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UNIT B06 - Digital Economy

## **INSPIRE Community Forum on Land Cover & Use Phase 2 - 2020 activity report (Deliverable – D2)**

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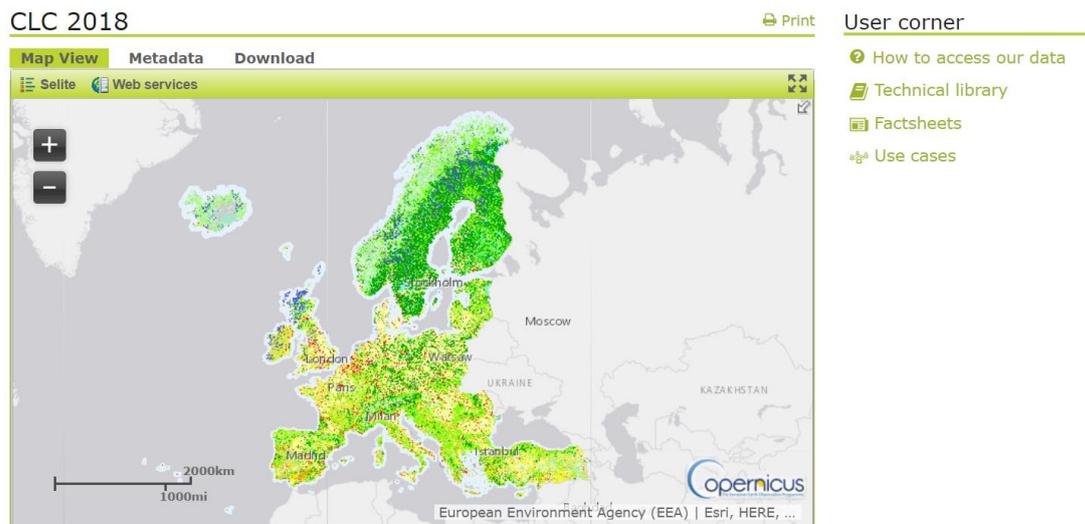


## 1. State of play in the thematic domain

1.1. Overview / list of relevant EU Projects/technology/SW activities (title, short description, URL link)

### 1.1.1 Corine Land Cover 2018 datasets

The Corine Land Cover 2018 projects have now been finalised. To my knowledge the data providers have been obliged to map their data to the INSPIRE Land Cover Vector application schema in a mapping table in Excel, which also has hopefully led to an increased understanding of the data model.



Source: <https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=mapview>

The description of the nomenclature of the CLC 2018 product can be found here:

[https://land.copernicus.eu/user-corner/technical-library/corine-land-cover-nomenclature-guidelines/docs/pdf/CLC2018\\_Nomenclature\\_illustrated\\_guide\\_20190510.pdf](https://land.copernicus.eu/user-corner/technical-library/corine-land-cover-nomenclature-guidelines/docs/pdf/CLC2018_Nomenclature_illustrated_guide_20190510.pdf)

Further product documentation can be found in the [product technical library](#) of the Copernicus Land Monitoring Service page.

### 1.1.2 Upcoming product CLC+

A call for tender to produce the so called CLC-backbone product was published on 22 July 2019. The deadline for offer submission was 23 September 2019. EEA got two offers. The project will take approximately 2 years and the budget is approximately 10 million €. In February 2020 a [Contract award notice](#) was published.

According to the tender specifications, the contractor shall provide the following INSPIRE related documentation to each of its datasets:

“1. Metadata for each dataset following the “INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119”. The most up to date version of technical guidelines shall be used and can be found on: <https://inspire.ec.europa.eu/Technical-Guidelines2/Metadata/6541>.

2. Evidence that the data model delivered by the contractors is compatible with the INSPIRE Data Specification on Land Cover. The evidence shall be provided as table document showing the associations between the source (contractors deliverable) and the target data model (INSPIRE Data Specification on Land Cover). The data specifications and templates for mapping

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tables are available on the INSPIRE website, <https://inspire.ec.europa.eu/Data-Models/Data-Specifications/2892>. These templates shall be used but can be extended if needed. Best practices for metadata and mapping table development are available under <https://land.copernicus.eu/eagle/EAGLE-related-topics/inspire-related-work>." Information on this so called best practice work has been provided at the Community Forum platform [here](#).

In the production process the so called CLC Hard bones will be produced based on EU-wide reference data, using Open Street Map (OSM), EU-hydro and the EU Water Framework Directive (WFD) data to derive roads, railways and hydrography.

