PROGRESS REPORT

Grant Agreement number: 250475

Project acronym: HLANDATA

Project title: Creation of value-added services based on Harmonized Land Use and Land Cover Datasets

Project type: ☐ **Pilot A** **X Pilot B** ☐ **TN** ☐ **BPN**

Periodic report: **1st** ☐ **2nd** ☐ **3rd** **X**

Period covered: **from 1st March 2012 to 28th February 2013 (year 3)**

Project coordinator name, title and organisation:

Delia Sola Giménez, Agriculture Service, Government of Navarra.

Tel: +34 848 426 196

Fax: +34 848 422 922

E-mail: dsolajim@navarra.es; HLANDATA@navarra.es

Project website address: http://www.hlandata.eu

PUBLISHABLE SUMMARY

Introduction and general project objectives

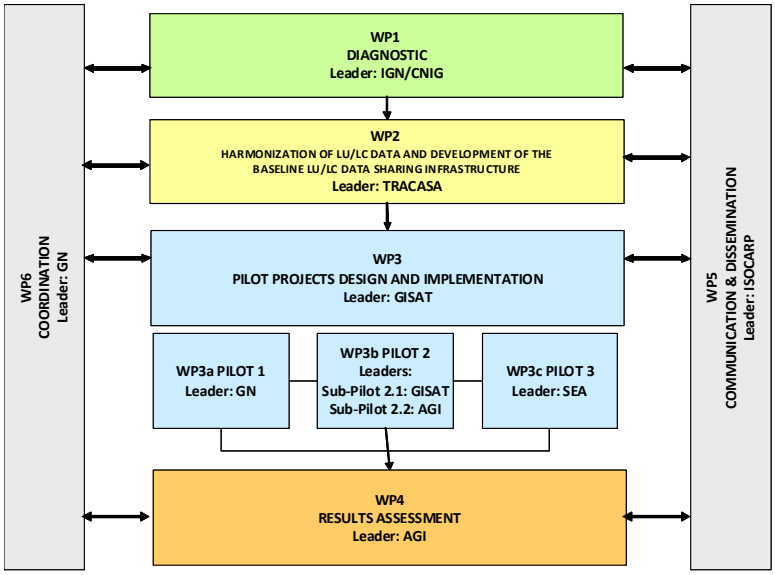
The HLanData project aims *to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets taking into account both the data categorization and the data models, for any of their possible uses and users, through the development of user-oriented value-added services*.

The specific objectives of the project are the following:
- To make the assessment of the relevant information related to the harmonization of the Land Use and Land Cover Datasets:
  - Previous harmonization initiatives and related results: Data models and Data Categorizations
  - Users: Types of users and users' real needs (from the point of view of the applications).
- To make a proposal for the harmonization of the Land Use and Land Cover datasets based on the previously gathered practical experience.
- To make the development and optimization of common data sharing infrastructure (based on web services) needed for the management of the harmonized Land Use and Land Cover datasets coming from different sources, allowing to make the visualization and overlay of the information
- To make the implementation of 3 pilot projects making use of the previous web services demonstrating the feasibility of the harmonization of these datasets and providing some value added service to a certain type of end users.
- To make the assessment and disseminate the obtained pilot results within their respective fields of action.
- To promote the creation of an experts' network composed of producers and users of this information.

The project started in March 2010 and run for 36 months. It had a total budget of 3.405.601 € and involves 9 partners from 7 European countries (Government of Navarra -ES, TRACASA - ES, IGN/CNIG - ES, AGI - LT, GISAT - CZ, TDF - LV, SEA - SK, CEIT - AT and ISOCARP - NL).

Description of work done and results

The work in HLanData is organised in 6 work packages (WP), including horizontal and transversal Workpackages as indicated in the figure below (see figure).



The main activities therefore relate to the tasks carried out in the above mentioned work packages. **WP1 – Diagnostic**, lead by the National Geographic Institute of Spain (IGN/CNIG) aimed to make the assessment of the current European situation regarding the harmonization of the Land Cover and Land Use

(LC/LU) geographic information, taking into account the categorization and data model initiatives already ongoing in that field. Being HLanData a project aimed at providing some relevant value-added services, for the evaluation of European LC/LU situation the end users and their needs were assessed from the point of view of data harmonization: kind of users, user purposes and required functionalities for the high-level services to be developed in the project.

