable land (211) and complex cultivation patterns into natural grasslands (321) in the province of Drenthe (Drentse Aa). On the left, the parcel structure is present on the satellite images of the year 2000. The situation in the year 2006 has completely changed due to human impact. Parcel structure disappeared while surrounding areas are still used for agriculture (middle – IMAGE2006 and right – AP2006).

b. Forest into heathland

Normally, changes from forest into moors and heathland (31x to 322) are considered as not possible. Moors and heathland are considered as climax vegetation. However, moors and heathland have a special status in The Netherlands. They are man-induced climax vegetations (Büttner, 2008; Hazeu, 2003):

- All heathlands in the country are historically “artificial” as forests were cleared to allow for grazing.
- After clear-cutting the natural process is the forest regeneration (31x-324), but this process is strongly influenced by humans (sheep grazing, taking away the sods).
- Currently it happens the owner removes the forest plantation, and does not create a new forest or allow natural regeneration. He supports the growth of heathland as “natural” area (see Figure 6 and 12).

c. Construction works for nature

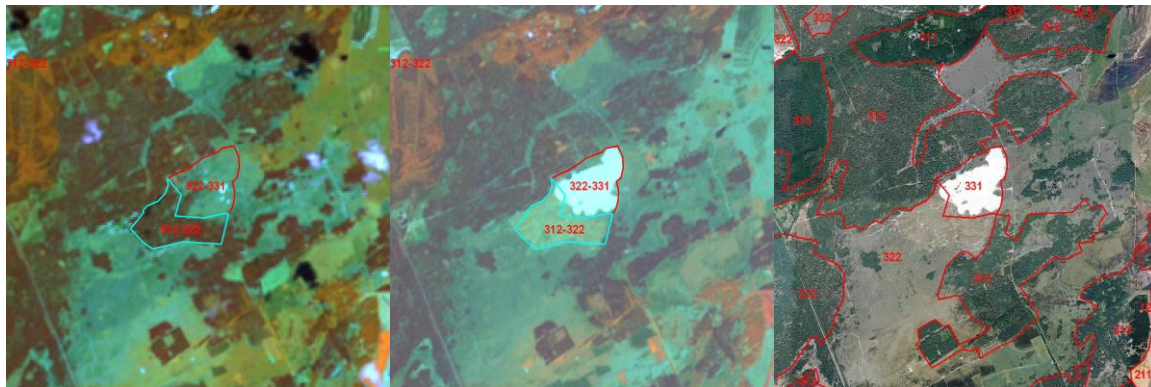
This is a new process in the Netherlands, that agricultural areas are converted back to “natural” status. Frequently this process starts with a significant earthwork, sometimes looks like a construction site on satellite images (Figure 7). Some remarks regarding this conversion process:

- New “natural” grassland with some recreation facilities is classified as sport and leisure facilities (142) and not as natural grassland (321) (e.g. a small harbour with boat renting in a newly created “natural” grassland).
- New transitional woodland shrub (324). Changes like 133-324 are not relevant, as the preparation of the new plantation area is never a construction site. In those cases use changes like 211-324, 231-324, etc.
- New inland marshes (411). Changes like 133-411 are possible – if supported by the images – as the top soil might be removed before the area is



inundated. Of course, changes as 211-411, 231-411 are also possible, if we do not see any "construction".

- The future land cover of constructions sites can not be detected from the satellite images. Sometimes the surroundings are an indication for future land cover. In the CLC2006 production they are all labelled as 133 without taking into account possible future land cover and the possible change types (see also Figure 7).



- Figure 6. An example of the conversion of forest (312) into an area with heathland (322) and heathland into shifting sands (331) in the province of Gelderland. The CHA06 database overlaid on IMAGE2000 (left) and IMAGE2006 (middle) and the CLC06 database with on the background AP2006 (right).

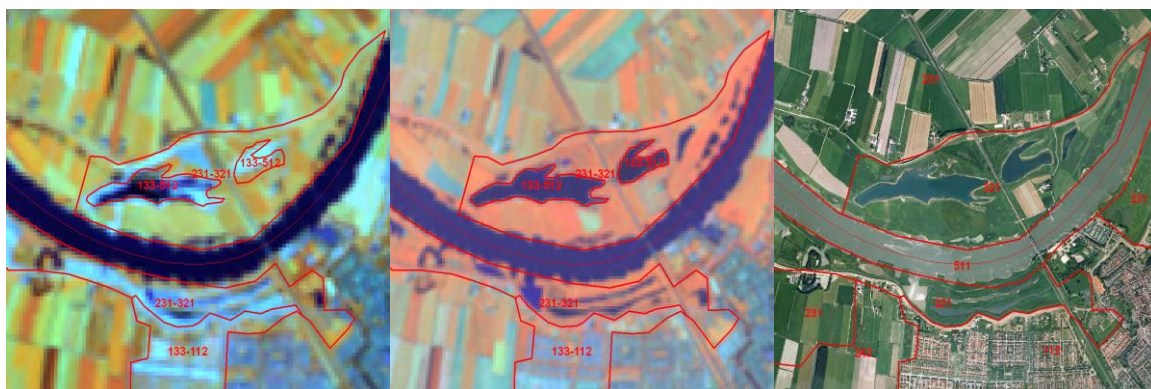


Figure 7. The pastures (231) along rivers are converted into natural grassland (321). This process is often initialized by a significant earthwork to create more space for the rivers. The earthworks are bluish on the IMAGE2000 (left), they are converted into natural grasslands (321) and water bodies (512)(IMAGE2006, middle). Changes from 133-321 are corrected into 231-321 as they are not in the sense of CORINE. The CLC06 database with AP2006 on the background is the right-hand figure.

d. Agricultural areas

During the production of CLC2006 the focus was not preliminarily on the land cover changes within the agricultural domain. Those changes are difficult to detect with the images available and are often of a very temporary character. Arable land (211) changes often between years or even within a year into pastures (231) and vice versa (see also section 2). Therefore, mapping changes in the heterogeneous classes complex cultivation patterns (242) and land principally occupied by agriculture with significant areas of natural vegetation (243) is even more cumbersome.



4. A mix of technical changes (TC), improvements (IM), changes and improvements (IM) and changes (CH) make the production process of CLC2006 databases complicated and difficult to oversee.
 - a. Technical Changes (TC) are changes where the CLC code for CLC2000 has changed not due to an improvement but only to comply with an adjacent change that did grow a virtual polygon over 25ha (see TG, 2007)(see Figure 8).
 - b. Improvements (IM) have a new CLC2000 code due to wrong interpretation in the CLC2000/CLC1990 updates. These improvements are often based on the use of high resolution aerial photographs. The CLC2000new and CLC2006 code do not differ (Figure 9). Improvements are introduced when they were encountered during the change detection. The main focus was change detection and not improvement of CLC2000!
 - c. A combination of change and improvement (CI) was often delineated to map the real change. E.g. a construction site (133) too small in CLC2000 was incorporated into discontinuous urban fabric (112) according to the priority rules. However, in 2006 this area changed into 112/121 and the real change was from 133 into 112/121. So CLC2000old code 112, CLC2000new code 133 and CLC2006 code 112 (Figure 10). This type of CI also occurred in case of misinterpretations in the CLC2000 update.
 - d. Normal and/or composite changes (CH). Single/isolated changes in land cover between 2000 and 2006 of at least 5ha or composite/mixed changes (see point 2 and Figure 11).

The complex delineations and coding obliged to the producer to control all changes after finishing the update process for a working unit. Also, it was decided not to produce a CLC2000 but directly a CLC2006 database on basis of the changes.
5. Land use classes like mineral extraction sites (131), dump sites (132), green urban areas (141) and sport and leisure activities (142) are difficult to detect on satellite images. Ancillary data (BBG2000, BBG2003) were used to delineate changes regarding those classes.
6. The merging of the polygons to produce the CLC06 database resulted in some cases too erroneous results. The Aml used for this process merged a complex change of 312-331 and 312-322 (both smaller than 25ha) with the neighbouring 322 and 312 polygons respectively. A correct merge operation would merge both changes with the moors and heath land (322) polygon (Figure 12).