For more information, please check the [tender specification](#) and <https://land.copernicus.eu/user-corner/technical-library/upcoming-product-clc>

### 1.1.3 ICAS-INSPIRE interoperability survey

The Commission has prepared a discussion paper (called draft Part 2 of the Technical Guidelines), dealing with IACS-INSPIRE interoperability and data harmonisation. The Commission invites the IACS experts and the INSPIRE community, in close collaboration if possible, to reply to an online survey by 15 May 2020 <https://ec.europa.eu/eusurvey/runner/lacsInteroperabilityFinal>

In order to reply to the survey the discussion paper has to be read. It introduces to the topic, provides preliminary mapping of IACS spatial data concepts to INSPIRE and proposes other interoperability solutions.

It has been agreed that I can share the document and the link to the survey and I will do it shortly.

### 1.1.4 Work related to the ISO 19144 standard

A 19144 Review Summary Report for the Stage 0 study project on Land Cover and Land Use was published on 15 November 2019 to be discussed and reviewed at the ISO/TC211 meeting in Omiya, Japan in December.

As background information: The purpose of the ISO 19144-2 standard is to serve as a standardized way to describe land cover classifications. The standard is a Land Cover Meta Language that allows formal and systematic documentation of Land Cover classification systems, facilitating translation and information exchange between systems. As an example, the technical specification for Land Cover data in the European spatial data infrastructure INSPIRE does not specify any land cover classification standard for Europe. Any classification system can be used, but the systems must be documented. The INSPIRE specifications recommends that the documentation is done using ISO 19144-2 (embeddedDescription). However, a schema defining how embed this information for example in an XML file is missing, and therefore it has been impossible to use the standard in INSPIRE. The INSPIRE community and the discussions on the platform, for example here, was one of the reasons that this Stage 0 project was initiated in the first place.

The first version of the ISO 19144-2 standard was released in 2012, but the standard has not been applied to the extent expected. The reason for this is probably that the standard expects classification systems to be consistent and not to mix land cover with land use concepts. In reality, many (most) land cover classification systems are inconsistent and do to some extent mix land cover and land use. There is thus a need for a revised and further evolve the standard, extending the Land Cover Meta Language to cover inconsistencies and incorporate land use

concepts. The aim of is to enable the comparison of information from existing classification systems in a meaningful way without replacing them.

The recommendations of the Stage 0 project were the following:

“1) Revision of 19144-2. This standard has been reaffirmed; however, there is a list of items that were identified in the reaffirmation vote that need to be addressed in the next revision. Also any changes required to support land use need to be included including moving some elements from the 19144-2 standard to a new 19144-3 standard on Land Use and the inclusion of a bridge to link to subsequent parts to the 19144 series.

2) Development of a new standard 19144-3 Land Use Meta Language. A detailed outline or a Working Draft (WD) needs to be attached to a New Work Item Proposal (NWIP).

3) Support for registration of classification systems, schemas, elements, and characteristics are already described in 19144-2; however, this has never been implemented. A recommendation is needed to encourage the establishment and maintenance of such registers. This Stage 0 study proposes that the existing clause 9 of ISO 19144-2 be extracted and made into a separate standard to support registration of schemas, elements, attributes and characteristics for both Land Cover (per 19144-2) and Land Use (per the proposed new 19144-3). This maybe a new standard 19144-4.”

The work of the Stage 0 Project Team has been continued by ISO in early 2020 in order to draft several New Work Item Proposals (NWIPs) for a revised ISO 19144-2 LCML, a new ISO 19144-3 LUML, and a 19144-4 on registration and implementation aspects. These have been drafted and will be submitted to TC211 for its June 3 meeting, which is the last meeting of the Stage 0 project. After that there will be a ballot on the NWIPs and a new call for participation. There are also plans to establish a high-level coordinating committee with ISO, the UN (FAO and other agencies and the UN-GGIM) and other parties such as INSPIRE, and organizations such as ISPRS, and the national or regional space agencies. This will be led by the UN.

