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Scoping Study for a

Pan-European Geological Data Infrastructure

D 3.2

Review of relevant datasets available within Europe

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SEVENTH FRAMEWORK PROGRAMME

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1 Introduction

The European Geological Data Infrastructure (EGDI) is a scoping project based on the success of earlier joint projects including 'OneGeology-Europe' and aims to provide the backbone for serving interoperable, geological data currently held by NGSO's (National Geological Survey Organisation). Data from past, ongoing and future European projects will be incorporated into the scope. The scoping study will run for a period of 24 months and is divided into 6 work packages: coordination & management; stakeholder consultation; prioritisation of datasets; technical design; legal & organisational aspects; and communication & dissemination.

Stakeholder input and communication is imperative to its success (feedback from WP2 will be incorporated), as is the collaboration with all the NGSO's of Europe. This will be conducted through a variety of media including meetings, email, website and newsletters. Communication, feedback and continual collaboration will be greatly encouraged throughout this scoping project to ensure that all aspects of pan-European geoscience are included.

Work Package 3 sets out to prioritise the datasets that will be delivered in the short, medium and long-term, and the methodologies by which derived datasets will be produced. The broad objectives are to deliver complete geographical coverage and higher resolution baseline geological spatial data in the short term, with the inclusion of baseline geophysical and geochemical data when available, to publish pan-European derived datasets in the medium-term, and to progress towards delivery of 3D model data in the longer term.

1.1 Overview of Work Package 3

This work package (WP) will assess the priority needs and evaluate which important datasets and expertise are currently available, at the national level, which can be used as the backbone of the EGDI. In order to achieve these goals WP3 will draft a long term prioritisation action plan and will be carried out through the following tasks: Task 3.1: Review of previous and ongoing projects; Task 3.2: Review of the data available within NGSO's; Task 3.3: Implementation and prioritisation plan for rolling out datasets on the EGDI; Task 3.4: Technical requirements for serving 3D geological models.

1.2 Description of Task 3.2

Task 3.2 is a review of the data available within NGSOs. A detailed analysis of the data currently available within NGSO was carried out and an inventory of those datasets has been produced and summarised herein. The task also aimed to complete a review of relevant datasets held by national organisations other than NGSO's. Once analysed, the priority datasets in terms of most available, spatial distribution, and considering the stakeholder and European policy needs, will feed into subsequent tasks. A survey of available geoscientific national and regional data in the proposed pan-European derived dataset areas will be discussed and will feed directly into the subsequent task 3.3 and other work packages.

The initial phase was to determine the sources of information that could be compiled and analysed. These were identified by three streams:

1. Data classified as in-scope of INSPIRE and listed as indicator data
2. Information provided directly from organisations via a specifically formulated questionnaire
3. Data resulting from the previous and ongoing European projects (reviewed previously in task 3.1).

The results from each information source were reviewed and all findings were then collated and assessed to ensure as much completeness as possible was achieved.

1.3 Participation

Participation from states within Europe totalled 25 from the EU, one from the EFTA and two independent states, resulting in 28 countries participating in this scoping study either passively through pre-volunteered dataset indicators via the INSPIRE Indicators web portal or via participation through the completion of the questionnaire posted to all known NGSO's throughout Europe.

Figure 1: Participating countries

The Pan-European datasets (datasets that spatially cover more than one European state) proved difficult to identify in terms of origin and single state ownership. These datasets (identified through task 3.1) are not represented in the list of participating countries illustrated in Figure 1 due to the ambiguity of their source and ownership.

2 Compilation of the INSPIRE dataset inventory

A detailed analysis of INSPIRE in-scope data currently available within NGSO's in participating EU member states was collected first in order to establish an overview of current availability (or will be available in the short-term under the INSPIRE criteria). The INSPIRE Directive is based on standardizing infrastructures for spatial information and data across Europe (Commission, 2007). By 2009 INSPIRE was implemented and immediately adopted by 27 Member states of the European Union (Commission, 2009). Additional interest in participation within European Free Trade Association (EFTA) member states was also included in this assessment (Figure 2).

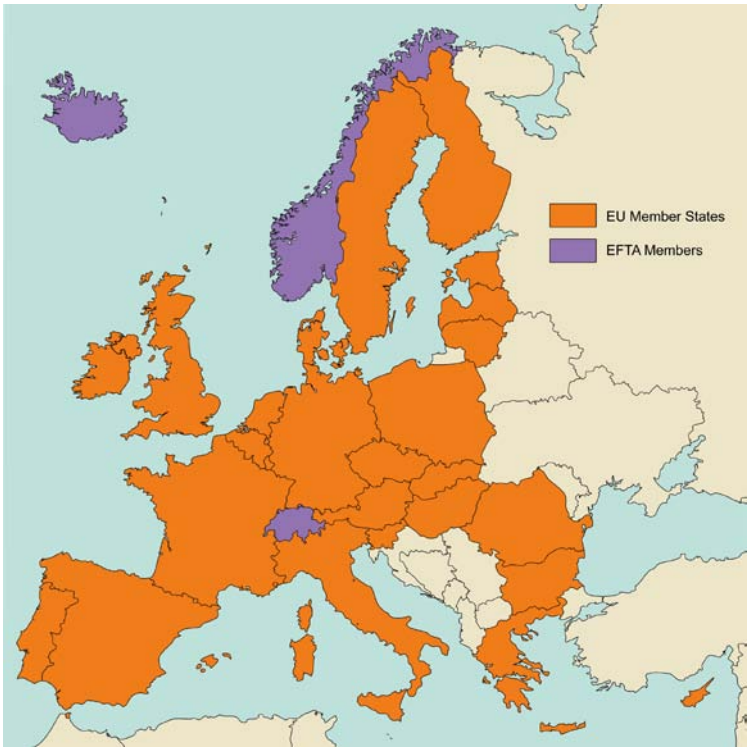


Figure 2: European Union member states and European Free Trade Association

Compilation of the INSPIRE in-scope inventory was completed between November and December 2012. A small team of staff from the BGS used available web resources and personal communication with international colleagues to collect and analyse the basic content of the inventory.

2.1 Sourcing datasets

Each Member State is encouraged to identify, define and list spatial datasets at national level that fulfil one or more qualifying themes set in the INSPIRE Indicators Monitoring and Reporting guidelines (Eurostat, 2009). Based on common Implementing Rules, data custodians (e.g. but not restricted to, NGSO's) review and release qualifying dataset details (known as INSPIRE Indicators), on an annual basis.

2.2 INSPIRE Indicators

INSPIRE Indicators are published annually via the voluntary release of specific questions set by the Directive, known as common Implementing Rules, via a Directive published spreadsheet designed to standardize submitted information and facilitate automated annual monitoring. Once submitted by the data custodians, these Indicator spreadsheets are published online via the European Commission INSPIRE Indicators web portal (INSPIRE Monitoring and Reporting). Geological data is primarily provided by the NGSO but this is not exclusive.

2.3 Participants

An initial assessment of participating (EC) member states revealed 22 out of the 27 participating member states have published INSPIRE Indicators listing spatially orientated datasets. One further contribution from within the European Free Trade Association (EFTA) is included, bringing the total number of European states covered by this part of the study to 23.

2.4 Basic criteria

A selection of key INSPIRE Indicators were chosen to help create a synthesized overview of existing spatial datasets available from all participating member states. These key INSPIRE Indicators are defined as follows:

2.4.1 *Themes*

Appropriate themes related to geological sciences are selected from a defined list of themes provided by the INSPIRE Monitoring and Reporting spreadsheet form. Chosen themes appropriate for this process are:

4. Geology *(Annex II)*
3. Soil *(Annex III)*
12. Natural risk zones *(Annex III)*
20. Energy resources *(Annex III)*
21. Mineral resources *(Annex III)*

2.4.2 *Metadata*

This collects spatial datasets that hold associated metadata, not necessarily adhering to INSPIRE Directive standards.

2.4.3 *Metadata Compliance*

This identifies spatial metadata that conforms to INSPIRE Directive standards (Commission Regulation (EC) No1205/2008) (Commission, 2008).

2.4.4 *Coverage (Extent)*

This indicator displays the percentage of area covered appropriate to dataset subject. A 100% return implies a complete coverage of area for that dataset.

2.4.5 *Metadata Access*

This indicator states whether the spatial metadata is obtainable via existing search-orientated discovery services.

2.4.6 *Data Accessibility (Downloadable)*

This indicator establishes whether these spatial datasets can be downloaded for external use.

3 Results – INSPIRE dataset analysis

The selected INSPIRE Indicators listed in 2.4 are collated and analysed in order to create a synthesised overview of existing spatial datasets that cover Europe.