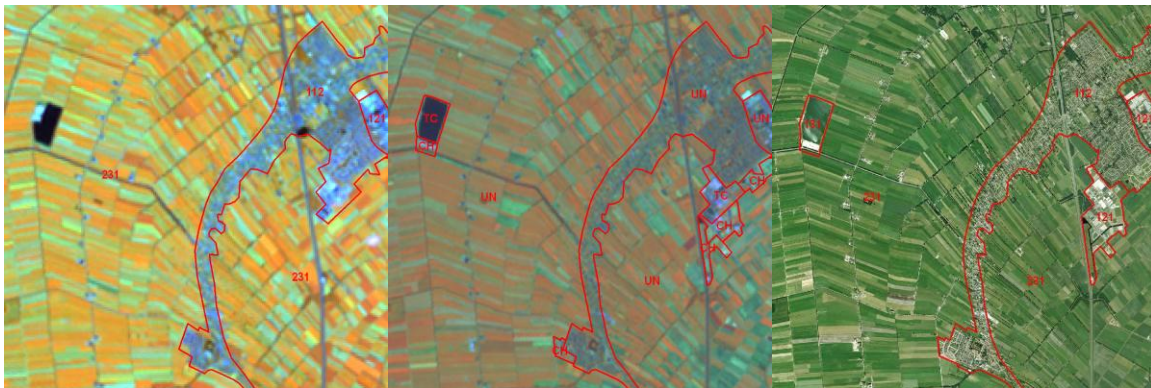


Figure 8. An example of two Technical Changes (TC) in the neighbourhood of Staphorst (province Overijssel). The virtual polygons industrial and commercial units (121) and mineral extraction sites (131) grew with the real changes (CH) into real polygons larger than 25ha. On the left the situation in the year 2000, in the middle the different interpretation labels with IMAGE2006 in the background and on the right the final CLC06 database with AP2006 in the background.



Figure 9. An example of IMprovement (IM) in the neighbourhood of Assen (province Drenthe). The improvements are within the agricultural domain (231-211-242) and between pastures (231) and natural grasslands (321). The situation in the year 2000 (left), the different interpretation labels with IMAGE2006 (middle) and the final CLC06 database with AP2006 (right).



Figure 10. An example of a combined Change and Improvement (CI) in the neighbourhood of Veendam (province of Groningen)(middle). The construction site (133) was not mapped in CLC2000 (not detected)(left). In the year 2006 it has changed into a industrial unit (121). The real change in the period 2000-2006 was from 133 into 121 and not from 211 into 121. On the right the final CLC06 database with AP2006 in the background.

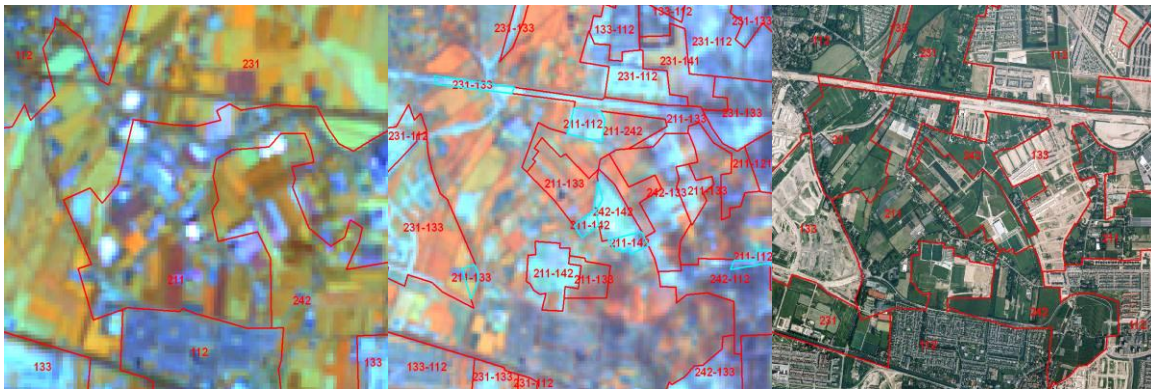


Figure 11. An example of a composite change (CH) in the neighbourhood of Vleuten (province of Utrecht). On the left the land cover in the year 2000 and on the right the final CLC06 database with AP2006 in the background. The figure in the middle shows all kinds of changes with in blue the changes smaller than 5ha (IMAGE2006). These small changes have neighbouring changes (with the same CLC06 code) that make them larger than 5ha.



Figure 12. An merging error in CLC06 due to the execution of the AML. The land cover in the year 2000 (left) and the 312-322 and 312-331 changes (middle). The 312-322 change is merged with the forest (312) polygon and the 312-331 change was merged created moors and heathland (322) polygon (right). It would be better if the 312-322 was also merged with the 322 polygon.



4. Results

The CLC2006 datasets with a buffer zone around the Netherlands can be described by the number of polygons:

- the CLC06 database consists of 9686 polygons
- the CHA06 database consist of 2674 change polygons that can be aggregated into 1706 change polygons larger than 5ha.

Table 1. Area (km²) and proportions (%) per land cover class for the CLC06, CLC2000 and CLC90rev databases. Land cover changes between the databases are presented in km².

CLC code	CLC2006		CLC2000		CLC90rev		CLC06 - CLC90rev	CLC06 - CLC00	CLC00 - CLC90rev
	km2	%	km2	%	km2	%	km2	km2	km2
112	3203	8.0	2982	7.5	2541	6.4	662	220	442
121	741	1.9	618	1.5	382	1.0	359	124	235
122	72	0.2	61	0.2	52	0.1	20	11	9
123	134	0.3	127	0.3	105	0.3	29	7	22
124	69	0.2	61	0.2	62	0.2	7	8	-1
131	36	0.1	24	0.1	13	0.0	24	12	11
132	18	0.0	7	0.0	3	0.0	15	11	4
133	207	0.5	133	0.3	138	0.3	69	74	-5
141	138	0.3	113	0.3	102	0.3	36	25	11
142	477	1.2	411	1.0	306	0.8	172	66	105
211	7541	18.9	7724	19.4	7923	19.9	-382	-183	-199
222	73	0.2	78	0.2	73	0.2	0	-5	5
231	10273	25.8	10715	26.9	11376	28.5	-1103	-442	-661
242	5429	13.6	5541	13.9	5718	14.3	-289	-111	-177
243	1155	2.9	1093	2.7	1087	2.7	68	62	6
311	599	1.5	584	1.5	499	1.3	100	15	85
312	1609	4.0	1617	4.1	1627	4.1	-17	-8	-10
313	939	2.4	942	2.4	936	2.3	3	-3	5
321	421	1.1	323	0.8	260	0.7	161	98	63
322	381	1.0	376	0.9	375	0.9	5	4	1
324	14	0.0	15	0.0	5	0.0	9	-1	10
331	152	0.4	166	0.4	189	0.5	-37	-15	-22
411	349	0.9	339	0.9	297	0.7	53	10	42
412	78	0.2	77	0.2	76	0.2	2	1	1
421	93	0.2	94	0.2	92	0.2	1	0	1
423	2294	5.8	2289	5.7	2301	5.8	-7	5	-12
511	461	1.2	462	1.2	460	1.2	1	0	2
512	2691	6.7	2677	6.7	2644	6.6	48	14	34
522	228	0.6	228	0.6	227	0.6	1	0	1

- The figures in the Table must be interpreted with care as the difference between years are not accounting all land cover changes. They are the sum of increase and decrease of land cover per class. Besides the net result of changes, these figures are also influenced by improvements during the update of CLC2006.
- The figures in this Table deviate slightly from the figures mentioned in Hazeu (2003) as they are calculated on basis of another Dutch territory mask.

Statistical data (areas and percentages) for these datasets delivered to the EEA differ only slightly from the data presented in this section. The (land) surface areas for the CLC06 and CHA06 databases including the buffer zone are 40676 km² respectively



650.3 km². The (statistical) results presented in this section deal with the national CLC2006 databases, i.e. without the buffer zone around the Dutch territory.

The national CLC2006 databases are occupying a smaller area. The CLC06 database deals with a surface area of 39878 km² (41543 km² with sea) and the CHA06 database has an surface area of 647.2 km². They are characterised by the following number of polygons:

- CLC06 consist of 8870 polygons
- CHA06 consist of 2659 polygons

Table 1 presents the area (km²) and the proportions per land cover class for the CLC06 database. Also the statistics for the CLC2000 and CLC90rev database are presented. Thirty of the forty-four CLC land cover classes are present in The Netherlands. The most important land covers in the Netherlands are the agricultural classes. Despite a continuous decrease, the main agricultural classes still occupy 25.8% (pastures – 231), 18.9% (arable land – 211), 13.6% (complex cultivation patterns – 242) and 2.9% (land principally occupied by agriculture with significant areas of natural vegetation – 243) of the Dutch territory. The urban classes are steadily increasing their surface area mainly at the expense of agricultural areas. Discontinuous urban fabric (112) is occupying 8% of the Dutch territory. Nowadays it is the land cover that holds the fourth place regarding the surface area occupied in the Netherlands. It has increased in the last 20 years with 662 km² from 2541 to 3203 km². Next to the increase in discontinuous urban fabric (112), also industrial and commercial units (121), construction sites (133) and sport and leisure facilities (142) are contributing to the urbanisation process.

Besides the urbanisation process one other important land cover class is occupying every time more land. Natural grasslands increased from 260 km² in 1990 to 421 km² (1.1%) in 2006 (see also section 3). The other land cover classes are not changing with large figures.

