

Annex I

Implementation of CLC2000 and CLC2006 for Kosovo

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1 PROJECT OUTLINE

In order to bring Kosovo under UNSCR 1244 to the same line of activities as the rest of the European countries in relation to assessing the land cover resources, to achieve comparable information and spatial land cover databases, it is foreseen to implement a Kosovo's Corine Land Cover map for the year 2000. After completion of the CLC2000 database, a CLC2006 compatible land cover change database will be developed.

Producing the 2000 database first, will make the project more compatible with the rest of the European CLC database where CLC2006 consists primarily of a land cover change map between 2000 and 2006.

The project will be jointly managed by the ETC/LUSI partner GeoVille Environmental Services Sàrl and the CLC technical team. GeoVille will be responsible for overall project management and financial administration of the project, while G. Büttner (CLC2000 coordinator) will be responsible for the technical follow-up of the project.

The implementation of the project on site will be executed by EvroGeomatika, Belgrade, supported by ETC/LUSI. EvroGeomatika has available the necessary technical knowledge in CLC, as well as local knowledge and skills in the Remote Sensing and GIS. Currently there is no organisation in Kosovo which has the required technical know-how. EvroGeomatika has produced the CLC 2000 and backdating to 1990 for Serbia as well as it is finalising the CLC2006 for Serbia. This is the only company in the region Serbia-Montenegro-Kosovo capable to execute the work and provide the necessary local knowledge and skills.

Geographical coverage of the work: 10.887 Km².

GeoVille and the CLC technical team will lead and will implement the whole project. This includes all tasks from project coordination, training, obtainment and check of the satellite images, supervision of the national implementation, verification of the photointerpretation and land cover changes mapping, and final acceptance of the national database. EvroGeomatika will be responsible for the local ancillary information, management of the local team and execution of the national activities. It is intended to include at least one member from Kosovo into the local team in order to build up capacity.

2 IMAGE PRE-PROCESSING

All image pre-processing will be done by GISAT.

GISAT will prepare images for 2000 and 2006 from the image overlap areas from the neighbouring countries. No additional image acquisition will be undertaken.

All image data will be delivered in local projection.

2.1 PHOTO INTERPRETATION (PI)

EvroGeomatika disposes of a team of interpreters who are well experienced in CLC interpretation. The same team has already produced the CLC databases for Serbia for 1990, 2000 and 2006.

The team is familiar with the Interchange software used for the CLC2006 update.

2.2 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

EvroGeomatika disposes of the necessary GIS skills from previous work.

2.3 PROJECT DELIVERABLES AND DEADLINES

Deliverables are as follows:

- IMAGE2000 and IMAGE2006 (EvroGeomatika)
- CLC2000 and CLC 2006 change database (EvroGeomatika)
- Meta data (EvroGeomatika)

All project work needs to be finalised according to the following timetable:

<i>Date</i>	<i>Activity</i>
2 weeks after project start	National project plan
4 weeks after project start	IMAGE2000 and IMAGE2006
31.12.2008	CLC2000 database
31.12.2008	CLC2006 change database

2.4 LOCAL TEAM

EvroGeomatika will base the work on the same team that has already created the database for Serbia (CLC2000 and CLC2006). Details about the composition of the local team will be provided in the national project plan. It is intended to include one team member from Kosovo who may also participate in the verification missions in order to build up capacities.

3 DETAILED DESCRIPTION OF WORK

3.1 IMAGE PRE-PROCESSING

A satellite image coverage of Kosovo will be obtained for the years 2000 and 2006 by GeoVille. The necessary scenes will be taken from the overlap area from the neighbouring countries from IMAGE2000 and IMAGE2006 and will be pre-processed by GISAT.

The satellite images will be ortho-rectified on the basis of a digital terrain model (DTM) according to the specifications of the IMAGE2000 database (RMSE < 25 m) by EvroGeomatika.

- The 1:100.000 topographic maps sheets are used as the Basic Working Unit for the CLC2000 phase. In some cases, different scenes might have to be used for the production of a single working unit. This is due to the fact that a map sheet / working unit can be covered by different scenes (path/row) or because different dates of the same scene have been used to provide a cloud free coverage.

- The file format used for storage and delivery of the images will be TIFF or any other image format that can be readily integrated into the InterView / Interchange software.

A standard header form is specified in the IMAGE2000 Reference Book (number of bands, rows, columns, number of header bytes, pixel size, georeferencing, etc) and actual information are included in the metadata.

3.2 TRAINING

Training will be not required.