3.1 Access and Availability

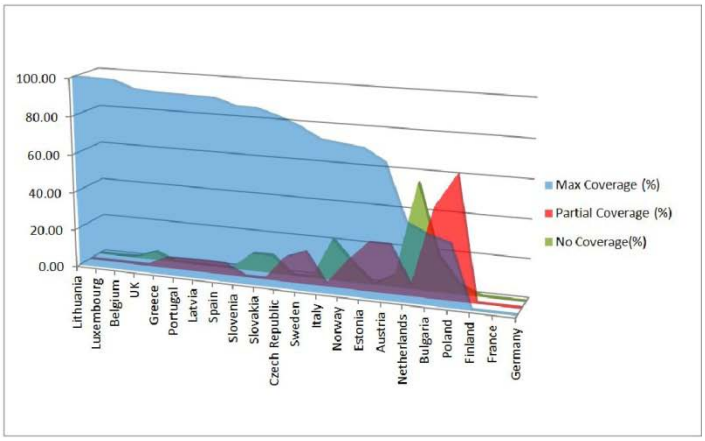
The following INSPIRE Indicators are selected from a range of ten INSPIRE Indicator questions. This section will provide an overview of dataset conformity, access and availability.

3.1.1 *Dataset Coverage*

All participating member states were invited to provide statistics on the current area the spatial dataset covers in relation to the total area, listed as 'Extent'. The 'extent' category clearly indicates how spatially complete each dataset is as a percentage. Table 1 illustrates dataset coverage for all participating member states.

Table 1: European dataset level of coverage completion

	Max Coverage (%)	Partial Coverage (%)	No Coverage(%)
Lithuania	100.00	0.00	0.00
Luxembourg	100.00	0.00	0.00
Belgium	99.64	0.00	0.36
UK	95.77	0.00	4.23
Greece	94.87	5.13	0.00
Portugal	94.59	5.41	0.00
Latvia	94.44	5.56	0.00
Spain	94.25	5.36	0.38
Slovenia	90.91	0.00	9.09
Slovakia	90.63	0.00	9.38
Czech Republic	87.50	12.50	0.00
Sweden	83.33	16.67	0.00
Italy	77.66	1.06	21.28
Norway	76.19	14.29	9.52
Estonia	75.00	25.00	0.00
Austria	68.75	25.00	6.25
Netherlands	40.00	5.00	55.00
Bulgaria	34.88	46.51	18.60
Poland	31.82	63.64	4.55
Finland	<Null>	<Null>	<Null>
France	<Null>	<Null>	<Null>
Germany	<Null>	<Null>	<Null>



Results show that 16 out of the 22 member states have in excess of 68.75% coverage of their spatial datasets. Two member states claim that all their datasets are 100% complete, where area coverage is concerned. Three member states indicate zero/<Null> coverage due to insufficient Indicator information.

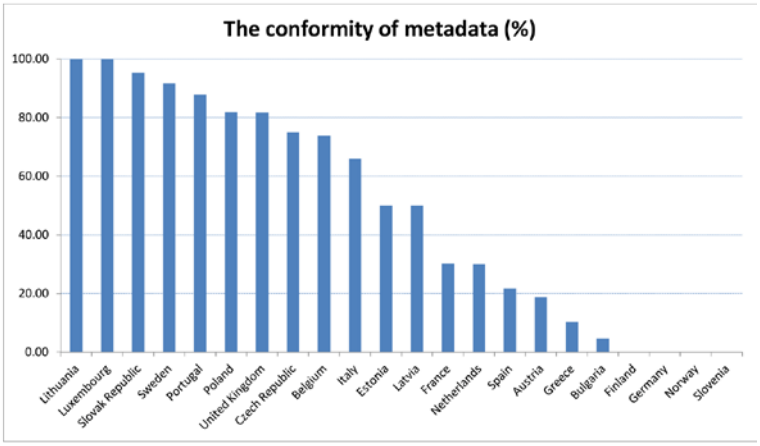
3.1.2 *Metadata Compliance*

The 'Compliance of Metadata' category identifies spatial metadata that conforms to INSPIRE Directive standards (Commission Regulation (EC) No1205/2008) (Commission, 2008). Overall results show results ranging from 0% to 100%. However, the lowest recorded level of Metadata Compliance still resides in the single figures at 4.65%. Generally, 60% of member states that submitted Indicator data state that 50% or more datasets comply to INSPIRE Directive standards.

It should be noted that the two member states showing 0% results are due to insufficient Indicator data supplied by the participating NGSO's. These have been omitted from the overall statistics for the 'Metadata Compliance' category in order to help reduce unnecessary bias towards 0%.

Table 2: INSPIRE compliant European datasets

	Compliant (%)
Lithuania	100.00
Luxembourg	100.00
Slovak Republic	95.31
Sweden	91.67
Portugal	87.84
Poland	81.82
United Kingdom	81.69
Czech Republic	75.00
Belgium	73.82
Italy	65.96
Estonia	50.00
Latvia	50.00
France	30.29
Netherlands	30.00
Spain	21.71
Austria	18.75
Greece	10.26
Bulgaria	4.65
Finland	0.00
Germany	0.00
Norway	0.00
Slovenia	0.00



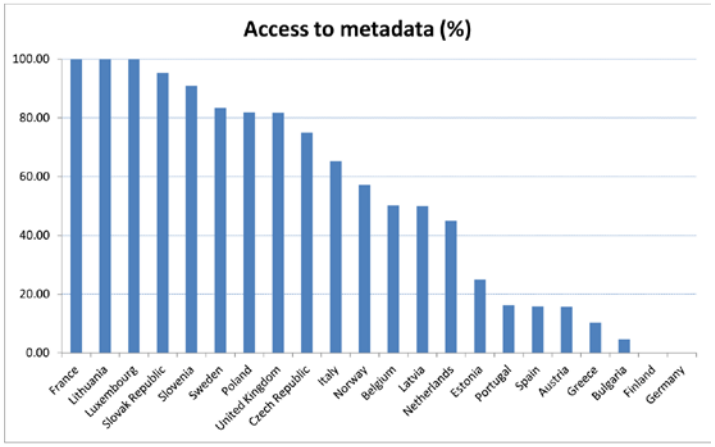
3.1.3 *Access to Metadata*

This Indicator shows the sum of all datasets that appear on existing online discovery services. Over 60% of all participating member states that supplied data for this Indicator returned an online discoverable metadata presence for more than half of their datasets. 25% of participants claimed an online metadata presence in excess of 90%.

It should be noted that two member states showing 0% results are due to insufficient Indicator data supplied by the participating NGSO's. These have been omitted from the overall statistics for 'Access to Metadata' category in order to help reduce unnecessary bias towards 0%.

Table 3: Accessibility of metadata through discovery services

	Metadata Access (%)
France	100.00
Lithuania	100.00
Luxembourg	100.00
Slovak Republic	95.31
Slovenia	90.91
Sweden	83.33
Poland	81.82
United Kingdom	81.69
Czech Republic	75.00
Italy	65.25
Norway	57.14
Belgium	50.18
Latvia	50.00
Netherlands	45.00
Estonia	25.00
Portugal	16.22
Spain	15.81
Austria	15.63
Greece	10.26
Bulgaria	4.65
Finland	0.00
Germany	0.00



3.1.4 *Dataset Availability*

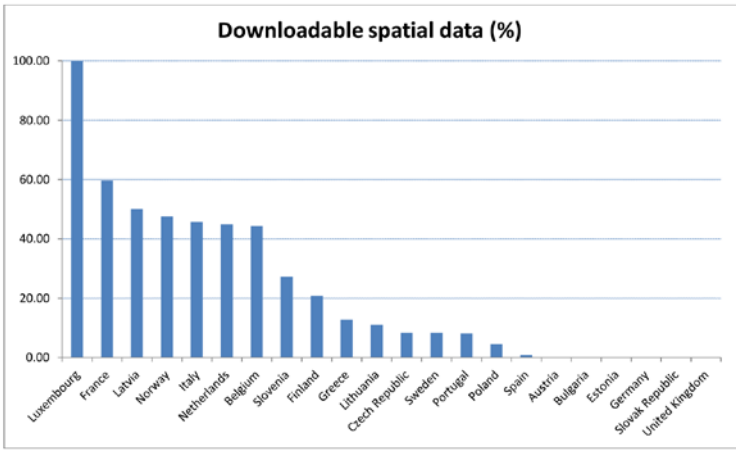
The ability for people to use these datasets appeared to be limited. Only one member state claimed that all their datasets were available to download, whilst over 50% (13 out of 22), indicated that less than 20% of their datasets were available for download.