Other important land cover classes are water bodies (512), intertidal flats (423), different forest types (31x) and water courses (511). The other land cover classes (122, 123, 124, 131, 132, 133, 141, 222, 322, 324, 331, 411, 412, 421 and 522) do not occupy more than 1% of the Dutch land territory.

In Annex 4 the statistics at the three hierarchical levels of CORINE for CLC06, CLC2000 and CLC90rev are presented.

The total area of changes in the CHA06 database is 647,2 km² as shown in Table 2. The Table presents the different type of land cover changes that occurred in the period 2000-2006. The total number of change types is 151 (the number of cells filled in the Table).

The changes in Table 2 confirm the statistics of Table 1; an increase for the urban land cover classes at the expense of the agricultural classes. In the column at the end of the Table (Total) you can see the decrease of a land cover class in the 2000-2006 period, while in the last row you can see the increase in area for a specific class in the same period. Subtraction per land cover class of the row with the column figures indicates the increase/decrease in area for that specific class.

The land cover changes from arable land (211), pastures (231) and complex cultivation patterns (242) into construction sites (133) with 73.9, 72.9 respectively 36.2 km² occupy large areas. Other important changes are land cover changes from 211, 231 and 242 into discontinuous urban fabric (112), industrial or commercial units (121) and sport and leisure facilities (142). Within the urban domain an



important change is from construction sites (133) into 112 (63.4 km²), 121 (30.8 km²) and 142 (9.1 km²).

Furthermore, changes from arable land (211), pastures (231) and complex cultivation patterns (242) into natural grass lands (321), wetlands (411) and water bodies are of importance. Also land cover changes are the changes from 231 into 211 (or intensification of agriculture) and from transitional woodland shrub (324) into forest (311, 313)(or afforestation) occupy more than 5 km².

The total number of land cover change types between 2000 and 2006 decreased dramatically compared to the number of change types encountered in the 1990-2000 period. In the 1990-2000 period 234 different changes were encountered (see Hazeu, 2003) while this figure decreased to 151 for the 2000-2006 period. However, 40 of these 151 types are new change types that were not present in the 1990-2000 period. Most of these new changes are small (<2 km²). Exceptions are changes from transitional woodland shrub (324) into mixed forest (313) with 7.58 km², arable land (211) into airports (124) (4.96 km²), pastures (231) into transitional woodland shrub (324) (2.49 km²) and discontinuous urban fabric (112) into constructions sites (133) (2.35 km²). Regeneration of forest, the construction of a new run-away at the national airport Schiphol, the introduction of subsidies for fallow in Dutch agriculture, the renovation of urban areas are explanations for these change types.

The following changes are specific for the Dutch context and can be encountered in the CHA06 database (see also section 3):

- the conversion of agricultural land into natural grasslands (321)(see Figure 5), inland wetlands (411) and water bodies (512). These changes can be explained by a combination of governmental policies and human involvement.
- the conversion of forest into shifting sands (331) and heathland (322) and 322 into 331 (see Figure 6 and 12). Environmental policies favour the development of shifting sands and heathland in favour of forest.
- construction works for nature (see Figure 7). Significant construction works are often the initial stage for the development of new nature (water bodies (133/2xx-512), inland wetlands (133/2xx-411) and natural grasslands (2xx-321).
- renovation of old urban districts and industrial centres. The discontinuous urban fabric class (112) or industrial units (121) have temporarily changed into a construction site (133). In most cases they will change again in a next update into 112 or 121.

Some small changes like 321-133 are open for discussion. However, due to the human influence in the process of nature development changes from 321 into 331, 411 or 512 are possible.

Land cover changes (>10km²) between 1990 and 2000 that did not occur between 2000 and 2006 are 211-242, 211-311, 231-242, 231-311, 331-423, 331-523, 423-331 and 423-512. Changes from agricultural land into forest (211-311, 231-311) are only detectable for longer time-spans. Other changes for the 1990-2000 period like 211-242 and 231-242 are questionable.

Important land cover changes that dominate in both periods are changes from agriculture (211/231/242) into urban areas (112/121/133/142), changes from construction sites (133) into urban areas (112/121) and into 321 and 411 (Hazeu, 2003). The changes figures per type are in most cases lower for the recent update which is not peculiar as the period is much smaller. Therefore, it is remarkable that



the amount of changes into construction sites for the 2000-2006 period are also in absolute figures higher than for the 1990-2000 period.

The area that changed its land cover decreased from 1685.1 km² (4.23%)* to 647.2 km² (1.62%) for the 1990-2000 respectively the 2000-2006 period. However, the difference between those periods is not as large as these figures indicate, because the periods have a different time-span. The change rate for the 2000-2006 period (6 years) is 108 km²/year as the rate for the 1990-2000 period (14 years as the 1990 update is based on images of 1986) is only slightly higher (120 km²/year).

Regional differences in change statistics are present in the Netherlands. The provinces Zuid-Holland, Noord-Holland, Gelderland and Noord-Brabant have the largest amount of changes (2nd column, Table 3). However, next to the province of Zuid-Holland also the provinces Utrecht and Flevoland have high relative changes, i.e. around 2.5% of surface area has changed (4th column, Table 3). The relative amount of changes is under the national mean of 1.6% for the provinces of Friesland, Overijssel, Gelderland, Zeeland and Limburg.

The average size of a change polygon is around 0.2 km² with the provinces of Limburg (0.15 km²) and Flevoland (0.54 km²) as the exceptions (5th column, Table 3). The number of changes is relatively low (< 200) in the provinces of Flevoland, Groningen, Utrecht, Zeeland, Friesland and Drenthe while it is relatively high (>300) in Noord-Holland, Gelderland and Noord-Brabant (7th column, Table 3). These figures show that Flevoland is characterised by large scale changes while in the provinces Gelderland, Noord-Brabant the small changes dominate the landscape.

The number of change types varies between 34 (Zeeland, Overijssel) and 70 (Noord-Holland)(6th column, Table 3) of which 6 respectively 16 change types occupy more than 1 km². The province of Noord-Brabant has the largest number of change types over 1km² (19) (8th column, Table 3). Most prominent land cover changes are the changes related to urbanisation with changes related to nature development on the second place (Table 3). Regional differences exist with the western part of the Netherlands dominated by urbanisation (Noord-Holland and Zuid-Holland) while in the provinces of Groningen and Drenthe land cover changes related to nature development are prominent.

* The percentage is slightly different from the 4.76% mentioned in Hazeu (2003). Due to a different country mask and including all CORINE Land Cover classes except the sea, the figure dropped with 0.43%. IJsselmeer and class 423 were not included as surface area in the previous calculations



5. Deliverables

The following deliverables are accompanying this interim report:

- CLC-changes
- CLC2006
- Metadata at national and working unit level

The CLC-change and CLC2006 databases are delivered as a file geodatabase CLC2006_NL. The CLC2006 feature dataset contains the CHA06_NL and the CLC06_NL feature classes.

The metadata concerned data at national level and at working unit level. At national level a metadata sheet for the change (MCOCH) and CLC2006 (MCO06) databases were delivered (Annex 1 and 2). At working unit level (per province) also metadata sheets were delivered (Annex 3).

All data were uploaded on CDR in the CLC2006 envelop for the Netherlands.



Table 2. Area per type of land cover changes between 2000 and 2006 (km2).

CLC2006																														
CLC	112	121	122	123	124	131	132	133	141	142	211	222	231	242	243	311	312	313	321	322	324	331	411	412	423	511	512	522	523	Total
CLC 2000	112							2.3		0.0																				2.4
	121					0.0		1.3																						1.3
	122							0.0																						0.0
	124							0.5																						0.5
	131						0.1	0.2		0.3		0.1							0.3							1.5				2.4
	132									0.3																0.7				1.0
	133	63.4	30.8	1.1	3.4		0.4		2.9	9.1	0.9	0.4										1.3			0.5	1.7	0.1			115.8
	141	0.7	0.3					0.9		0.2																				2.1
	142	1.4	0.7					2.6																						4.7
	211	23.3	14.4	1.4		5.0	2.0	0.6	73.9	4.6	6.5		0.1	2.6	0.2				17.0		3.3		3.7				4.2			162.7
	222	0.2	0.4						0.3		0.2	2.7																		3.8
	231	24.5	16.0	1.5	0.1		2.6	0.7	72.9	6.0	9.5	13.2			0.6				19.0		2.5		9.5				5.7			184.3
	242	13.6	11.5	1.7	0.1	0.1	2.3		36.2	1.0	8.0	2.2							15.0		2.1		1.1				8.2			103.2
	243	2.2	1.9						4.9	0.2	3.4						0.5		0.1				0.3				0.1			13.6
	311	0.4	0.1			0.2			1.4	0.3	0.5										0.1	0.0					0.2			3.3
	312	0.1	0.1				0.3		0.7		0.8									3.0	2.6	0.7		0.1						8.5
	313	0.4	0.1				0.1		0.7		0.1									0.3	1.0						0.2			2.9
	321								1.8													0.6		1.7			0.6			4.8
	322					0.1			0.5		0.1											0.8	1.0				0.0			2.6
	324								0.1	0.5							11.0	0.6	7.6											19.8
	331																		0.7	1.3	0.2									2.1
	411				0.0				0.1		0.1																0.1			0.3
	412																									0.1				0.1
	421								0.6																					0.6
	423																											0.8		0.8
	511				0.3				0.2																					0.6
	512	0.2	0.1		0.2				0.9																					1.4
	523																								1.8					1.8
	Total	130.4	76.3	5.6	4.2	5.3	7.5	1.8	203.1	15.5	39.1	18.9	0.1	3.0	0.2	0.6	11.5	0.6	7.6	52.0	4.6	12.5	2.4	17.6	0.1	1.8	0.5	23.3	0.1	0.8



Table 3. Change statistics for the 12 provinces of the Netherlands.