The diagnostic phase was followed by the **Harmonization** phase (WP2), coordinated by TRACASA (Spain). Harmonization activities included the synchronisation with INSPIRE Road map in order to better establish the relationships with the definition of Land Cover and Land Use data specifications (DS). For this purpose, the participation of different HLanData partners in the INSPIRE Thematic Working Groups (TWG) on Land Cover and Land Use has been a key factor. In this way, the knowledge collected and discussed among the HLanData partners was reported to the TWGs. This collaboration was maintained all along the DS process and allowed the knowledge exchange and feedback among the HLanData partners and INSPIRE TWGs, with a very active participation in the testing phase of INSPIRE V2.0 DS, working on developing common case studies and also evaluating the needs to transform into the new version 3 of INSPIRE DS. HLanData data models and categorization were harmonised according to INSPIRE DS V2.0 and V3.0.

The preparation and launching of the HLanData **Geoportal** (http://portal.hlandata.eu) allowed the demonstration of the interoperability of LC/LU Data and services through the Common Data Sharing Infrastructure.

The activities related to the **Pilots design and implementation (WP3)**, coordinated by GISAT (Czech Republic), included a prototype for the four HLanData Pilots with their basic functionalities and services for visualising the LC/LU information (WMS), and their specific characteristics. After the first prototype, the partners worked on the definition, development and deployment of the pilots, taking into consideration the end-users' requirements gathered on the Pilots' validation phase for prioritizing the functionalities to be implemented in each Pilot. In addition, a cross-checking of the users requirements of INSPIRE and HLanData pilots has been made and 'use cases' have been defined and explained in the 4 pilots.

The four HLanData Pilots are:

- Pilot 1: LC/LU Data Analysis System for intermediate-level users (https://gisportal.tracasa.es/hlandata/viewer), implemented in Spain and Latvia by GN, TRACASA, IGN/CNIG and TDF.
- Pilot 2: National Land information systems, including
    - Pilot 2.1: Harmonized interoperable national land information system (http://hlandata.gisat.cz/app), implemented in the Czech Republic by GISAT.
    - Pilot 2.2: Establishment of a national land statistical accounting system based on GMES core mapping service products (http://hlandata.agi.lt), implemented in Lithuania by AGI.
- Pilot 3: Stratification of waste dumps (http://hlandata.sazp.sk/pilot), implemented in Slovakia by SEA.

As part of the Pilots implementation, the need of training the final users on how to use them was also addressed in an e-learning platform (http://hlandata.cloud-learning.net) based on previous experiences from other European projects, addressing not only the HLanData Pilots users, but also providing didactic units on other results of the project. The HLanData training platform has been linked with a training package of modules related to INSPIRE developed in the context of other European Projects (Copernicus, eContentplus, ICT-PSP), as well with the BRISEIDE Training Framework and HABITATS Networking Services and service toolkits.

Finally a **results assessment (WP4)** of the project as a whole, coordinated by AGI (Lithuania), was carried out, with the objective to assess the obtained results, evaluate the implemented web services and the harmonized geographic information databases, analyse the potential applications of the provided solutions and develop exploitation plans for each of the Pilots.

Impact and use of the project

In general terms, the main achievement of the project relays on the Harmonization carried out, with widely validated methodology and tools. HLanData has also proved the usefulness of the bottom – up approach, demonstrating that Corine Land Cover (CLC) is not enough for Land Use and that there are still serious problems for planned Land Use (currently being addressed by Plan4Business EU project).

HLanData used reliable standards, as well as provided some services that could be relevant in the future for Copernicus.