The use of data at European level depends also on the compliance to a common data model, but the INSPIRE obligation related to this requirement is not yet adopted by the European Parliament (possibly end of 2013?). The common data model compliance criteria will become a key element in the near future for the datasets analysis.

It should be noted that one member state showing a 0% result is due to insufficient Indicator data supplied by the participating NGSO's. The result from this member state has been omitted from the overall statistics for the 'Data Availability' category as a measure to help reduce unnecessary bias towards 0%.

Table 4: Availability of datasets as downloads

	Downloadable (%)
Luxembourg	100.00
France	59.79
Latvia	50.00
Norway	47.62
Italy	45.74
Netherlands	45.00
Belgium	44.36
Slovenia	27.27
Finland	20.83
Greece	12.82
Lithuania	11.11
Czech Republic	8.33
Sweden	8.33
Portugal	8.11
Poland	4.55
Spain	0.76
Austria	0.00
Bulgaria	0.00
Estonia	0.00
Germany	0.00
Slovak Republic	0.00
United Kingdom	0.00



3.2 Theme Coverage

Out of 34 Themes listed on the (EC) INSPIRE Indicators submission form, the most appropriate themes relevant to the geological sciences were chosen to help identify what was available. The chosen relevant themes are listed in 2.4.1 and the analysis is shown below.

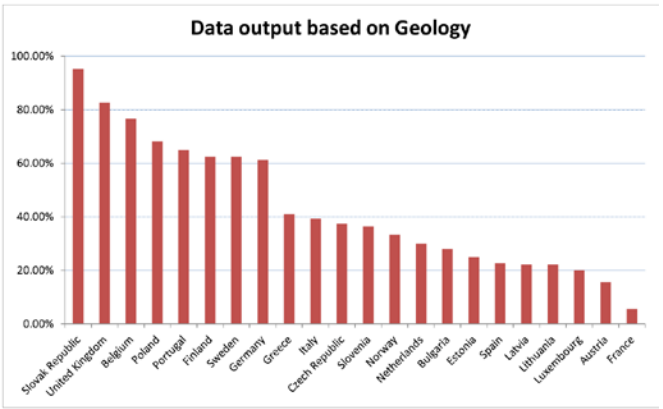
One participating member state appeared to hold no datasets under the chosen themes, effectively reducing the total number of European states covered by this study to 22 out of a potential 31.

3.2.1 *Geology*

All participating member states show evidence of holding geology themed datasets. Around 60% of all the participating member states (22 in total) hold geology themed data of a proportion greater than 33.33% of total themed output: Geology, Soils, Natural Hazard Zones, Energy Resources and Mineral Resources. The average proportional output for geology themed data from European NGSO's is 43.31%.

Table 5: European dataset output on Geology

	4. Geology
Slovak Republic	95.31%
United Kingdom	82.69%
Belgium	76.73%
Poland	68.18%
Portugal	64.86%
Finland	62.50%
Sweden	62.50%
Germany	61.21%
Greece	41.03%
Italy	39.36%
Czech Republic	37.50%
Slovenia	36.36%
Norway	33.33%
Netherlands	30.00%
Bulgaria	27.91%
Estonia	25.00%
Spain	22.61%
Latvia	22.22%
Lithuania	22.22%
Luxembourg	20.00%
Austria	15.63%
France	5.63%



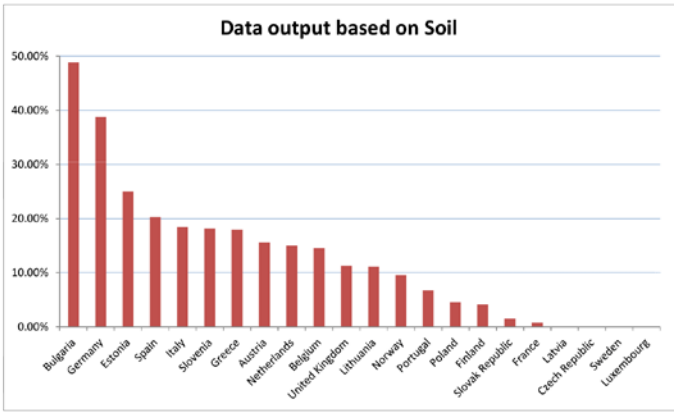
3.2.2 *Soils*

Datasets of a Soil theme are less numerous compared to geology themed datasets. Two member states show an output of more than 33.33% of the total, with 4 member states showing no data held in

this category. The average proportional output for soil themed data from European NGSO's is 15.69%.

Table 6: European dataset output on Soils

	3. Soil
Bulgaria	48.84%
Germany	38.79%
Estonia	25.00%
Spain	20.31%
Italy	18.44%
Slovenia	18.18%
Greece	17.95%
Austria	15.63%
Netherlands	15.00%
Belgium	14.55%
United Kingdom	11.27%
Lithuania	11.11%
Norway	9.52%
Portugal	6.76%
Poland	4.55%
Finland	4.17%
Slovak Republic	1.56%
France	0.80%
Latvia	0.00%
Czech Republic	0.00%
Sweden	0.00%
Luxembourg	0.00%

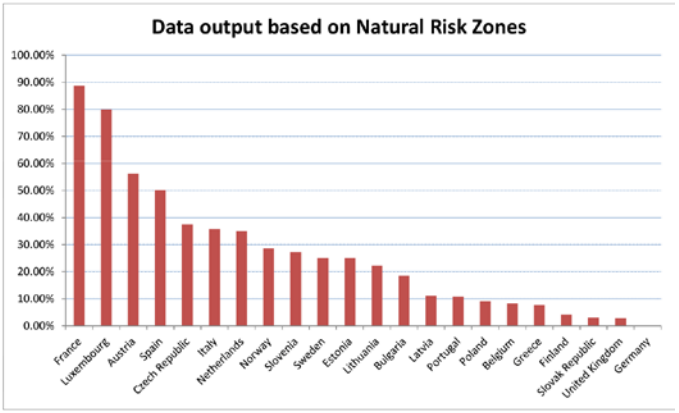


3.2.3 *Natural Risk Zones*

Natural Risk Zone themed datasets hold a significant presence within the NGSO's of Europe with an average proportional overall output of 28%. Nine out of the 22 participating member states (41%) cluster round 28% (+/- 10%). Three Member states show a proportional output above 50% for Natural Risk Zone datasets.

Table 7: European dataset output on Natural Risk Zones

	12. Natural risk zones
France	88.74%
Luxembourg	80.00%
Austria	56.25%
Spain	50.19%
Czech Republic	37.50%
Italy	35.82%
Netherlands	35.00%
Norway	28.57%
Slovenia	27.27%
Sweden	25.00%
Estonia	25.00%
Lithuania	22.22%
Bulgaria	18.60%
Latvia	11.11%
Portugal	10.81%
Poland	9.09%
Belgium	8.36%
Greece	7.69%
Finland	4.17%
Slovak Republic	3.13%
United Kingdom	2.82%
Germany	0.00%

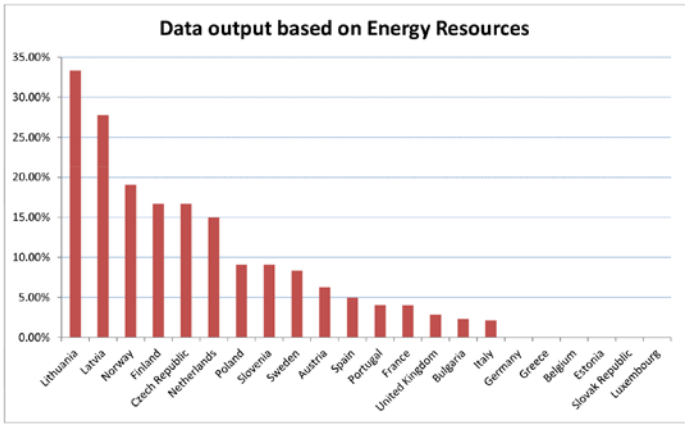


3.2.4 *Energy Resources*

The Energy Resources theme appears to be the smallest of the five theme categories, with 16 member states showing an average proportional portfolio of 11.35%. Two member states claim holdings of above 25%, with the largest being 33.33%. Six member states indicated no datasets in this category, although some of these are no doubt due to a limited range of Indicators provided by the member state NGSO's.