	Area of changes km2	Total area of province km2	Percentage change %	Average size km2	Number of change types	Number of changes	Number of change types above 1km2	Median km2	Dominant change types type km2		Most important processes
Groningen	44.5	2809.3	1.6	0.30	35	150	14	0.70	211-321	6.2	nature development / water
Friesland	41.3	5347.4	0.8	0.23	38	178	12	0.32	242-512	6.0	urbanisation
Drenthe	51.5	2680.4	1.9	0.28	58	185	14	0.35	231-133	10.8	urbanisation
Flevoland	60.6	2412.3	2.5	0.54	38	113	13	0.76	231-211	4.5	intensification agriculture / water
Overijssel	42.4	3420.9	1.2	0.19	34	225	12	0.64	242-321	7.4	nature development / forestation
Noord-Holland	70.2	3766.3	1.9	0.22	70	313	16	0.32	211-133	5.0	urbanisation
Utrecht	35.7	1449.1	2.5	0.21	40	171	11	0.22	133-112	13.9	nature development / forestation
Gelderland	68.2	5136.5	1.3	0.20	57	337	13	0.43	231-133	8.4	urbanisation
Zuid-Holland	77.9	3241.9	2.4	0.32	39	242	14	0.64	133-112	9.4	nature development
Zeeland	30.9	2323.4	1.3	0.18	34	176	6	0.37	211-133	4.3	urbanisation
Noord-Brabant	92.5	5081.8	1.8	0.24	58	380	19	0.65	211-133	8.9	urbanisation
Limburg	31.5	2209.2	1.4	0.15	53	205	11	0.29	231-133	7.7	urbanisation
									231-112	5.5	nature development
									231-133	12.0	urbanisation
									211-133	6.7	nature development
									211-133	15.2	urbanisation
									133-112	13.8	urbanisation
									211-133	11.2	urbanisation
									211-321	3.9	nature development
									242-133	18.5	urbanisation
									231-133	7.2	nature development
									211-133	4.0	urbanisation
									242-133	3.3	nature development / water
Totaal	647.2	39878.4	1.6	0.24	151	2675					



6. Discussion and Conclusions

The Netherlands is characterised by 30 out of 44 CORINE land cover classes. The main land cover in The Netherlands is still agriculture (pastures, arable land and complex cultivation patterns (58.3%)). However, the surface area occupied by urban areas has increased to 12.8%. Land classified as semi-natural and forest areas occupies around 10% of the national territory. The remainder of the Dutch land surface was classified as wetland or water bodies, rivers and/or canals.

The most important changes in the Netherlands are:

- agricultural land (211, 231 and 242) into urban classes (112, 121, 133, 142),
- construction sites (133) into 112, 121 and 142,
- agricultural land (211, 231 and 242) into natural grasslands (321), inland wetlands (411) and water bodies (512),
- forest (3xx) into transitional woodland-shrub (324), and
- pastures (231) into arable land (211).

Special land cover change pairs in the Netherlands are:

- agriculture (2xx) into natural grasslands (321), inland wetlands (411) and water bodies (512),
- forest (3xx) into shifting sands (331) and heathland (322) and 322 into 331,
- construction works for nature: construction sites (133) into inland wetlands (411) or water bodies (512),
- internal urban changes like 112/121 into 133 due to the renovation of industrial centres or urban districts.

The total area that changed its land cover between 2000 and 2006 is 647.2 km² (1.62% of the Dutch territory (except the sea)) which is much lower than the 1685 km² between 1990-2000 (4.23%). However, the change rate did not really slowed down as the period between the updates is much shorter (108 km²/year against 120 km²/year). These changes figures are comparable with the figures of our national database LGN. The changes between LGN3-4 (1995/1997-1999/2000) occupy an area of 388.9 km² (Hazeu and de Wit, 2004 and de Wit, 2003) and they occupy between LGN4-5 (1999/2000 – 2003/2004) an area of 277.6 km² (Hazeu, 2005 and 2006). Figures per year for the national databases are difficult to present as each database is a composite of 2 years. The real change area per year will be somewhere between the total area divided by 3 and 5.

A Dutch study using the Dutch statistical databases (BBG2000 and BBG2003) revealed an increase of urban area with 106.3 km² between 2000 and 2003 (Odijk and Louwerse, 2007). The urban area was defined as urban fabric, industrial or commercial units and port areas (112, 121 and 123, respectively). Some small areas of dump sites, sport and leisure and green urban were added on basis of expert knowledge and GIS decision rules. The total area changed into urban area (112, 121 and 123) between 2000 and 2006 is 210.9 km² for the CHA06_NL database (Table 2). Extrapolation of the Dutch urban area that changed to the 2000-2006 period results in a similar area.

Overestimation of changes due to methodology is very small (Feranec, 2007). Only due to misinterpretation. However, the methodology implicitly underestimate changes (<5ha, certain change types are difficult to find, large area that are unchanged makes it difficult to find all changes (omission errors)).



New CLC updates has to take into account national initiatives to avoid duplications and to increase the use of the database. However, this will have consequences for the comparability of the (change) databases.

Multi-temporal analysis can be useful in dynamic countries as the Netherlands. However, the images must be of different seasons in one year to make optimal use of the possibilities of multi-temporal analysis.

7. References

- EEA documents

Bossard, M.; Feranec, J.; Otahel, J., 2000. *Corine land cover technical guide — Addendum 2000*. <http://terrestrial.eionet.europa.eu/>. EEA Technical report No 40. Copenhagen (EEA).

Büttner, G.; Feranec, G.; Jaffrain, G. (2002). *Corine landcover update 2000, Technical guidelines*. EEA Technicalreport No 89. http://reports.eea.europa.eu/technical_report_2002_89/en.

Büttner, G.; Feranec, G.; Jaffrain, G. (2006). *Corine land cover nomenclature illustrated guide (Addendum 2006)*. http://eea.eionet.europa.eu/Members/irc/eionetcircle/spatial/library?l=/clc2005_update/clc2006_technical/draft/nomenclaturedoc/_EN_1.0_&a=d.

Buttner, G. (2008). *CLC2006 2nd verification report, the Netherlands*. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.

EEA (2007). *Technical guidelines CLC2006*. EEA Technical report 17, European Environmental Agency, Copenhagen, Denmark.

EEA (2006). *GMES Fast Track Service on Land Monitoring*. EEA Project Implementation Plan GMES Land FTS 2006–2008, European Environmental Agency, Copenhagen, Denmark.

Feranec, J.; Cebecauer, T.; Hazeu, G. W.; Jaffrain, G. (2007a). Cartographic aspects of land cover change detection (over- and underestimation in the I&Corine land cover 2000 Project). *The Cartographic Journal Vol. 44*, No 1, 44-54.

Feranec, J.; Hazeu, G. W.; Christensen, S.; Jaffrain G. (2007b). Corine land cover change detection in Europe (Case studies of the Netherlands and Slovakia). *Land Use Policy 24*, 234–247.

Heymann, Y.; Steenmans, Ch.; Croissille, G.; Bossard, M. (1994). *Corine Land Cover. Technical Guide*. EUR12585 Luxembourg, Office for Official Publications of the European Communities.

JRC (2008). *Technical proposal for high resolution Forest/Non-Forest map 2006*.

Kosztra, B. & Mari, L. (2007). *CLC2006 1st verification report, the Netherlands*. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.



Maucha, G. & Buttner, G. (2007). *Recommendations Quantitative assessment high resolution soil sealing layer*. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.

Pataki, R. (2008). *A macro program for generating CLC2006 from CLC2000 and CLC-changes*. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.

Soukup, T. (2007). *Guidelines for CLC2006 delivery*. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.

Soukup, T. (2008). *CLC2006. Database Technical Acceptance*. The Netherlands. Final. Project 126: CORINE Land Cover update. ETC-LUSI, Barcelona, Spain and EEA, Copenhagen, Denmark.

Steenmans, C. & Sousa, A. (2007). *Guidelines for verification of high resolution soil sealing layer. Qualitative assessment*. EEA, Copenhagen, Denmark.

