Creation of Value-Added Services based on Harmonized Land Use and Land Cover Datasets: Project HLANDATA

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1 ABSTRACT

Land use and Land cover are amongst the most important geographic information themes today because they are essential for many applications areas. Unfortunately, despite the initiatives which have already been carried out and others that are being carried out at present moment, there is no valid data harmonization model for the Land Cover and Land Use datasets, taking into account both the data categorization and the data model and the end users' specificities, which could be valid for all the application areas and at a European level.

The HLANDATA project aims at making a significant step forward in overcoming the aforementioned barrier, fostering the use of the Land Use and Land Cover geographic data at a European level, through the creation of value-added European services. The main objective of the project is to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets taking into account both the data categorization and the data models, for any of their possible uses and users, through the development of user oriented value added services.

In order to achieve this objective, newly developed web services will be used for the implementation of 3 pilot projects in 3 different application areas, which will be used to validate the harmonization proposal made:

- PILOT 1: Land Use- Land Cover Data Analysis System for intermediate-level
- PILOT 2: Harmonized and Interoperable Land Information Systems
- PILOT 3: Stratification of waste dumps

The assessment of the results of these pilot projects and the related Land Use and Land Cover data involved will lead to the generation of a validated and harmonized Land Use Classification scheme and a methodology for the harmonization of the Land Use datasets.

2 INTRODUCTION

Land Use and Land Cover are amongst the most important geographic information themes today because they are essential for many applications areas, such as: evaluation of town-planning growth models, Environmental Impact Evaluation, GMES applications, calculations on CO_2 drains, irrigation land's evolution and evaluation-projection on water consumption, study on habitats and ecosystems, calculations on erosive states, etc.

Land Cover is referred to the physical, chemical, ecological or biological categorization of the earth surface. The **Land Use** is referred to the categorization of the territory based on its current and future planned socio economic purpose. Unfortunately, despite the initiatives which have already been carried out and others that are being carried out at present moment, **there is no valid data harmonization model for the Land Cover and Land Use datasets, taking into account both the data categorization and the data model and the end users' specificities, which could be valid for all the application areas and at a European level.**

3 PROJECT DESCRIPTION

The HLANDATA project aims at making a significant step forward in overcoming the aforementioned barrier, fostering the use of the Land Use and Land Cover geographic data at a European level, through the creation of value-added European services.

The **main objective** of the project is **to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets taking into account both the data categorization and the data models, for any of their possible uses and users, through the development of user oriented value-added services.**

In order to achieve the project goal, **specific objectives** have been stated:

- Assessment of the relevant information related to the harmonization of the Land Use and Land Cover Datasets:
  - Previous harmonization initiatives and related results:
  - Users: Types of users and users' real needs (from the point of view of the applications).
- Harmonization proposal of the Land Use and Land Cover datasets.
- Development and optimization of common data sharing infrastructure based on web services
- Implementation of 3 pilot projects providing value added service to end users.
- Validation of the project results by the target users
- Promotion of the creation of an experts' network composed of producers and users of this information.

Therefore, newly developed web services will be used for the implementation of 3 pilot projects in 3 different application areas, which will serve to validate the harmonization proposal made.

This project is fully aligned with the INSPIRE European Directive and its Annexes, since its main objective is in fact to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets (included in the annexes II and III) taking into account both the data categorization and the data models, for any of their possible uses and users. Moreover follows the line of the European Directive 2003/98/EC, on the reuse of public sector information delivering as a result a set of pilot project built on web services allowing to access and exploit the Land Cover/ Land Use geographic information.

The project duration is 36 month and has been organised into six work packages:

WP 1: Diagnostic

WP 2: Harmonization of LU/LC data and development of the baseline LU/LC data sharing infrastructure

WP 3: Pilot projects design and implementation

WP 4: Results assessment

WP 5: Communication and Dissemination

WP 6: Coordination

4 RESULTS

The first results of the project have been produced presenting here in after the diagnostic of the state of the art about data bases and users of LU/LC information.

4.1 Databases

The data bases and models/categorizations analysed during the 'Diagnostic' can be considered a good overview of current state of LC/LU information across Europe. Although some of them come from Spain, as there is more number of partners from this country, we can also find representation at European level, or other countries such as Austria or Czech Republic.

We can underline that information is classified according to scale mainly in two groups: large scales representing CORINE Land Cover at regional level are used by national and European users and detailed scale representing other regional LC/LU information used mainly at regional level.

Regarding the type of model/categorization used to model LC/LU data bases, the traditional 'hierarchical classification', still represent the majority of the information, as it has been demonstrated in several former projects its value to storage and obtain stats at medium-small scales with an admissible rate for errors at European level. Additionally, there are some data bases using 'enumeration of classes', which represent a simplification of the first for special non-detailed proposes. Finally, another way to model LC/LU information, 'object oriented data models' is used for some of the analysed information (i.e. SIOSE or LISA). This schema makes possible an advanced way to storage the information, providing multiple and almost free relationships between polygons and classes, and being especially useful for data bases at large-medium scales for national or regional purposes.

4.2 Users

According to the information analysed from the questionnaires, the most important end users of Land Cover and Land Use data are public institutions from European, national and regional administrations, which consider this thematic data as essential or very important for their work and reporting obligations, often combined with other thematic data to produce spatial analysis and even derived information (statistics, indicators, report, maps, etc.).

CORINE Land Cover (CLC) databases are the most used Land Cover and Land Use inventories, but in general this information is not enough for the users who consider insufficient the semantic and spatial resolution of CLC databases.

Additionally, some of the user's group, highlight the need of flexible data categorization and aggregation to improve the Land Cover and Land Use data model, and others the importance of temporal data comparability, instead of the need for new data classification. So any definition of a future data model in Europe should be completely compatible with CLC nomenclature for allowing temporal comparability between past and present land cover inventories.

A minimum functionality is required by users; such are visualization and identification, followed by overlaying and downloading. Finally the user friendliness and accessibility to the land information, are also consider as critical points by the users.

5 CONCLUSION

First results of the project states the importance of the Land Use/Land Cover information for multiple purposes. Aditionally the need of harmonised LC/LU information that makes comparable and interoperable this information is underlined and it's clearly necessary the development of added value services using LC/LU data which maximize the use and usability of such data.

6 REFERENCES

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