Table 8: European dataset output on Energy Resources

	20. Energy resources
Lithuania	33.33%
Latvia	27.78%
Norway	19.05%
Finland	16.67%
Czech Republic	16.67%
Netherlands	15.00%
Poland	9.09%
Slovenia	9.09%
Sweden	8.33%
Austria	6.25%
Spain	4.98%
Portugal	4.05%
France	4.02%
United Kingdom	2.82%
Bulgaria	2.33%
Italy	2.13%
Germany	0.00%
Greece	0.00%
Belgium	0.00%
Estonia	0.00%
Slovak Republic	0.00%
Luxembourg	0.00%

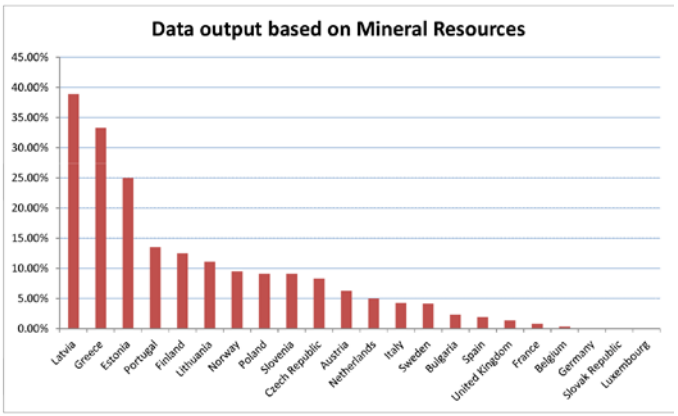


3.2.5 *Mineral Resources*

Mineral Resources fare marginally better over Energy Resources where 19 out of the 22 participating member states show holdings in this category. However, the average proportional output for Mineral Resources themed data from European NGSO's is the smallest out of the five themes analysed at 10.36%, nine out of the 22 participating member states (41%) cluster round 10.36% (+/- 10%).

Table 9: European dataset output on Mineral Resources

	21. Mineral resources
Latvia	38.89%
Greece	33.33%
Estonia	25.00%
Portugal	13.51%
Finland	12.50%
Lithuania	11.11%
Norway	9.52%
Poland	9.09%
Slovenia	9.09%
Czech Republic	8.33%
Austria	6.25%
Netherlands	5.00%
Italy	4.26%
Sweden	4.17%
Bulgaria	2.33%
Spain	1.92%
United Kingdom	1.41%
France	0.80%
Belgium	0.36%
Germany	0.00%
Slovak Republic	0.00%
Luxembourg	0.00%



3.3 INSPIRE Indicator Theme 'Sub-categories'

A further measure was put in action with the aim of helping to identify potential errors in data categorisation. Analysis of the data identified a risk of dataset title misnomer, possibly due to translation issues and differing cultural ontologies. For example, analysis of the description field for each dataset revealed a significant number of datasets placed in the 'geology' theme despite being more relevant to soils or hazards, etc.

3.3.1 *Establishing dataset types*

To help reduce the effects of dataset mislabelling, and establish the validity of the existing Indicator Theme labels, a second level 'sub-category' field was created and manually populated by deriving information from existing dataset 'Spatial Data Set' description fields. All datasets were individually analysed and re-allocated with the new 'sub-category' field as was discernible from the descriptive fields supplied on the INSPIRE Indicator spreadsheet.

3.3.2 *Sub-category analysis*

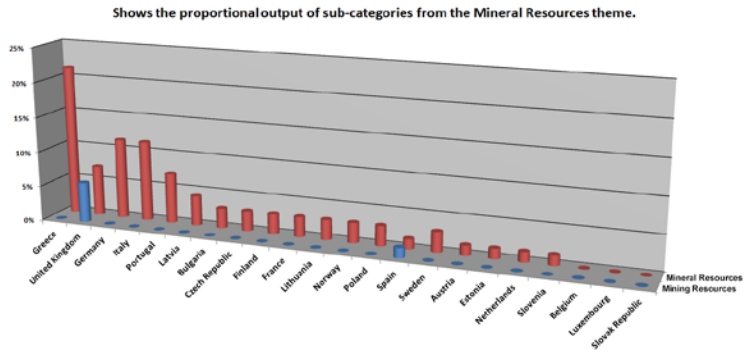
Two INSPIRE Indicator themes ('Mineral Resources' and 'Natural Risk Zones') were selected by using the results from task 3.1 for the most common pan-European projects. This also aligns to stakeholder needs and European policy drivers. These two themes were used to test the method of manually deriving data into sub-set categories. These sub-set categories were then collated and quantitatively aggregated according to their associated member state, as shown in Table 10 and Table 11.

Two sub-category themed datasets were then chosen ('Mineral Resources' and 'Flood') as part of the total contribution towards the sum datasets sourced for the scoping study. The sum of all data identified within these sub-categories was then used to show the results of the pan-European search query facility.

Table 10: 'Mineral Resources' datasets sub-categorized from the INSPIRE Indicator Theme descriptions

Proportional Output for the Mineral Resources Theme (%)

	Member States	Mining Resources	Mineral Resources	Theme Contribution
1	Greece	0.00%	21.43%	21.43%
2	United Kingdom	5.71%	7.14%	12.85%
3	Germany	0.00%	11.43%	11.43%
4	Italy	0.00%	11.43%	11.43%
5	Portugal	0.00%	7.14%	7.14%
6	Latvia	0.00%	4.29%	4.29%
7	Bulgaria	0.00%	2.86%	2.86%
8	Czech Republic	0.00%	2.86%	2.86%
9	Finland	0.00%	2.86%	2.86%
10	France	0.00%	2.86%	2.86%
11	Lithuania	0.00%	2.86%	2.86%
12	Norway	0.00%	2.86%	2.86%
13	Poland	0.00%	2.86%	2.86%
14	Spain	1.43%	1.43%	2.86%
15	Sweden	0.00%	2.86%	2.86%
16	Austria	0.00%	1.43%	1.43%
17	Estonia	0.00%	1.43%	1.43%
18	Netherlands	0.00%	1.43%	1.43%
19	Slovenia	0.00%	1.43%	1.43%
20	Belgium	0.00%	0.00%	0.00%
21	Luxembourg	0.00%	0.00%	0.00%
22	Slovak Republic	0.00%	0.00%	0.00%
	SubCat weighting	7.14%	92.89%	*100%*



Within the 'Mineral Resources' INSPIRE Indicator theme, two appropriate sub categories emerged: Mineral Resources and Mining Resources (Table 10). The sub-category 'Mineral Resources' proved to be the most dominant category and was duly selected as a contributory indicator for demonstrating the effectiveness for field search query of European datasets, as demonstrated in section 8.

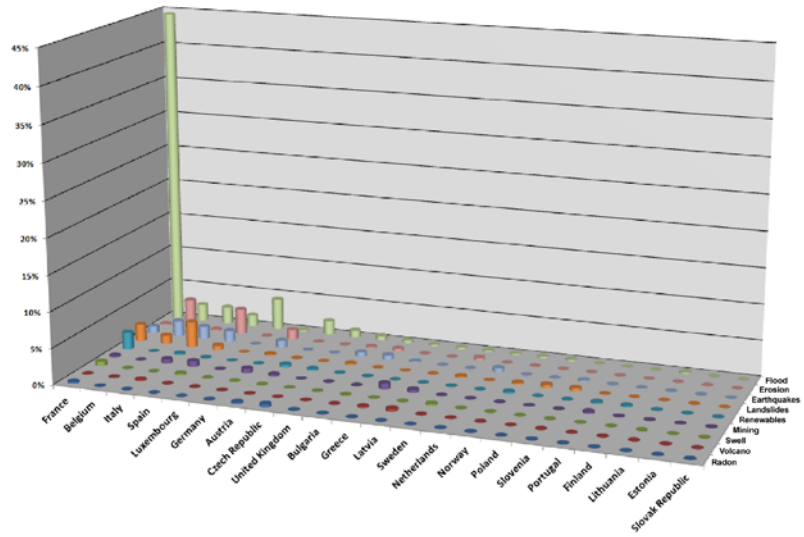
Within the 'Natural Risk Zones' INSPIRE Indicator theme, the 'Flood' sub-category proved to be the most dominant and was selected as an ideal indicator for demonstrating the effectiveness for field search query of European datasets within the 'Natural Risk' theme (Table 11).