- National documents

Hazeu, G.W., (2007). *National project plan CLC2006 - The Netherlands*.

Hazeu, G.W. (2003). *CLC2000 Land Cover database of the Netherlands. Monitoring land cover changes between 1986 and 2000*. Wageningen, Alterra, Green World Research. Alterra-rapport 775 / CGI-rapport 03-006, 108 pp., 12 figs, 11 tables, 16 refs.

Hazeu, G.W. & de Wit, A.J.W., 2004. CORINE Land Cover database of the Netherlands: Monitoring land cover changes between 1986 and 2000. Workshop on Remote Sensing of Land Use & Land Cover, May 28 – 29, 2004, Dubrovnik, Croatia. *EARSeL eProceedings*, 3(3), 382-387

Hazeu, G.W. (2005). *Landelijk Grondgebruiksbestand Nederland (LGN5). Vervaardiging, nauwkeurigheid en gebruik*. Wageningen, Alterra. Alterra-report 1213, 92p., 18 figs., 11 tables and 11 refs.

Hazeu, G.W., 2006. *Land use mapping and monitoring in the Netherlands (LGN5)*. 2nd EARSeL Workshop on Land Use and Land Cover, 28-30 September 2006, Bonn, Germany. Conference proceedings.

Odijk, M. and Louwerse, P., 2007. *Begrenzing Bebouwd Gebied 2003*. Directoraat-Generaal Ruimte, Directie VOS – Cluster GEO en Directie NIB – cluster B&U, Den Haag, the Netherlands.

Wit, A.J. de, 2003. *Land use mapping and monitoring in the Netherlands using remote sensing data*. In: IEEE, International Geoscience and Remote Sensing Society (IGARSS) – Learning from Earth's shapes and Colors, 21-25 July Toulouse, France. Interactive Session A21 Land Cover, 3pp. CD-ROM, ISBN 0-7803-7930-6.



Annex 1: CLC-Changes metadata sheet for the country

EEA			ISO Number	EEA Description	Please fill in	Max
Field name						
Level 1	Level 2	Level 3				
Metadata on metadata	Point of contact			Defines the metadata on the dataset		1
				Responsible organisation and individual for the metadata		1
		Organisation name	8.376	Responsible organisation name	Alterra bv, Wageningen UR	1
		Individual name	8.375	Responsible individual name	Mr. Gerard Hazeu	1
		Position name	8.377	The responsible individual role or position in the organisation	Project manager	1
		Role	8.379	Function performed by the responsible organisation	Researcher GIS & Remote Sensing	1
		Address: Delivery point	8.378.38 1	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	8.378.38 2	City of the location	Wageningen	1
		Address: State, Province	8.378.38 3	State, province of the location		1
		Address: Postal code	8.378.38 4	Postal code of the location	6708 PB	1
		Address: Country	8.378.38 5	Country of the location	The Netherlands	1
		Address: E-mail	8.378.38 6	The electronic mail address of the responsible organisation or individual	gerard.hazeu@wur.nl	1
		Last modified	9	Date of the last modification of the metadata (YYYYMMDD)	20080227	1
		Name of standard	10	Name of metadata standard	EEA-MSGI/ISO19115 (First Edition)	1
	Version of standard	11	Version of the metadata standard	EEA-MSGI 1.1	1	
Dataset identifier				Basic information required to identify the dataset		1



fication	Title	15.24.360	Title of the dataset	CHA06_NL	1
	Alternative title	15.24.361	Alternative titles of the dataset	CORINE Land Cover change (2000-2006) database of the Netherlands; CLC change (2000-2006) – the Netherlands	N
	Brief Abstract	15.EEABriefAbstract	Brief abstract explaining in short the content of the dataset	CORINE Land Cover change (2000-2006) database of the Netherlands	1
	Abstract	15.25	An abstract explaining the content of the dataset	<p>An increasing need for factual and quantitative information on the state of the environment of DG Environment, DG Agriculture and other users initiated a proposal of the EEA to collaborate with the European Space Agency (ESA) and the European Commission (EC) on the implementation of a fast track service on land monitoring. The project focused on on timely, quality assured data, in particular in land cover and land use related issues for 2006-2008. The CLC2006 project is part of the GMES Fast Track Service Precursor (FTSP) Land Monitoring. In CLC2006 38 countries with total area of 5.8 Mkm² are participating (32 EEA member states and 6 collaborating countries).</p> <p>In The Netherlands the project is co-financed by:</p> <ol style="list-style-type: none"> 1. The Ministry of Housing, Spatial Planning and Environment (VROM). Contract number: AMP2006-1.2.4.CST/AMP2007-1.2.6.ASO. 2. The Ministry of Agriculture, Nature and Food Quality (LNV). 3. The European Environment Agency (EEA). Contract number: 3601/RO/CLC/B2007.EEA.52947. 	1



	Keywords		15.33.53	Keywords helping to classify the dataset	CLC change, CLC2006, CORINE, geographic, land cover change, environment, vector data, the Netherlands	N
	Topic category		15.41	A predefined ISO category, see code list 2 underneath	010 (imageryBaseMapsEarthCover)	1
	Dataset version		15.24.36 3	Version of the dataset	Version 1	1
	Reference date		15.24.36 2.394	Date of last modification to the dataset (YYYYMMDD)	20080227	1
Reference system				Definition of the reference system used for the dataset		1
	Name		13.196.2 07	Name of reference system	Rijksdriehoekstelsel_NEW	1
	Datum			Identity of the datum		1
		Name	13.192.2 07	Name of datum	D_Amersfoort	1
	Ellipsoid			Identity of the ellipsoid		1
		Name	13.191.2 07	Name of ellipsoid	Bessel_1941	1
		Semi-major axis	13.193.2 02	Radius of the equatorial axis of the ellipsoid	6377397.155	1
		Axis units	13.193.2 03	Units of the semi-major axis	Meter	1
		Flattening ratio	13.193.2 04	Ratio of the difference between the equatorial and polar radii of the ellipsoid to the equatorial radius when the numerator is set to 1	299.1528128 or 0.00334277	1
	Projection			Identity of the projection		1
		Name	13.190.2 07	Name of projection	Double Stereographic	1
		Zone	13.194.2 16	Unique identifier for grid zone		1
		Standard parallel	13.194.2 17	Line of constant latitude at which the surface of Earth and the plane or developable surface intersect		1



		Longitude Of Central Meridian	13.194.2 18	Line of longitude at the centre of a map projection generally used as the basis for constructing the projection	5.38763889	1
		Latitude of projection origin	13.194.2 19	Latitude chosen as the origin of rectangular coordinates for a map projection		1
		False easting	13.194.2 20	Value added to all “x” values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in planar coordinate units	155000	1
		False northing	13.194.2 21	Value added to all “y” values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in planar coordinate units	463000	1
		False easting northing units	13.194.2 22	Units of false northing and false easting	Meter	1
		Scale factor at equator	13.194.2 23	Ratio between physical distance and corresponding map distance, along the equator	0.99990790	1
		Longitude of projection centre	13.194.2 24	Longitude of the point of projection for azimuthal projections		1
		Latitude of projection centre	13.194.2 25	Latitude of the point of projection for azimuthal projections	52.15616056	1
Distribution information				Information about the distributors of the dataset		1
	Owner 1			Information about the owner organisation		N



on		Organisation name	15.29.37 6	Name of the owner organisation	European Environment Agency	1
		Individual name	15.29.37 5	Name contact person in the owner organisation	See contract with EEA!	1
		Position name	15.29.37 7	Position of the contact person in the owner organisation	See contract with EEA!	1
		Role	15.29.37 9	Always "Owner" role	owner	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Kongens Nytorv 6	1
		Address: City	15.29.37 8.389.38 2	City of the location	Copenhagen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	K	1
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	1050	1
		Address: Country	15.29.37 8.389.38 5	Country of the location	Denmark	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the owner organisation or individual	eea@eea.europa.eu	1
				Information about the distributors of the dataset		
	Owner 2			Information about the owner organisation		
		Organisation name	15.29.37 6	Name of the owner organisation	Alterra bv, Wageningen UR)	
		Individual name	15.29.37 5	Name contact person in the owner organisation	Mr. Gerard Hazeu	
		Position name	15.29.37 7	Position of the contact person in the owner organisation	project manager	
		Role	15.29.37 9	Always "Owner" role	Originator	



		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	
		Address: Country	15.29.37 8.389.38 5	Country of the location	The Netherlands	
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the owner organisation or individual		
	Originator			Information about intellectual creator (person and/or organisation with intellectual rights) of the dataset		N
		Organisation name	15.29.37 6	Name of the creating organisation	Alterra bv, Wageningen UR)	1
		Individual name	15.29.37 5	Name contact person in the creating organisation	Mr. Gerard Hazeu	1
		Position name	15.29.37 7	Position of the contact person in the creating organisation	project manager	1
		Role	15.29.37 9	Always "Originator" role	Originator	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	1