## 1.2. Overview / list of selected good / highly visited / highly replied Forum contributions

Cluster	User	Date	Topic	Views	Replies	Status
		16.11.2015	<a href="#">Codelist for Corine Land Cover (CLC) published</a>	2932	7	

There is still a clear interest from the community in the code lists. The top scoring discussion discussions in terms of Views in the Land Cover & Use cluster are related to the Corine Land Cover code list (eg. see above and below). I’m not an expert on code lists, but to me it seems that everything is not yet in place in order to use the CLC code list in a way that was originally intended in INSPIRE. That is, it seems like the extension of the LandCoverClassValue code list is not fully in place:

<https://inspire.ec.europa.eu/forum/discussion/view/27211/codelist-for-corine-land-cover-clc-published>

Cluster	User	Date	Topic	Views	Replies	Status
		14.10.2016	<a href="#">Examples of INSPIRE view and download services for LC/LU</a>	1721	7	

There is also a clear interest in finding examples of view and download services providing Land Cover & Use datasets, especially the ones providing harmonized data sets.

<https://inspire.ec.europa.eu/forum/discussion/view/108800/examples-of-inspire-view-and-download-services-for-lclu>

I have collected examples on this page:

  19.12.2016 Examples of INSPIRE view and download services for the INSPIRE Land Cover and Land Use themes 2024 0

<https://inspire.ec.europa.eu/forum/pages/view/117401/examples-of-inspire-view-and-download-services-for-the-inspire-land-cover-and-land-use-themes>

One of the discussion topics that has gained the most attention recently is the one related to the production of the so called Open Land Use map, which now has full European coverage. Work is presently ongoing to get full coverage of also Africa:

<https://inspire.ec.europa.eu/forum/discussion/view/70563/open-land-use-map>

Another quite recent discussion that I'd like to draw your attention to is the following discussion topic, which discusses suggestions to make amendments to the Land Cover and Land Use (vector) data models.

<https://inspire.ec.europa.eu/forum/discussion/view/245981/discussion-about-amendments-for-tg-land-cover-and-land-use>

### 1.3. Overview / list of relevant existing applications, services (Title, description, URL link)

Unfortunately, I cannot come to think of any application nor other services than the INSPIRE Network services.

### 1.4. Overview and assessment of the availability of thematic domain data sets in the EU Geoport

#### Status of Land Cover in the INSPIRE Geoport

When checking the status of the INSPIRE Geoport in December 2019, data providers of all countries but Bulgaria and Greece have provided metadata of their datasets in the Land Cover theme.

December 2019:

 Austria	14   11   12	 Finland	20   4   4	 Latvia	12   0   0	 Portugal	31   6   19
 Belgium	8   4   8	 France	1155   238   234	 Liechtenstein	4   1   1	 Romania	5   0   0
 Bulgaria	0   0   0	 Germany	135   14   29	 Lithuania	21   20   1	 Slovakia	18   0   0
 Croatia	16   2   3	 Greece	0   0   0	 Luxembourg	3   3   3	 Slovenia	3   1   1
 Cyprus	1   0   0	 Hungary	1   0   0	 Malta	1   1   1	 Spain	6   4   4
 Czech Republic	2   1   1	 Iceland	16   1   0	 Netherlands	2   2   2	 Sweden	2   0   1
 Denmark	1   0   1	 Ireland	1   0   0	 Norway	11   3   2	 Switzerland	9   0   0
 Estonia	2   1   1	 Italy	518   0   2	 Poland	51   0   0	 United Kingdom	135   2   1

In April 2020, the situation was more or less the same, but there has on a whole been a big drop in the amount of datasets, mainly due to the fact that the figures no longer cover UK and because France that in December had 1155 datasets now has none (perhaps because of a temporary harvesting error). In several other countries however, there has been an increase either in datasets or number of services (eg. Denmark, Estonia, Italy, Norway, Portugal).

## April 2020

Austria	14   12   11	Finland	20   4   5	Latvia	2   0   0	Portugal	32   11   10
Belgium	8   5   8	France	0   0   0	Liechtenstein	4   1   1	Romania	5   0   0
Bulgaria	0   0   0	Germany	103   12   38	Lithuania	21   21   1	Slovakia	11   0   0
Croatia	15   2   4	Greece	0   0   0	Luxembourg	4   3   3	Slovenia	6   1   4
Cyprus	1   0   0	Hungary	1   0   0	Malta	1   1   1	Spain	6   2   2
Czech Republic	4   1   2	Iceland	16   1   0	Netherlands	2   2   2	Sweden	1   0   1
Denmark	5   4   1	Ireland	1   0   0	Norway	11   7   7	Switzerland	9   0   0
Estonia	3   1   2	Italy	599   34   36	Poland	44   0   0		

The total number of datasets harvested to the INSPIRE Geoportal is 1084 (12/2019 2204). According to the INSPIRE Geoportal 140 (figure in 12/2019 331) of these are viewable and 127 (figure in 12/2019 319) downloadable. Of these 101 are national datasets, of which approximately half or more exactly 51 are viewable and 45 downloadable.