Table 11: 'Natural Risk Zones' datasets sub-categorized from the INSPIRE Indicator theme descriptions

Proportional Output for the Natural Risk Zones Theme (%)

	Member States	Radon	Volcano	Swell	Mining	Renewables	Landslides	Earthquakes	Erosion	Flood	Theme Contribution (%)
1	France	0.20%	0.00%	0.59%	0.20%	2.36%	2.36%	0.98%	0.20%	44.49%	51.38%
2	Belgium	0.00%	0.00%	0.00%	0.00%	0.00%	1.18%	2.17%	4.13%	2.36%	9.84%
3	Italy	0.00%	0.20%	0.00%	0.59%	0.20%	3.54%	1.77%	0.20%	2.36%	8.86%
4	Spain	0.00%	0.00%	0.20%	0.79%	0.00%	0.59%	1.57%	3.54%	1.57%	8.26%
5	Luxembourg	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.33%	4.33%
6	Germany	0.00%	0.00%	0.00%	0.59%	0.00%	0.20%	0.98%	1.38%	0.20%	3.35%
7	Austria	0.20%	0.00%	0.00%	0.20%	0.39%	0.00%	0.00%	0.00%	1.97%	2.76%
8	Czech Republic	0.39%	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.98%	1.57%
9	United Kingdom	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.59%	0.20%	0.59%	1.58%
10	Bulgaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.39%	0.39%	1.37%
11	Greece	0.00%	0.20%	0.00%	0.79%	0.00%	0.00%	0.20%	0.00%	0.20%	1.39%
12	Latvia	0.00%	0.39%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.20%	0.98%
13	Sweden	0.00%	0.00%	0.20%	0.00%	0.00%	0.20%	0.00%	0.39%	0.20%	0.99%
14	Netherlands	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.20%	0.79%
15	Norway	0.00%	0.00%	0.00%	0.00%	0.20%	0.20%	0.00%	0.00%	0.20%	0.60%
16	Poland	0.00%	0.00%	0.00%	0.00%	0.00%	0.39%	0.00%	0.00%	0.20%	0.59%
17	Slovenia	0.00%	0.00%	0.00%	0.00%	0.00%	0.39%	0.20%	0.00%	0.00%	0.59%
18	Portugal	0.00%	0.00%	0.00%	0.20%	0.20%	0.00%	0.00%	0.00%	0.00%	0.40%
19	Finland	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.20%
20	Lithuania	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.20%
21	Estonia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
22	Slovak Republic	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	SubCat weighting	0.79%	0.79%	0.99%	3.75%	3.75%	9.25%	9.64%	10.43%	60.64%	*100%*

Shows the proportional output of sub-categories from the Natural Risk Zones theme.



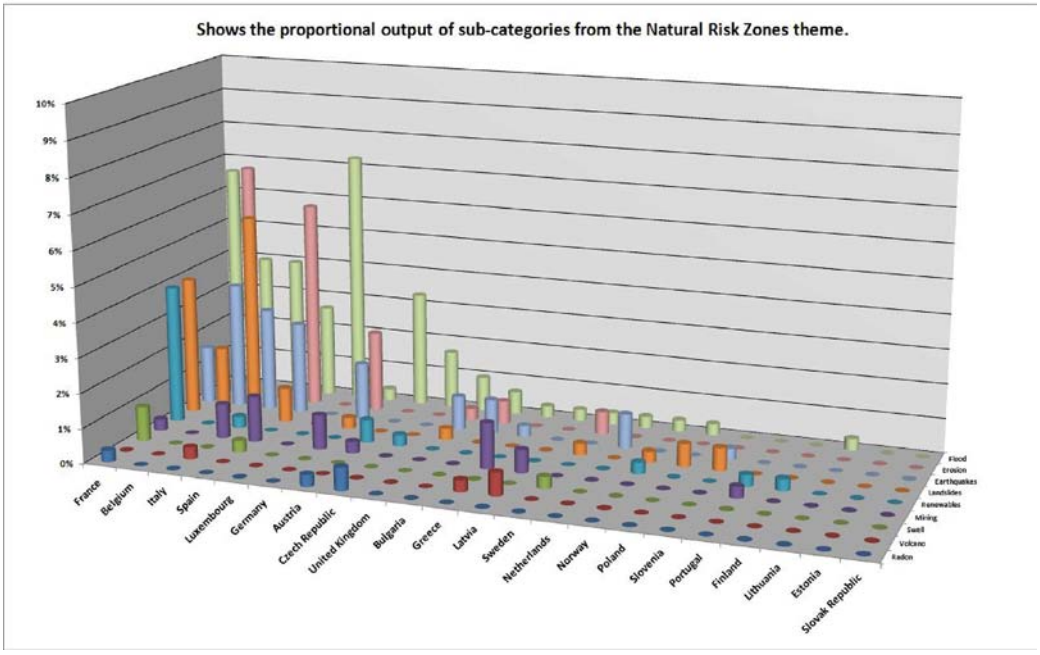
3.3.3 *Sub-Category aggregation*

Analysis of sub-categories revealed distinct statistical outliers that contributed to distorting results. A clear example was demonstrated with Flood data derived from within the INSPIRE Indicator dataset (Table 11). Further analysis revealed that the outlier appeared to contain sub-sets of what would potentially be a larger 'national' dataset. As a result, the project decided to aggregate these data sub-sets into whole datasets, allowing for a degree of coverage consistency with neighbouring data. It must be noted that the potential for further sub-set aggregation will exist in other datasets, but an extensive examination at this stage proved beyond the resources of this scoping study. Limiting aggregation to only those datasets that presented themselves as statistical outliers was considered a reasonable compromise at this stage. Where appropriate, standardising obvious outliers through a process of aggregation helped to reduce the quantitative range, allowing for a clearer statistical representation of available datasets in a Theme (Table 12).

Table 12: 'Natural Risk Zones' datasets sub-categorized from the INSPIRE Indicator theme after aggregation of the Flood data outlier

Proportional Output for the Natural Risk Zones Theme (%)

	Member States	Radon	Volcano	Swell	Mining	Renewables	Landslides	Earthquakes	Erosion	Flood	Theme Contribution (%)
1	France	0.33%	0.00%	0.99%	0.33%	3.97%	3.97%	1.66%	0.33%	6.62%	18.21%
2	Belgium	0.00%	0.00%	0.00%	0.00%	0.00%	1.99%	3.64%	6.95%	3.97%	16.56%
3	Italy	0.00%	0.33%	0.00%	0.99%	0.33%	5.96%	2.98%	0.33%	3.97%	14.90%
4	Spain	0.00%	0.00%	0.33%	1.32%	0.00%	0.99%	2.65%	5.96%	2.65%	13.91%
5	Luxembourg	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.28%	7.28%
6	Germany	0.00%	0.00%	0.00%	0.99%	0.00%	0.33%	1.66%	2.32%	0.33%	5.63%
7	Austria	0.33%	0.00%	0.00%	0.33%	0.66%	0.00%	0.00%	0.00%	3.31%	4.64%
8	Czech Republic	0.66%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	1.66%	2.65%
9	United Kingdom	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.99%	0.33%	0.99%	2.65%
10	Bulgaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.66%	0.66%	2.32%
11	Greece	0.00%	0.33%	0.00%	1.32%	0.00%	0.00%	0.33%	0.00%	0.33%	2.32%
12	Latvia	0.00%	0.66%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.33%	1.66%
13	Sweden	0.00%	0.00%	0.33%	0.00%	0.00%	0.33%	0.00%	0.66%	0.33%	1.66%
14	Netherlands	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.00%	0.33%	1.32%
15	Norway	0.00%	0.00%	0.00%	0.00%	0.33%	0.33%	0.00%	0.00%	0.33%	0.99%
16	Poland	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.33%	0.99%
17	Slovenia	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.33%	0.00%	0.00%	0.99%
18	Portugal	0.00%	0.00%	0.00%	0.33%	0.33%	0.00%	0.00%	0.00%	0.00%	0.66%
19	Finland	0.00%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%	0.33%
20	Lithuania	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.33%
21	Estonia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
22	Slovak Republic	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	SubCat weighting	1.32%	1.32%	1.65%	6.27%	6.28%	15.55%	16.22%	17.54%	33.75%	*100%*



3.4 Summary

Evidence suggests that geological datasets are the most dominant theme out of the five chosen categories (2.4.1) with a 43.31% average across all 22 participating member states (Table 13). Energy Resources are statistically the weakest with 11.35% if member state participation is taken into account.

It should be noted that some of the 0% values are the result of insufficient Indicator information supplied by the member state NGSO's.

A further two stage of process proved necessary in order to adequately identify these European datasets, involving manual categorization of each dataset through the use of both their 'Theme' and 'Spatial Data Set' description fields, and the statistical process of sub-class aggregation where necessary to help standardise dataset coverage to a national scale.

Table 13: Summary of Themed Datasets

	Contributing Member states	Proportional Average
Geology	22	43.31%
Natural Risk Zones	21	27.97%
Soil	18	15.69%
Energy Resources	16	11.35%
Mineral Resources	19	10.36%

4 Compilation of NGSO dataset holdings

4.1 Sourcing datasets via questionnaire

Further analysis of additional datasets held by European NGSOs and other relevant organisations was undertaken. In January 2013, a simple questionnaire was designed and distributed to all NGSOs and other Europe-wide organisations requesting details of datasets held by their organisation. (see Appendix 2: Questionnaire).