3.3 PHOTO INTERPRETATION

The local team will first create the CLC2000 database. The CLC2006 database will than be created in the same manner as in the other European countries participating in CLC2006 – as a change map between 2000 and 2006.

The interpretation of CLC data will apply the CLC standard method – computer assisted visual interpretation of the land cover map supplemented by field checking. The output of the photo interpretation process will encompass the two standard deliverables of the project:

- the CLC2000 database
- the CLC2006 change database with land cover changes between the two dates of observation
- the CLC2006 database, integrating changes with the 2000 database.

The local team is already familiar with the software used for the creation of a new CLC database from zero (InterView) and the one used for the CLC2006 update (Interchange).

Topographic maps, aerial photographs and thematic maps to support photo interpretation should be provided by the local team.

The territory of Kosovo under UNSCR 1244 covers about 11.000 km². Assuming a photointerpretation capacity of 1.000 km² in 12 days, the total number of man-days to cover the complete territory will be about 120 days. This estimate includes the interpretation of for both 2000 and 2006 changes.

It is expected that the work will also include some field trips, necessary to ensure the interpretation quality in areas that contain a high degree of uncertainty in the photo interpretation alone.

3.4 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

The resources needed by the local team for the creation of a topologically correct and seamless national GIS database is estimated at approximately 22 man-days (500 km² per day).

This estimate includes the processing of 2 databases: CLC2000 and CLC2006.

3.5 QUALITY CONTROL

The following quality assurance and quality control mechanisms will be implemented:

Thematic verification missions

Two thematic verification missions will be undertaken by the CLC2000 technical team (TT). Two experts of the TT will verify on-site about 8 to 10 percent of the mapping progress.

- A first verification mission will be done after completion of CLC2000 for 50% of the territory.
- The second verification mission will be held after the completion of CLC2000 for the whole territory and the completion of the CLC2006 change database.

The objective of the thematic verification missions is the assurance of a common understanding of the photo-interpretation process and the identification of CLC classes.

Technical verification

Before the start of the land cover mapping, the ortho-rectification of the image database will be controlled by GISAT. It is assumed that GISAT will receive for this purpose access to reference material.

At the end of the project a technical verification will be done by the CLC2000 Technical Team to assure the correctness (topology of data, projection, meta data) of the resulting GIS database. Only after the technical acceptance of the GIS database, the CLC data will be assumed final and ready for integration into the European CLC database.

Integration in seamless European CLC database

This activity is not covered by this contract. The work will be done as part of the regular ETC activities.

Integration in IMAGE2000 database

This activity is not covered by this contract. The work will be done as part of the regular ETC activities.

4 MILESTONES

The dates defined as project milestones should be regarded as latest date for the execution (finalisation) of a particular activity. Any slippage beyond the given date should be notified immediately to the CLC technical team and GeoVille.

The project is scheduled to finish by 31. January 2009.

01.07.2008	Contract signature
01.08.2008	Geo-correction of image data & final validation
01.10.2008	First verification (50% of CLC2000 database finished)
31.12.2008	Second & final verification
31.01.2009	Delivering results (CLC2000, CLC2006 Changes) to GeoVille: seamless vector database for Kosovo
15.03.2009	Assure correctness of the topology of data, projection, and meta data of the resulting GIS database CLC Kosovo and produce final Kosovo layer ready for integration into the European CLC database

5 DELIVERABLES

At the end of the project the following outputs will be delivered:

- Ortho-rectified images and working units for 2000 (IMAGE2000)
- Ortho-rectified images and working units for 2006 (IMAGE2006)
- National project plan (with schedule)
- CLC2000
- CLC changes between 2000 and 2006 (*ref. EEA product 3*)
- CLC land cover map 2006 (*ref. EEA product 4, if specified in national project plan*)
- Verification of FTS soil sealing layer (*ref, EEA product 5*)
- Meta data for CLC (by working unit and country meta data)
- Project final report

Ownership of the final products 3 and 4 will lay with the National Public Institution which is responsible in the country for implementation of CLC. The EEA will have a co-ownership on these products.

6 RELEVANT TECHNICAL DOCUMENTS

EEA (2000): CORINE land cover technical guide – Addendum 2000.- EEA technical report No. 40/2000

EEA (2007): CLC2006 technical guidelines.- EEA technical report No. 17/2007

7 IDENTIFICATION SHEET – GEOVILLE SARL

ADMINISTRATIVE DETAILS

Full company name: GeoVille Environmental Services Sàrl
Short form: GeoVille
Legal form: Limited liability company (sàrl) according to Luxembourg's law
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