Find below information on the availability of harmonized datasets within the theme Land Cover. These are the countries for which harmonized datasets are available or seem to be available. The analysis was based on visual analysis based on the INSPIRE Geoportal and may contain errors:

**Austria** offers harmonized data (at least CORINE Land Cover 2018 Österreich Harmonisiert Test), using embeddedDescription in a created way by providing an own schema repository for the classification (Comment: provides both units and datasets).

**Croatia** offers harmonized data (at least Pokrov i namjena korištenja zemljišta CORINE Land Cover). (Comment: provides both units and dataset )

**Finland** provides harmonised data [INSPIRE-tietotuote: Corine maanpeite 2018](#). You can download the GML containing the whole country (including both units and dataset information) or use this WFS to download a few units or the dataset separately: <http://geoserver.ymparisto.fi/geoserver/wcs?request=GetCapabilities&service=WFS&AcceptVersions=2.0.0> (Comment: <base2:link><http://uls.eionet.europa.eu/CLC2000/classes</base2:link>> does not provide the document describing the CLC nomenclature. The documentation has been put to another web address)

**Luxemburg** provides harmonized data, eg. INSPIRE - Annex II Theme Land Cover - LandCoverSurfaces - Corine 2012 (Comment: only units implemented, not dataset)

**Slovenia** provides harmonized data 'Pokrovnost tal v Sloveniji po CORINE 2012'. (Comment: lcn:embeddedDescription used in a wrong way)

**Spain** provides harmonized data, but 'CORINE Land Cover 2018 de España' is provided using the Existing Land Use schema.

### Regional harmonised data found in the INSPIRE Geoportal:

**Lichtenstein** seems to offer harmonised data from an Atom feed: [http://geodaten.llv.li/atom/data/2e72850d-6e4f-47e2-90e8-984704996136\\_ETRS89\\_GML321.xml](http://geodaten.llv.li/atom/data/2e72850d-6e4f-47e2-90e8-984704996136_ETRS89_GML321.xml)

### National harmonized data found in 12/2019, not in 4/2020 in the INSPIRE Geoportal:

**Norway** provides harmonized data (Comment: the dataset feature type is missing)

**Portugal** seems to provide harmonised data <http://wssig3.azores.gov.pt/geoserver/lc-corine-90/wfs?request=GetCapabilities>

Spain provides harmonized data. <https://servicios.idee.es/wfs-inspire/ocupacion-suelo?request=GetCapabilities&service=WFS&AcceptVersions=2.0.0> (Comment: both units and dataset feature types implemented and accessible through separate requests)

### General remarks related to Land Cover based on the analysis of the INSPIRE Geoportal

A general comment is that GM\_MultiSurface has been used in several implementations, even though the Land Cover Vector application only allow the use of GM\_Surface. The use of GM\_MultiSurface is allowed for Land Use and could be allowed for Land Cover Vector as well as the most typical European Land Cover data is allowed to contain multipolygons and splitting them up has consequences on id management.

Most of the LC datasets provided in a harmonised way are Corine Land Cover (CLC) data sets. If the aim is that also other datasets for Europe need to be provided according to the LC data models, then there remains a lot to be done. One also needs to know that CLC data sets will in the future be produced by the industry not by the MS.

### Status of Land Use in the INSPIRE Geoportal

Data providers of all countries but Bulgaria, Greece and Hungary have provided metadata of their datasets in the Land Use theme.

December 2019:

Austria	48   40   44	Finland	94   1   3	Latvia	6   0   0	Portugal	54   1   26
Belgium	36   22   24	France	13477   3812   4768	Liechtenstein	14   1   1	Romania	6   0   0
Bulgaria	0   0   0	Germany	26687   9624   9057	Lithuania	0   0   0	Slovakia	17   0   0
Croatia	17   0   2	Greece	0   0   0	Luxembourg	25   18   14	Slovenia	4   3   0
Cyprus	1   0   0	Hungary	0   0   0	Malta	2   2   2	Spain	16   2   3
Czech Republic	57   0   2	Iceland	13   0   0	Netherlands	3   2   3	Sweden	1   0   1
Denmark	52   1   2	Ireland	1   0   0	Norway	6   3   0	Switzerland	9   0   0
Estonia	1   0   0	Italy	3749   1   3	Poland	29407   0   4829	United Kingdom	5358   2   42

In April 2020, the situation was more or less the same, but there has on a whole been a big drop in the amount of datasets, mainly due to the fact that the figures no longer cover UK and because France that in December had 13477 datasets now has none (perhaps because of a temporary harvesting error).