4.2 Questionnaire structure

For each dataset identified, the following details were requested:

1. Theme *(what type of data)*
2. Dataset name
3. Description
4. Scale *(at which data should be used)*
5. Coverage *(full/part)*
6. Format *(how is data made available)*
7. Metadata *(yes/no)*
8. Cost *(yes/no)*

In order to constrain the detail provided on filling in the questionnaire, the participants were required to choose their answers from a drop down list. For example, participants were asked to categorise their datasets using the following themes (linking for consistency with task 3.1):

- Geology Onshore
- Geology Offshore
- Climate and Environment *(including Geoheritage)*
- Water
- Energy
- Natural Risk / Geohazards
- Oceanographic / Marine
- Economic / Mineral Resources / Carbon Capture Storage
- Soil / Environmental Chemistry / Geochemistry
- Urban
- Other

The following data formats were options:

- WMS / WFS
- Vector / Raster GIS

- 3D / Grids
- ASCII / Spreadsheet
- Other

4.3 Participants

Of the 27 NGSOs contacted, 17 returned information using the questionnaire provided to them. In addition to the NGSOs, various contacts within the following Europe-wide organisations were approached for information:

- European Environment Agency (EEA)
- Joint Research Council (JRC)
- European Space Agency (ESA)

None of the above organisations completed a questionnaire, but it was clear from the responses we received (emails with links to web pages) that all information available to the public is published widely in reports and available on the relevant organisational web sites. For example, the EEA provided the following information and links but unfortunately this was biased to the water theme only. It has proven difficult to engage with these stakeholders, however WP2 has organised a workshop with the EEA in June where other themes and data will be addressed.

Reporting obligations database: ROD: http://rod.eionet.europa.eu/
NRC Groundwater: http://rod.eionet.europa.eu/contacts?roleId=eionet-nrc-groundwater-mc
Waterbase groundwater: http://www.eea.europa.eu/data-and-maps/data/waterbase-groundwater-8
SoE groundwater kort: http://www.eea.europa.eu/themes/water/interactive/water-quality-in-groundwater
Generelt entry WISE water data centre: http://www.eea.europa.eu/themes/water/dc
Europakort for WFD chemical and quantitative status: http://www.eea.europa.eu/themes/water/interactive/water-live-maps/wfd
map services på water: http://discomap.eea.europa.eu/ArcGIS/rest/services/Water
WISE-RTD: http://www.wise-rtd.info/en
Kontakt til BGR: Duscher, Klaus Klaus.Duscher@bgr.de WFD groundwater bodies
Evt. detaljer om groundwater rapporteret til EEA og vist i Waterbase kontakt European Topiv Center (Water): Vít Kodeš kodes@chmi.cz (bl. Hvorfor der ikke vises flere geo-referenced data på kort)

4.4 Sourcing Pan-European datasets

The same questionnaire was also completed (as far as possible) by the EGDI project for those datasets identified as existing by past and present EC funded projects, collated under Task 3.1 and visible via online web portal. These results are included in Appendix 4.

5 Results - NGSO datasets holdings

The returned questionnaires requesting relevant datasets, in addition to those made available under INSPIRE (as discussed in Section 3), were analysed and are presented for each individual NGSO in Appendix 3. Each NGSO's submission is represented as a series of charts and tables to give a synthesized overview of the types and extent of datasets held by them.

Analysis of the returned questionnaires was limited by certain inconsistencies in the data returned:

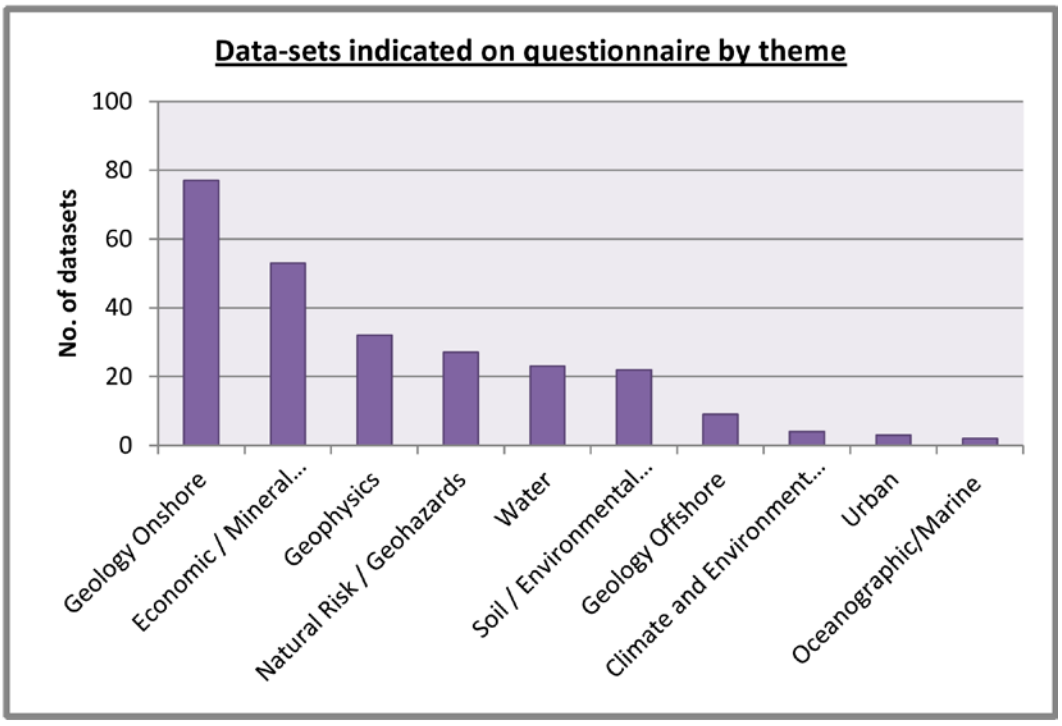
- The level of detail provided by each NGSO was inconsistent in some cases.
- The use of the “Other (Please specify)“ option was used in some cases to describe datasets which cover more than one theme or were provided in more than one format or at different scales.

However, the returns do provide a useful first look at the spread of non-INSPIRE datasets held across the NGSOs.

5.1 Themes

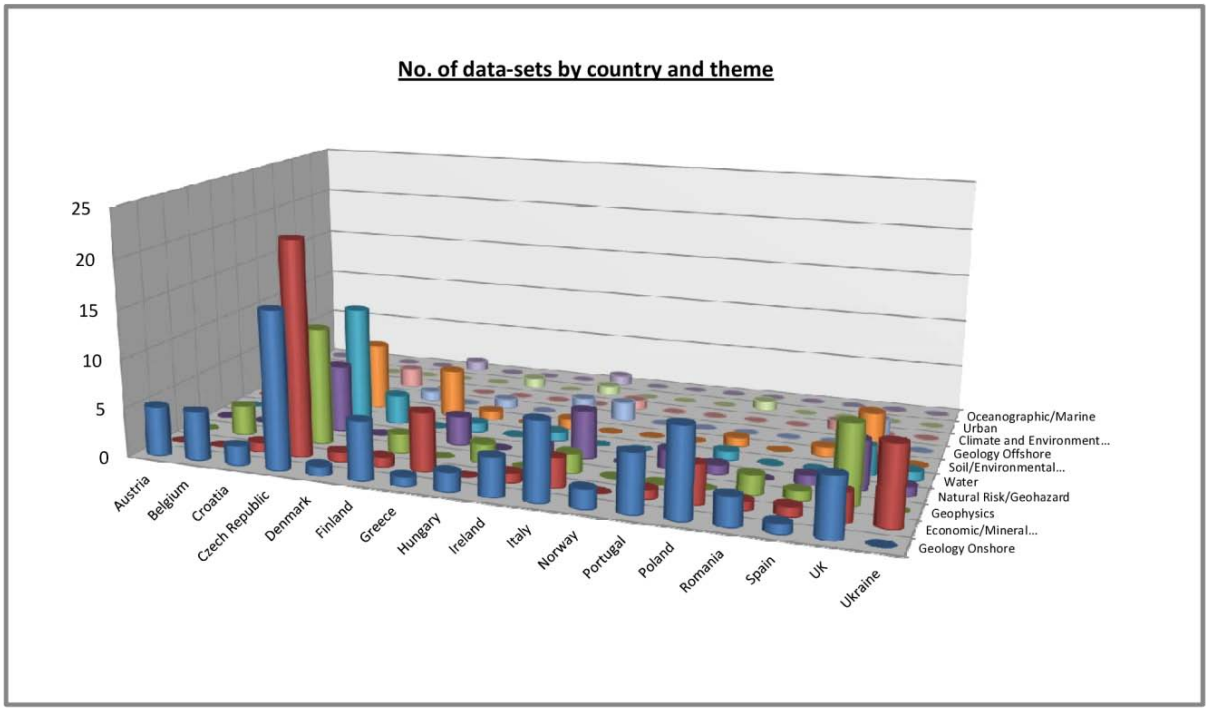
An overall review of the submissions indicates that, unsurprisingly, Onshore Geology constitutes the largest number of datasets with a count of 77 across all NGSOs, whilst only 18 Offshore Geology datasets were counted; a likely explanation for this being that not all countries possess a coastline. This could also explain in part the lack of Oceanographic/Marine datasets indicated. Economic/Mineral Resource/CCS is the next most extensive dataset with a count of 53. Fairly even numbers were indicated for Geophysics, Natural Risk/Geohazard, Soil/Environmental Chemistry/Geochemistry, and Water.