Considering INSPIRE there is a clear impact on:

- Harmonisation: Great efforts have been devoted for aligning and working together with INSPIRE team for the development of data specifications. The impact has been materialized in two ways:
  1. Providing a widely proved **methodology for data transformation**, which includes also the tools for performing this transformation, such as **GeoConverter©**, offered by TRACASA and made available for the partners and also for the INSPIRE community through the INSPIRE forum.
  2. The direct involvement of partners in the INSPIRE Land Use and Land Cover Thematic Working Groups made it possible to direct the development of data specification of both themes in the direction to make it more useful for end users. In this sense, partners worked at different levels: evaluating and testing the feasibility of the proposed data model with actual transformation of real data, using metadata profile, preparing XML request and responses, providing and adapting the portrayal of LU and LC at different levels of detail.
- New deployments using harmonised information compliant with INSPIRE DS and added value tools built upon users requirements, demonstrating the feasibility of INSPIRE in implementations that are open and can be widely used.

Offering freely accessible methodologies, tools and services (the Geoportal and the Pilots) will have a direct economic impact not only at the level of individual companies and organizations (GIS developers, data providing administrations, professionals form public administration or private companies using GIS tools, etc) but also a broader socio-economic impact may be expected in the long term, derived from a more efficient data sharing and coordination at EU level.

The direct impact on society mainly derived from the involvement of different stakeholders in the project since the beginning. The demand of web-based solutions for LU/LC information started initially from Public Institutions, but this interest has extended to wider users' communities. This aspect opened a new perspective beyond spatial information, with a growing interest for the solutions offered through the Pilots, raising new requirements that usually are different from those of the initial users.

Conclusions

The main conclusions of the HLanData project are:

1. Harmonisation of the existing national, regional and European datasets of Land Use and Land Cover to the INSPIRE data specifications versions 2.0 and 3.0 was successfully

performed with the standard data transformation tools and documented in the Project deliverables.

2. HLanData revealed that INSPIRE principles can be achieved and represents a real and massive application of the Directive by trans-boundary public administrations and private enterprises with competence in geospatial data across Europe.
3. HLANDATA pilots offer examples of INSPIRE environments tuned and personalized for final users. Some times INSPIRE specifications (at level of data and web services) can be complicated to be understood by final users, and HLanData pilots help in the use of INSPIRE, thanks to friendly added value services and tools.
4. Harmonisation was successfully implemented at all levels – starting from the database model and the metadata profile, to XML requests and responses of the Spatial Data Infrastructure (SDI) system components up to styles and legends of the datasets published on different nodes and combined into seamless trans-boundary web mapping and data analysis solutions.
5. Testing of the most popular open source and commercial software technologies for the development and implementation of an interoperable SDI network and publishing large volumes of harmonised LU/LC data was successful, although there were some issues related to interoperability of SDI services caused by different default settings of the SDI services, but these aspects have been also documented in order to facilitate customization for better performance.
6. The main problem affecting the performance of the SDI network and web applications are the large volumes of geometry features to be transferred, displayed and processed, as well as different projections of datasets used for overlaying and geo-processing. HLanData analysed and checked some alternatives to reach a profitable solution for users, so the project offered experience and application solutions for these difficulties.
7. Institutional users from governments and ministries currently are the most stable demand for integrated web-based solutions providing harmonised LU/LC information, while there is a clear potential for expanding such services into the sector of high education and general public.
8. The most successful business model for the development of web-based applications implies that they are fostered under the initiative of the above-mentioned governing institutions of the public sector, while the actual implementation is carried out either in-house with their own human resources and technological infrastructure or sub-contracted to the external companies providing combined services of application development, spatial data management and consultancy in the corresponding thematic area.
9. Barriers based on languages, the high speed in which developments advance and funding are still difficult to foster active participation in INSPIRE. Funding would be solved in the new period (at least to support the maintenance of INSPIRE).
10. Users' Communities' perspective is different from Public Administrations' one. Horizon 2020 could be the key for connecting both perspectives as INSPIRE is likely to be included in the 3 areas of H2020. So, current initiatives for INSPIRE familiarization by users represent a key strategy to guarantee a continuous and stable geospatial environment.
11. INSPIRE is not a static directive; it is moving and evolving, looking for new aspects, new initiatives (Open data, citizen participation, web 2.0…), etc. and similar tasks and works carried out within HLanData project will be reflected for years in public administrations and enterprises.

Further information

To know more about HLanData visit the projects' website www.hlandata.eu, or contact the Project Coordinator, Ms. Delia Sola (Government of Navarra) at hlandata@navarra.es.