April 2020:

Austria	59   57   58	Finland	99   22   19	Latvia	3   1   1	Portugal	48   19   15
Belgium	40   22   24	France	0   0   0	Liechtenstein	14   1   1	Romania	6   0   0
Bulgaria	0   0   0	Germany	28495   11670   11214	Lithuania	0   0   0	Slovakia	17   0   0
Croatia	16   0   2	Greece	0   0   0	Luxembourg	13   11   5	Slovenia	4   2   0
Cyprus	1   0   0	Hungary	0   0   0	Malta	2   2   2	Spain	16   2   2
Czech Republic	59   1   4	Iceland	13   0   0	Netherlands	3   2   3	Sweden	1   1   1
Denmark	18   2   2	Ireland	1   0   0	Norway	6   3   0	Switzerland	9   0   0
Estonia	2   1   1	Italy	3920   33   85	Poland	29691   764   2238		

The total number of datasets harvested to the INSPIRE Geoportal is 67911 (12/2019 was 79161). According to the INSPIRE Geoportal 13719 (12/2019 was 18826) of these are viewable and 12618 (12/2019 was 13535) downloadable. Of these 123 are national datasets, of which 43 are viewable and 53 downloadable. In several other countries however, there has been an increase either in datasets or number of services (eg. Austria, Italy, Poland, Portugal).

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Find below information on the availability of **national** harmonized datasets within the theme Land Use. These are the countries for which harmonized datasets are available or seem to be available. The analysis was based on visual analysis based on the INSPIRE Geoportal and may contain errors:

**BELGIUM:** EG. SAND AND GRAVEL EXTRACTION ZONES IN THE BELGIAN PART OF THE NORTH SEA

**NETHERLANDS:** LAND USE 2015

**SPAIN:** SISTEMA DE INFORMACIÓN DE OCUPACIÓN DEL SUELO EN ESPAÑA (SIOSE), AÑO 2014

### **General reflections on the LU theme based on the analysis of the INSPIRE Geoportal**

Corine has sometimes been reported both to Land Use and Land Cover, eg.:

CORINE LAND COVER DEUTSCHLAND 25 HA - 1990 (DATENSATZ) -GERMANY

Information from the Land Parcel Identification System (LPIS) can sometimes be found in the Land Cover and sometimes in the Land Use theme.

The fact that this analysis was made for datasets with national coverage only may explain why no harmonized datasets using the Planned Land Use data model were encountered.

### **General concern regarding the LCLU themes based on the analysis of the INSPIRE Geoportal**

One concern I have is that I cannot find examples of harmonized LCLU datasets in raster form on the INSPIRE Geoportal. There seems to be unclarity on how to provide raster data eg. from a WCS in order to do it in a sufficiently INSPIRE compliant way.

## **2. Overview of the facilitator's activity**

During this first six months some time was used to get used to the new system and to re-tag part of the content that I realized that had to be tagged in order to appear as part of the cluster. Otherwise you wouldn't have been able to find for examples pages, news items, documents etc. that had been posted in the Land Cover & Use cluster before June 2019.

I haven't opened very few new discussion topics, but instead been focusing on answered to existing ones and going through topics, closing topics and trying to find out whether its ok to close topics, where there has been little activity.

I've also used quite some time going through the sources on the INSPIRE Geoportal especially regarding the Land Cover theme. I've particularly tried to analyze the availability of harmonized datasets, looking for implementation examples and differences between the existing examples. I've contributed to one discussion topic based on my analysis and I plan to update the list (dedicated page) of view and download services providing harmonized LC and LU data.

Regarding the promotion, I made a short demo the new Community Forum platform at the Nordic INSPIRE meeting in September in Copenhagen. I asked how many participants had registered to the Thematic Cluster platform and a big share of the participants had. When I asked them how many that knew you after the launch of the Community Forum must follow tags in order to be notified on new content, none of them had understood that. I showed the participants how to follow tags and at least a few of them started following the tags of main interest to them straight away.