Table 14: Number of datasets indicated by theme



Further examination of the datasets by theme and country shows that Onshore Geology is fairly evenly spread across most returning NGSOs. Returns for three of the four next highest scoring datasets: Natural Risk/Geohazard; Soil/Environmental Chemistry/Geochemistry; and Water, represented a good spread across most NGSOs. In contrast, whilst in terms of numbers of datasets Geophysics ranked relatively high, most submissions were concentrated across six of the returning NGSOs. It is clear from this analysis that consideration must be given to the relative spread of the datasets, and other indicators such as Coverage, when choosing priority datasets on which to base any further methodology development.

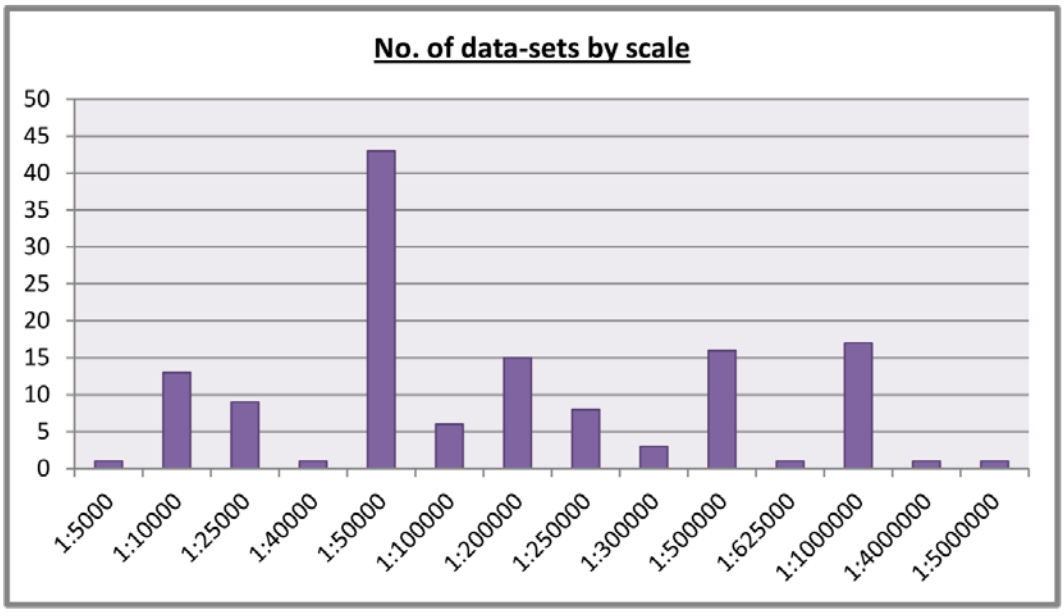
Table 15: Number of datasets indicated by theme and country



5.2 Scale

The scale of different datasets indicated on each NGSO's questionnaire varies significantly from country to country. The graph below does not include all returns e.g. those that indicated a scale range, and is used simply to demonstrate the variety of scales reported. Historically, scale has been a major obstacle in developing Europe-wide datasets e.g. OneGeology. Any derived dataset methodology development (Task 3.3) will need to take account of all scale variations.

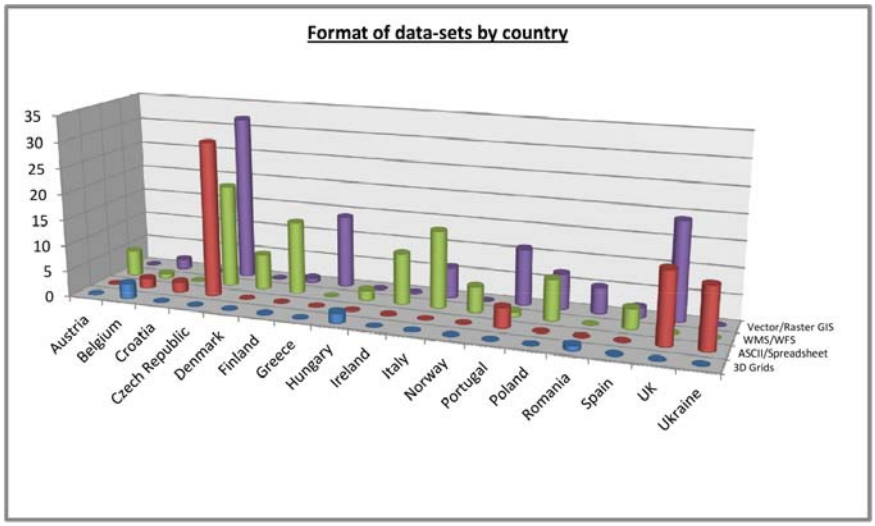
Table 16: Number of datasets indicated by scale



5.3 Format

The most common format used by NGSOs to make data available is Vector/Raster GIS closely followed by WMS/WFS. However, on further analysis, the availability of data provided as WMS/WFS is concentrated in a small number of NGSOs whereas Vector/Raster GIS data is more evenly spread. Whilst the count of datasets provided in ASCII/Spreadsheet format is relatively high (2/3 the count provided in Vector/Raster GIS format), questionnaire returns suggest only two or three NGSOs actually provide their data in this format. Other formats reported include PDF, WMV, raster, AVI, Earth Resource ML, XML and text. (There may be an issue with the returns made in the questionnaire, and our interpretation of the results, in that the person completing the questionnaire had only one option e.g. WMS or Vector/Raster when choosing a format for each dataset, when in reality both or more formats may exist).

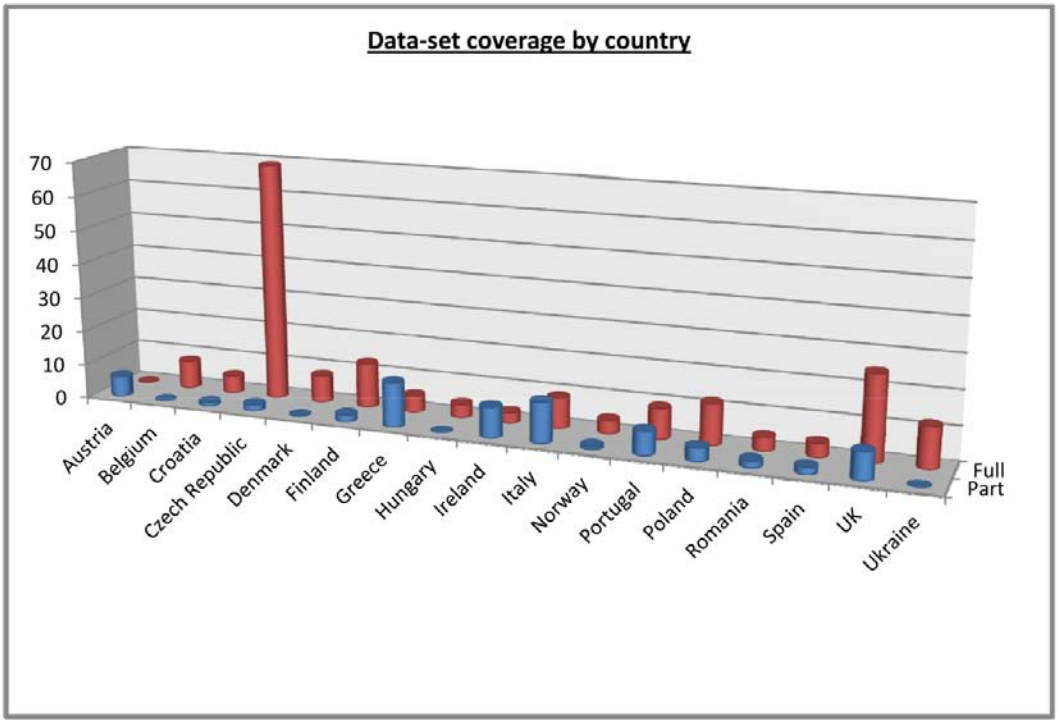
Table 17: Dataset format indicated by country



5.4 Coverage

Most NGSOs reported full coverage for many of their datasets. Further analysis is now needed for potential priority datasets when planning development of a methodology for producing derived datasets (Task 3.3). Any datasets chosen for this exercise will need significant coverage across all NGSOs, although account will also be taken of any data made available under INSPIRE or as part of past/ongoing projects.