		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	1
		Address: Country	15.29.37 8.389.38 5	Country of the location	The Netherlands	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the originator/creator organisation or individual	gerard.hazeu@wur.nl	1
	Processor			The technical producer or processor of the data		N
		Organisation name	15.29.37 6	Name of the processor organisation	Alterra bv., Wageningen UR	1
		Individual name	15.29.37 5	Name contact person in the processor organisation	Mr. Gerard Hazeu	1
		Position name	15.29.37 7	Position of the contact person in the processor organisation	project manager	1
		Role	15.29.37 9	Always "Processor" role	Processor	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	1
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	1
		Address: Country	15.29.37 8.385	Country of the location	The Netherlands	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the processor organisation or individual	gerard.hazeu@wur.nl	1
	Distributor			The organisation distributing the data		N
		Organisation name	15.29.37 6	Name of the distributor organisation	European Environment Agency	1



		Individual name	15.29.37 5	Name contact person in the distribution organisation		1
		Position name	15.29.37 7	Position of the contact person in the distributor organisation		1
		Role	15.29.37 9	Always "Distributor" role		1
		Address: Delivery point	15.29.37 8.389.38 2	Address line for the location	http://dataservice.eea.europa.eu/dataservice	1
		Address: City	15.29.37 8.389.38 3	City of the location	Copenhagen	1
		Address: State, Province	15.29.37 8.389.38 4	State, province of the location	K	1
		Address: Postal code	15.29.37 8.385	Postal code of the location	1050	1
		Address: Country	15.29.37 8.389.38 6	Country of the location	Denmark	1
		Address: E-mail	15.29.37 8.389.38 2	The electronic mail address of the distributor organisation or individual	eea@eea.europa.eu	1
		Access rights		Defines access rights for the dataset		N
		Type of constraint	20.70	The type of access right applied to assure the protection of privacy or intellectual property, and any special restriction or limitations on obtaining the resource. See code list 1 .	005 (licence)	1
		Restriction	20.72	Description of the restriction of the access right.		1
Other dataset information				Other aspects explaining the dataset		1
	Language		15.39	Language used within the dataset	EN	1



	Format name	15.32.28 5	Name of the used exchange format for the dataset	Shape file or PGDB	1
	Format version	15.32.28 6	Version of the used exchange format for the dataset	-	1
	Methodology description	18.81.83	General explanation of the data producer's knowledge about how the geometry was constructed/derived and how the attribute information being part of the dataset was generated.	CLC-Changes (CHA06_NL) database has been derived from CLC2006 by visually comparing IMAGE2006 and IMAGE2000. All changes fulfilling the mapping criteria (> 5 ha, > 100 m boundary displacement) have been delineated, not only those that form a valid (>25 ha) polygon in CLC2000. Büttner, G., Feranec, G., Jaffrain, G., 2002. CORINE Land Cover update, Technical Guidelines, http://terrestrial.eionet.europa.eu , EEA Technical Report No. 89.	1
	Changes	18.EEAC hanges	Description of the changes since last version of the dataset	-	1
	Process steps		Information about the event in the creation process of the dataset		N
	Description	18.81.84. 87	Description of the process step including related parameters or tolerance	Step1: Visual comparison of IMAGE2000 and CLC2000 database displayed on IMAGE2006, direct delineation of changes and improvements. Software used: ArcGIS9.2, JTX	1
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	IMAGE2006 data: Ortho-corrected SPOT4and5 imagery and IR06. Pixelsize: 20m.	N
	Source data reference date	18.81.84. 91.362	Date of the resource used in process step	Date range: 05/28/2005 – 07/18/2006.	N
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	IMAGE2000 data: Landsat TM imagery, pixelsize: 25 m.	
	Source data reference date	18.81.84. 91.362	Date of the resource used in process step	Date range: 1999 and 2000 (July-September data)	
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	Digital Topographic scale 1:10.000 of 2006, BBG of 2000 and 2003 at scale 1:10.000	



		Source data reference title	18.81.84.91.360	Name of the resource used in process step	Aerial photographs of 2000 and 2006 at 4 and 0.5m resolution, respectively	
		Description	18.81.84.87	Description of the process step including related parameters or tolerance	Step2: Internal verification (Technical & thematic)	
		Description	18.81.84.87	Description of the process step including related parameters or tolerance	Step3: External verification by the CLC2000 Technical Team	
		Description	18.81.84.87	Description of the process step including related parameters or tolerance		
	Scale		15.38.60.57	Gives a rough value of accuracy of the dataset; e.g. 2500000 means dataset has an accuracy suitable for use at scale 1:2.5 million at best	100.000	1
	Geographic accuracy		15.38.61	Geographic accuracy of location, ground distance as an value in meters	100	1
	Geographic box			Geographic position bounding box of the dataset		1
	West bound longitude		15.42.33 6.344	Western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)	3.4414711	1
	East bound longitude		15.42.33 6.345	Eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)	7.25617	1
	South bound latitude		15.42.33 6.346	Southern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)	50.730885	1
	North bound latitude		15.42.33 6.347	Northern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)	53.507753	1



Annex 2: CLC2006 metadata sheet for the country

EEA			ISO Number	EEA Description	Please fill in	Max
Field name						
Level 1	Level 2	Level 3				
Metadata on metadata	Point of contact			Defines the metadata on the dataset		1
				Responsible organisation and individual for the metadata		1
		Organisation name	8.376	Responsible organisation name	Alterra bv, Wageningen UR	1
		Individual name	8.375	Responsible individual name	Mr. Gerard Hazeu	1
		Position name	8.377	The responsible individual role or position in the organisation	Project manager	1
		Role	8.379	Function performed by the responsible organisation	Researcher GIS & Remote Sensing	1
		Address: Delivery point	8.378.381	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	8.378.382	City of the location	Wageningen	1
		Address: State, Province	8.378.383	State, province of the location		1
		Address: Postal code	8.378.384	Postal code of the location	6708 PB	1
		Address: Country	8.378.385	Country of the location	The Netherlands	1
		Address: E-mail	8.378.386	The electronic mail address of the responsible organisation or individual	gerard.hazeu@wur.nl	1
	Last modified		9	Date of the last modification of the metadata (YYYYMMDD)	20080227	1
	Name of standard		10	Name of metadata standard	EEA-MSGI/ISO19115 (First Edition)	1
	Version of standard		11	Version of the metadata standard	EEA-MSGI 1.1	1



Dataset identification			Basic information required to identify the dataset		1
	Title	15.24.360	Title of the dataset	CLC06_NL	1
	Alternative title	15.24.361	Alternative titles of the dataset	CORINE Land Cover 2006 database of the Netherlands; CLC2006 – the Netherlands	N
	Brief Abstract	15.EEABriefAbstract	Brief abstract explaining in short the content of the dataset	CORINE Land Cover 2006 database of the Netherlands	1
	Abstract	15.25	An abstract explaining the content of the dataset	<p>An increasing need for factual and quantitative information on the state of the environment of DG Environment, DG Agriculture and other users initiated a proposal of the EEA to collaborate with the European Space Agency (ESA) and the European Commission (EC) on the implementation of a fast track service on land monitoring. The project focused on timely, quality assured data, in particular in land cover and land use related issues for 2006-2008. The CLC2006 project is part of the GMES Fast Track Service Precursor (FTSP) Land Monitoring. In CLC2006 38 countries with total area of 5.8 Mkm² are participating (32 EEA member states and 6 collaborating countries).</p> <p>In The Netherlands the project is co-financed by:</p> <ol style="list-style-type: none"> 4. The Ministry of Housing, Spatial Planning and Environment (VROM). Contract number: AMP2006-1.2.4.CST/AMP2007-1.2.6.ASO. 5. The Ministry of Agriculture, Nature and Food Quality (LNV). 6. The European Environment Agency (EEA). Contract number: 3601/RO/CLC/B2007.EEA.52947. 	1



	Keywords	15.33.53	Keywords helping to classify the dataset	CLC change, CLC2006, CORINE, geographic, land cover change, environment, vector data, the Netherlands	N
	Topic category	15.41	A predefined ISO category, see code list 2 underneath	010 (imageryBaseMapsEarthCover)	1
	Dataset version	15.24.36 3	Version of the dataset	Version 1	1
	Reference date	15.24.36 2.394	Date of last modification to the dataset (YYYYMMDD)	20080227	1
Referen ce system			Definition of the reference system used for the dataset		1
	Name	13.196.2 07	Name of reference system	Rijksdriehoekstelsel_NEW	1
	Datum			Identity of the datum	1
		Name	Name of datum	D_Amersfoort	1
	Ellipsoid			Identity of the ellipsoid	1
		Name	Name of ellipsoid	Bessel_1941	1
		Semi-major axis	Radius of the equatorial axis of the ellipsoid	6377397.155	1
		Axis units	Units of the semi-major axis	Meter	1
		Flattening ratio	Ratio of the difference between the equatorial and polar radii of the ellipsoid to the equatorial radius when the numerator is set to 1	299.1528128 or 0.00334277	1
	Projection			Identity of the projection	1
		Name	Name of projection	Double Stereographic	1
		Zone	Unique identifier for grid zone		1
		Standard parallel	Line of constant latitude at which the surface of Earth and the plane or developable surface intersect		1