I have also promoted the use of the Community Forum to two networks in Finland. In addition, I have sent separate personal emails to some of the users that were actively involved in contributing to the Thematic Cluster activity.

## 2.1. Short summary of your activity during the INSPIRE Helsinki (10/2019 technical conference)

As I was part of the Local Organisation Committee (LOC) of the event I was quite busy with all kinds of things. I was for example involved in the team, which evaluated the Data Challenge submissions and the oral presentations during the event. I did not ask for reimbursements as I knew beforehand that this would be the case.

Being part of the LOC enabled me to arrange a 30 minutes slot for promoting the INSPIRE Community Forum activity. During this slot, Robert presented the platform and each facilitator, including myself, gave a pitch like promotion speech.

## 2.2 Planned activity at the INSPIRE Conference 2020

To share information on latest topic activities in the LCLU domain, I made a proposal for a special session focusing on LCLU-specific issues in the INSPIRE Conference 2020. The proposal was accepted, and the organizing committee added a few more presentations to the agenda. As the conference was canceled, I hope that the presentations and discussions can either take place during an online webinar in 2019 or at the INSPIRE Conference, whenever it will be held. See contents below:

### Land in sight

Room: 6 Chair: Lena Hallin-Pihlatie - National Land Survey, Finland

<a href="#">CROSS - FOREST project: harmonization and modeling of open forest data from Spain and Portugal for forest fire control and forestry growing assessment</a>	Alexandra Fonseca
<a href="#">I Can Haz a Single Spatial Plan? - Data Models for the Finnish National Platform for Built Environment</a>	Ilkka Rinne
<a href="#">Insights into harmonization and standardization of LC/LU nomenclatures – from national to international (ISO) level</a>	Stephan Arnold
<a href="#">Leveraging WCS for Rastered Land Cover and Land Use</a>	Kathi Schleidt
<a href="#">An attempt to make an executive summary on where we stand in the implementation in the INSPIRE themes Land Cover &amp; Use</a>	Lena Hallin-Pihlatie
<a href="#">Towards a new pan - European Copernicus Land Monitoring Service product</a>	Stefan Jensen
<a href="#">Land take measure arrangement, what's going on in France?</a>	Pascal Lory

## 3. Facilitator's suggestions for improvements

### 3.1. For promotion, content generation, reaching new users etc.

Promotion by email (newsletters etc) to all the 1000+ already registered users is a good start, but probably not enough, in order to get already registered users to follow tags, which is required in the new system to get notified on new contents (replies to discussion topics etc). It would be valuable to use 5-10 minutes in different fora (MIG, MIG-T, Eionet, INSPIRE

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Conference 2020) to make a live demo on how to follow tags and to tell the audience hints on which tags to at least use (eg. tags of the groups that you're mostly interested in, depending on fora).

In addition, for promotion purpose European-wide, it would be useful to have a video to share of the basic functionalities, requirements in order to get notified if you prefer so and on how to get the most out of the new platform.

In order to reach new users and to generate more content, it is important that everyone involved (MIG representatives, facilitators, DG-ENV staff, JRC staff, EEA staff, national INSPIRE coordinator) promote the existence of the platform and encourage people to register and to contribute. We can all also act as good examples by sharing valuable information on the platform.

I think it would be good to also systematically use the INSPIRE Community Forum to share information on the activities carried out by JRC and EEA related to INSPIRE. It could be a INSPIRE Geoportal or Validator update, or materials or minutes of a MIG-T or MIG available.

One of my more general concerns, is the lack of resources related to data modelling and maintenance of the data models and the schema repository. It would be important to find a solution to this. There are several issues related to the data models and schemas on the Community Forum, here are couple, just to name a few:

There's a schema missing in the draft schema repository (reported 16.11.2016)

<https://inspire.ec.europa.eu/forum/discussion/view/112345/missing-xsd-file-for-landcoverextension>

A typo in the Planned Land Use xsd:

<https://inspire.ec.europa.eu/forum/discussion/view/142984/planned-land-use-schema-typo>

Needs for changes (related to TGs, schemas etc.) have been collected, but the process to accept them is unfortunately very slow. It would be good if the process could be a bit faster and if possible also more transparent, so that everyone could follow what has already been reported and what is likely to be fixed etc, perhaps using GitHub.

### 3.2. For the SW collaboration platform used including the new functionality and better management

Sometimes I've found it hard to find material that I know that I've posted a couple of years ago on the platform. I wonder if the tag search functionality could also be extended by other search criteria, for example, when posted and by whom?