		Longitude Of Central Meridian	13.194.2 18	Line of longitude at the centre of a map projection generally used as the basis for constructing the projection	5.38763889	1
		Latitude of projection origin	13.194.2 19	Latitude chosen as the origin of rectangular coordinates for a map projection		1
		False easting	13.194.2 20	Value added to all "x" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in planar coordinate units	155000	1
		False northing	13.194.2 21	Value added to all "y" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in planar coordinate units	463000	1
		False easting northing units	13.194.2 22	Units of false northing and false easting	Meter	1
		Scale factor at equator	13.194.2 23	Ratio between physical distance and corresponding map distance, along the equator	0.99990790	1
		Longitude of projection centre	13.194.2 24	Longitude of the point of projection for azimuthal projections		1
		Latitude of projection centre	13.194.2 25	Latitude of the point of projection for azimuthal projections	52.15616056	1
Distribution information				Information about the distributors of the dataset		1
	Owner 1			Information about the owner organisation		N



on		Organisation name	15.29.37 6	Name of the owner organisation	European Environment Agency	1
		Individual name	15.29.37 5	Name contact person in the owner organisation	See contract with EEA!	1
		Position name	15.29.37 7	Position of the contact person in the owner organisation	See contract with EEA!	1
		Role	15.29.37 9	Always "Owner" role	Owner	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Kongens Nytorv 6	1
		Address: City	15.29.37 8.389.38 2	City of the location	Copenhagen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	K	1
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	1050	1
		Address: Country	15.29.37 8.389.38 5	Country of the location	Denmark	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the owner organisation or individual	eea@eea.europa.eu	1
				Information about the distributors of the dataset		
	Owner 2			Information about the owner organisation		
		Organisation name	15.29.37 6	Name of the owner organisation	Alterra bv, Wageningen UR)	
		Individual name	15.29.37 5	Name contact person in the owner organisation	Mr. Gerard Hazeu	
		Position name	15.29.37 7	Position of the contact person in the owner organisation	project manager	
		Role	15.29.37 9	Always "Owner" role	Originator	



		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	
		Address: Country	15.29.37 8.389.38 5	Country of the location	The Netherlands	
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the owner organisation or individual		
	Originator			Information about intellectual creator (person and/or organisation with intellectual rights) of the dataset		N
		Organisation name	15.29.37 6	Name of the creating organisation	Alterra bv, Wageningen UR)	1
		Individual name	15.29.37 5	Name contact person in the creating organisation	Mr. Gerard Hazeu	1
		Position name	15.29.37 7	Position of the contact person in the creating organisation	project manager	1
		Role	15.29.37 9	Always "Originator" role	Originator	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	1



		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	1
		Address: Country	15.29.37 8.389.38 5	Country of the location	The Netherlands	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the originator/creator organisation or individual	gerard.hazeu@wur.nl	1
	Processor			The technical producer or processor of the data		N
		Organisation name	15.29.37 6	Name of the processor organisation	Alterra bv., Wageningen UR	1
		Individual name	15.29.37 5	Name contact person in the processor organisation	Mr. Gerard Hazeu	1
		Position name	15.29.37 7	Position of the contact person in the processor organisation	project manager	1
		Role	15.29.37 9	Always "Processor" role	Processor	1
		Address: Delivery point	15.29.37 8.389.38 1	Address line for the location	Droevendaalsesteeg 3	1
		Address: City	15.29.37 8.389.38 2	City of the location	Wageningen	1
		Address: State, Province	15.29.37 8.389.38 3	State, province of the location	-	1
		Address: Postal code	15.29.37 8.389.38 4	Postal code of the location	6708 PB	1
		Address: Country	15.29.37 8.385	Country of the location	The Netherlands	1
		Address: E-mail	15.29.37 8.389.38 6	The electronic mail address of the processor organisation or individual	gerard.hazeu@wur.nl	1
	Distributor			The organisation distributing the data		N
		Organisation name	15.29.37 6	Name of the distributor organisation	European Environment Agency	1



		Individual name	15.29.37 5	Name contact person in the distribution organisation		1
		Position name	15.29.37 7	Position of the contact person in the distributor organisation		1
		Role	15.29.37 9	Always "Distributor" role		1
		Address: Delivery point	15.29.37 8.389.38 2	Address line for the location	http://dataservice.eea.europa.eu/dataservice	1
		Address: City	15.29.37 8.389.38 3	City of the location	Copenhagen	1
		Address: State, Province	15.29.37 8.389.38 4	State, province of the location	K	1
		Address: Postal code	15.29.37 8.385	Postal code of the location	1050	1
		Address: Country	15.29.37 8.389.38 6	Country of the location	Denmark	1
		Address: E-mail	15.29.37 8.389.38 2	The electronic mail address of the distributor organisation or individual	eea@eea.europa.eu	1
		Access rights		Defines access rights for the dataset		N
		Type of constraint	20.70	The type of access right applied to assure the protection of privacy or intellectual property, and any special restriction or limitations on obtaining the resource. See code list 1 .	005 (licence)	1
		Restriction	20.72	Description of the restriction of the access right.		1
Other dataset information				Other aspects explaining the dataset		1
	Language		15.39	Language used within the dataset	EN	1



	Format name	15.32.28 5	Name of the used exchange format for the dataset	Shape file or PGDB	1
	Format version	15.32.28 6	Version of the used exchange format for the dataset	-	1
	Methodology description	18.81.83	General explanation of the data producer's knowledge about how the geometry was constructed/derived and how the attribute information being part of the dataset was generated.	CLC2006 for the Netherlands has been derived from the revised CLC2000 database combined with the CHA06_NL. All polygons fulfil the criteria of > 25ha and > 100 m boundary displacement. Büttner, G., Feranec, G., Jaffrain, G., 2002. CORINE Land Cover update, Technical Guidelines, http://terrestrial.eionet.europa.eu , EEA Technical Report No. 89.	1
	Changes	18.EEAC hanges	Description of the changes since last version of the dataset	-	1
	Process steps		Information about the event in the creation process of the dataset		N
	Description	18.81.84. 87	Description of the process step including related parameters or tolerance	Step1: Visual comparison of IMAGE2000 and CLC2000 database displayed on IMAGE2006, direct delineation of changes and improvements. Software used: ArcGIS9.2, JTX	1
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	IMAGE2006 data: Ortho-corrected SPOT4and5 imagery and IR06. Pixelsize: 20m.	N
	Source data reference date	18.81.84. 91.362	Date of the resource used in process step	Date range: 05/28/2005 – 07/18/2006.	N
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	IMAGE2000 data: Landsat TM imagery, pixelsize: 25 m.	
	Source data reference date	18.81.84. 91.362	Date of the resource used in process step	Date range: 1999 and 2000 (july-september data)	
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	Digital Topographic scale 1:10.000 of 2006, BBG of 2000 and 2003 at scale 1:10.000	
	Source data reference title	18.81.84. 91.360	Name of the resource used in process step	Aerial photographs of 2000 and 2006 at 4 and 0.5m resolution, respectively	



		Description	18.81.84.87	Description of the process step including related parameters or tolerance	Step2: Internal verification (Technical&thematic)	
		Description	18.81.84.87	Description of the process step including related parameters or tolerance	Step3: External verification by the CLC2000 Technical Team	
		Description	18.81.84.87	Description of the process step including related parameters or tolerance	Step4: Aggregation of polygons according to priority table to fulfil the 25ha rule	
	Scale		15.38.60.57	Gives a rough value of accuracy of the dataset; e.g. 2500000 means dataset has an accuracy suitable for use at scale 1:2.5 million at best	100.000	1
	Geographic accuracy		15.38.61	Geographic accuracy of location, ground distance as an value in meters	100	1
	Geographic box			Geographic position bounding box of the dataset		1
		West bound longitude	15.42.33 6.344	Western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)	3.4414711	1
		East bound longitude	15.42.33 6.345	Eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)	7.25617	1
		South bound latitude	15.42.33 6.346	Southern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)	50.730885	1
		North bound latitude	15.42.33 6.347	Northern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)	53.507753	1



Annex 3. CLC metadata for the working units (provinces)

CLC2006 METADATA

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Groningen
-------------------------------	------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			05/06/2006	
IR06			07/15/2006	A lot of clouds mainly in northern and western part

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	197	23	08/26/2000	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)



Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	04/24/2007	05/01/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	03/15/2007	03/20/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
05/01/2007	Gerard Hazeu	05/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Barbara Kosztra		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Friesland
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A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			05/06/2006	
SPOT5			07/02/2006	2 consecutive images
SPOT4			05/09/2006	
IR06			05/28/2005	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	23	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
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	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	10/30/2007	11/05/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	07/01/2007	07/10/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Drenthe
-------------------------------	----------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT4			09/05/2006	
SPOT5			05/06/2006	
SPOT5			07/18/2006	
SPOT4			06/24/2005	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	197	23	08/26/2000	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
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	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	05/02/2007	05/12/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	03/20/2007	03/25/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
05/12/2007	Gerard Hazeu	05/25/2007	Too detailed and size error of changes, nature construction must be as 133

2. Field checking (*if carried out*)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Barbara Kosztra		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Flevoland
-------------------------------	------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT4			05/09/2006	Only small northeastern part
IR06			08/25/2005	2 consecutive images

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	23	07/30/2000	
Landsat-7 ETM+	198	24	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
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	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	11/05/2007	11/12/2007	2.5
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	07/15/2007	07/20/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Overijssel
-------------------------------	-------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			07/18/2006	2 consecutive images, one with stripes
SPOT4			05/09/2006	
SPOT5			05/28/2005	Only far eastern part of province
IR06			05/28/2005	Western part of province

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	197	23	08/26/2000	
Landsat-7 ETM+	197	24	09/09/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	11/12/2007	11/15/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	09/01/2007	09/10/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (*if carried out*)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Gelderland
-------------------------------	-------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			07/18/2006	Stripes in image
SPOT5			07/14/2005	Or SPOT4 05/09/2006 of second coverage
SPOT5			05/28/2005	Only far eastern part of province
IR06			05/28/2005	Western part of province

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	24	07/30/1999	
Landsat-7 ETM+	197	24	09/09/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	11/22/2007	11/27/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	11/09/2007	10/10/2007	2

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (*if carried out*)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated

**C: FINAL TECHNICAL QUALITY CONTROL****1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)**

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Utrecht
-------------------------------	----------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
IR06			06/11/2006	
IR06			05/28/2006	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	23	07/30/1999	
Landsat-7 ETM+	198	24	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	06/01/2007	06/15/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	05/25/2007	05/30/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
06/15/2007	Gerard Hazeu	06/30/2007	Too detailed and size error of changes

2. Field checking (*if carried out*)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated

**C: FINAL TECHNICAL QUALITY CONTROL****1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)**

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Laszlo Mari		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Noord-Holland
-------------------------------	----------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			07/02/2006	
IR06			06/11/2006	
SPOT4			05/09/2006	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	23	07/30/1999	
Landsat-7 ETM+	198	24	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	06/15/2007	06/30/2007	4
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	06/10/2007	06/15/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
07/15/2007	Gerard Hazeu	07/23/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Laszlo Mari		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Zuid-Holland
-------------------------------	---------------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
IR06			06/11/2006	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	24	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	03/25/2007	03/31/2007	1
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	03/01/2007	03/15/2007	4

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
03/31/2007	Gerard Hazeu	04/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated

**C: FINAL TECHNICAL QUALITY CONTROL****1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)**

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Laszlo Mari		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Zeeland
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A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT4			06/08/2006	
IR06			06/11/2006	
SPOT5			07/03/2006	
SPOT5			05/27/2005	

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	24	07/30/1999	
Landsat-7 ETM+	199	24	08/24/2000	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	05/15/2007	05/30/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	04/01/2007	04/05/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
05/30/2007	Gerard Hazeu	06/10/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	10/18/2007	Barbara Kosztra		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Noord-Brabant
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A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			09/13/2006	Second coverage
SPOT5			07/03/2006	
SPOT5			06/08/2006	
SPOT5			05/11/2006	
IR06			05/28/2005	2 consecutive images, only used in small parts of province

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	198	24	07/30/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)



Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	11/28/2007	12/04/2007	4
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	10/15/2007	10/30/2007	2

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC

**CLC2006 METADATA**

– Working unit level

- Please provide a single summary file for each interpretation sheet -

Title of working unit:	Limburg
-------------------------------	----------------

A: GENERAL INFORMATION

Sponsor:	
Address:	
Phone:	
Fax:	
Responsible:	
E-mail:	

Contractor:	Alterra b.v.
Address:	Droevendaalsesteeg , 6708 PB Wageningen, the Netherlands
Phone:	++ 31 317 481928
Fax:	
Project leader:	Gerard Hazeu
E-mail:	Gerard.hazeu@wur.nl

1. IMAGE2006 data used

SPOT-4 XI and / or IRS P/ LISS III scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
SPOT5			06/08/2006	Small northern part
SPOT5			05/11/2006	
SPOT5			07/13/2006	Only far north-eastern part of province
SPOT4			07/17/2005	Southern part of province

2. IMAGE2000 data used

Landsat-7 ETM and / or other scene(s)				
Satellite & Sensor	Path-	Row	Date (m/d/y)	Remark (e.g. clouds)
Landsat-7 ETM+	197	25	09/11/2000	
Landsat-7 ETM+	197	24	09/09/1999	

3. Topographic maps used (indicate in remark if digital)

Scale	Sheet id	Title/Name	Year of production	Year of last revision	Remark
1:10000		Top10Vector			Digital, version 2006

4. Other ancillary data used (thematic data, satellite images, aerial photos, city maps, vegetation maps, LUCAS data)

Id.	Data source/type	Title (if relevant)	Date of production (m/d/y)	Scale (spatial detail)	Remark
-----	------------------	---------------------	----------------------------	------------------------	--------



	Color aerial photos		06/2000	4 m resolution	
	Color aerial photos		06/2006	1m resolution	
BBG2000/2003	Bestaand BodemGebruik 2000 and 2003			1:10000	

5. Photointerpreter(s)

Name	Affiliation	Phone	E-mail	interpretation		
				start (m/d/y)	end (m/d/y)	no. of days
Gert van Dorland		++31 317 481693	Gert.vandorland@wur.nl	11/16/2007	11/21/2007	3
Gerard Hazeu		++31 317 481928	Gerard.hazeu@wur.nl	08/25/2007	08/30/2007	1

B: INTERPRETATION OF CHANGES

1. Photo-interpretation of changes and internal quality control

Date of submission (m/d/y)	Control made by	Date of control (m/d/y)	Remark (errors, corrections, etc.)
11/01/2007	Gerard Hazeu	11/15/2007	Too detailed and size error of changes

2. Field checking (if carried out)

Date (m/d/y)	Itinerary (main settlements crossed on the working unit)	Problems checked and main conclusions
-		Not carried out

3. Border matching of CLC-changes with neighbour working units

working unit	Controlled and corrected by	Date (m/d/y)	Remark
-			Not the case as the working units were not physically separated



C: FINAL TECHNICAL QUALITY CONTROL

1. Control of topology, unnecessary boundaries, 25 ha limit, invalid codes and invalid changes (internal control)

	Date (m/d/y)	Controlled by	Remark
CLC2006	02/25/2008	Gerard Hazeu	Okay
CLC Changes	02/25/2008	Gerard Hazeu	Composite changes with common codes for clc00 or clc2006 are > 5ha
Revised CLC2000	02/25/2008	Gerard Hazeu	Will not be delivered

If produced by the country

2. Verification and acceptance (CLC-changes and CLC2006)

	Date (m/d/y)	Name	Signature	Remark
National level	02/25/2008	Gerard Hazeu		
CLC technical team	02/22/2007	George Buttner		

D: SOFTWARE / HARDWARE

Work phase	Software used	Hardware used
Interpretation of changes	ArcGIS9.2	PC
Technical quality control	ArcGIS9.2	PC


Annex 4. Area (km²) per CORINE level for the CLC06, CLC2000 and CLC90rev databases.

CLC code	CLC2006			CLC2000			CLC90rev		
	level3	level2	level1	level3	level2	level1	level3	level2	level1
112	3203	3203		2982	2982		2541	2541	
121	741			618			382		
122	72			61			52		
123	134			127			105		
124	69	1017		61	867		62	602	
131	36			24			13		
132	18			7			3		
133	207	262		133	164		138	154	
141	138			113			102		
142	477	616	5097	411	524	4537	306	408	3705
211	7541	7541		7724	7724		7923	7923	
222	73	73		78	78		73	73	
231	10273	10273		10715	10715		11376	11376	
242	5429			5541			5718		
243	1155	6584	24471	1093	6634	25150	1087	6805	26177
311	599			584			499		
312	1609			1617			1627		
313	939	3147		942	3143		936	3062	
321	421			323			260		
322	381			376			375		
324	14	816		15	714		5	641	
331	152	152	4115	166	166	4024	189	189	3892
411	349			339			297		
412	78	427		77	416		76	373	
421	93			94			92		
423	2294	2387	2815	2289	2383	2800	2301	2394	2766
511	461			462			460		
512	2691	3152		2677	3139		2644	3104	
522	228	228		228	228		227	227	
523			3381			3367			3331

[illegible]

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