Table 18: Number of datasets indicated by coverage and country



5.5 Cost

The questionnaire returns suggest that around half of all datasets indicated by NGSOs incur some sort of charge. On closer analysis, only two of the returning NGSOs charge for all data indicated whereas returns from six of the NGSOs suggested no charge for all datasets indicated. It is unclear at this stage whether charging will be an issue when developing derived dataset methodologies as part of task 3.3 and this will be considered in detail in WP5.

This criteria has also been used as an initial indication as to the conditions of use of the data. On a very broad scale, all data with an associated cost will need to be licensed; however 'free' data will potentially have conditions of use attached. The large amount of data being captured was considered too wide-ranging to ask for specific information on every dataset, therefore it is practical that only the 'prioritised' theme or derived areas will be investigated in greater detail in task 3.3. This will involve each organisation being approached with requests for further specific information and details.

5.6 Metadata

Around 80% of all datasets indicated on the returned questionnaire have associated metadata. In fact the information held in the questionnaires suggests that all but one of the NGSOs provide some sort of metadata for most of their datasets. It is unclear at this stage what sort of metadata is held e.g. Discovery/Technical.

5.7 Theme Sub-categories

Once all the datasets were collated, a measure was put into action with the aim of helping to identify potential errors in data categorisation, possibly due to translation issues and differing cultural ontologies, as observed in the INSPIRE Indicator data source (see section 3.3). To ensure dataset title continuity with other sourced datasets, a second level 'sub-category' field was created and manually populated by deriving information from other descriptive fields supplied on the returned questionnaire.

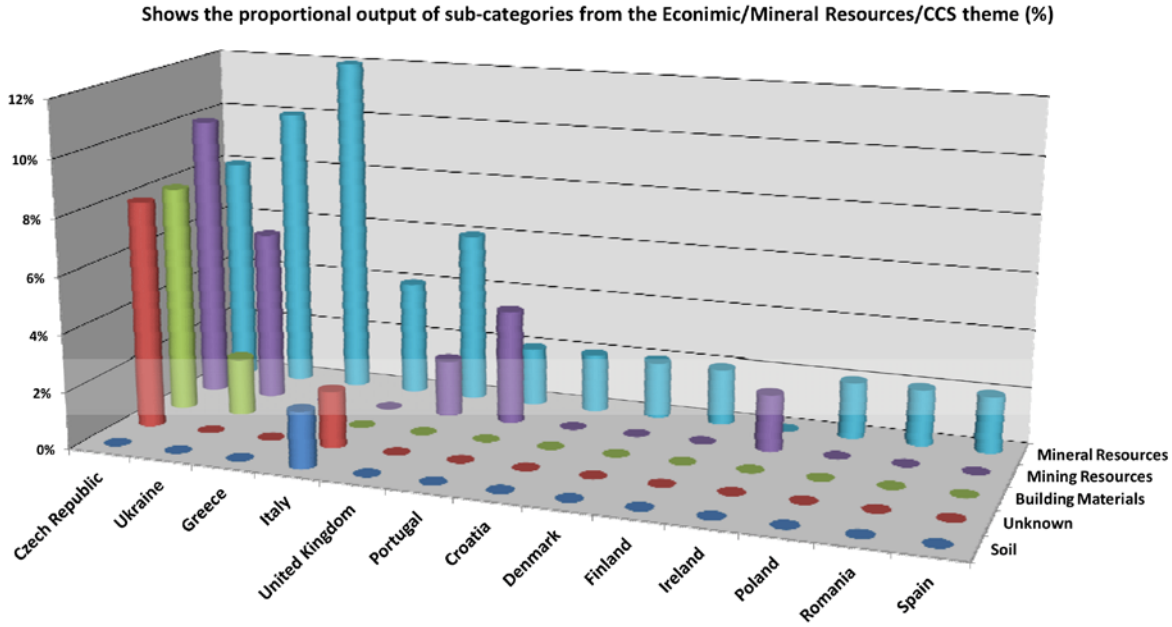
5.7.1 *Sub-category analysis*

Due to the relative dominance of the INSPIRE Indicator datasets by quantity, 'Economic/Mineral Resources/CCS' and 'Natural Risk/Geohazards' were identified as the most appropriate datasets to statistically contribute to the overall totals: 'Mineral Resources' and 'Natural Risk Zones'. A new 'categories' field was created and populated by the same method as carried out for the INSPIRE Indicator themed data, collated and, if required, quantitatively aggregated according to their associated member state, as shown in Table 20 and Table 21.

Table 19: 'Economic/Mineral Resources/CCS' datasets sub-categorized from the questionnaire dataset name and descriptions fields

Proportional Output for the Economic/Mineral Resources/CCS theme

	Member States	Soil	Unknown	Building Materials	Mining Resources	Mineral Resources	Theme Contribution (%)
1	Czech Republic	0.00%	8.00%	8.00%	10.00%	8.00%	34.00%
2	Ukraine	0.00%	0.00%	2.00%	6.00%	10.00%	18.00%
3	Greece	0.00%	0.00%	0.00%	0.00%	12.00%	12.00%
4	Italy	2.00%	2.00%	0.00%	0.00%	4.00%	8.00%
5	United Kingdom	0.00%	0.00%	0.00%	2.00%	6.00%	8.00%
6	Portugal	0.00%	0.00%	0.00%	4.00%	2.00%	6.00%
7	Croatia	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
8	Denmark	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
9	Finland	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
10	Ireland	0.00%	0.00%	0.00%	2.00%	0.00%	2.00%
11	Poland	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
12	Romania	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
13	Spain	0.00%	0.00%	0.00%	0.00%	2.00%	2.00%
	SubCat weighting	2.00%	10.00%	10.00%	24.00%	54.00%	100%



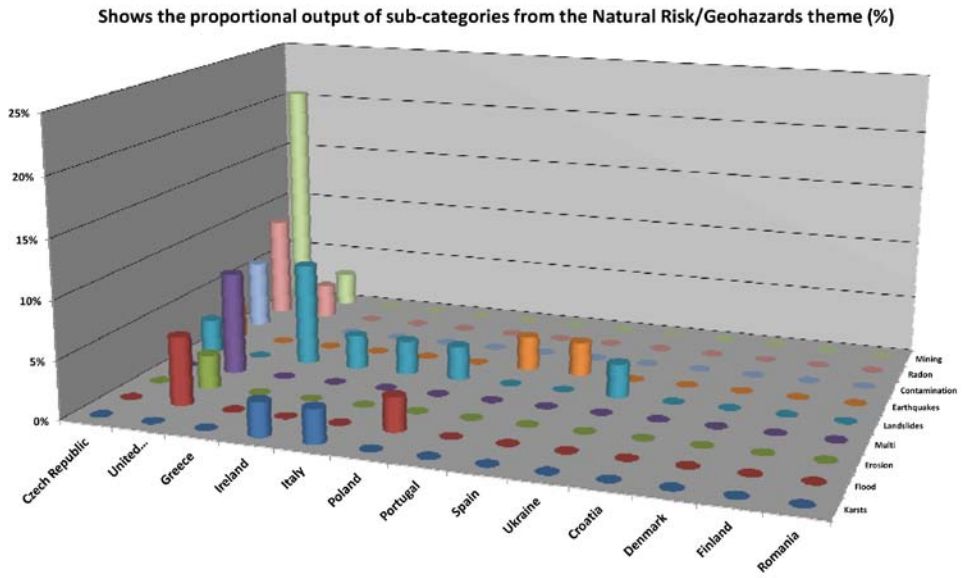
Results show that Mineral Resources data dominates with 54% share along with Mining Resources weighing in at 24% share of the total sub-categories identified within the 'Economic/Mineral Resources/CCS' theme (Table 20).

The Flood sub-category is significantly reduced via NGSO returns with less than 9% presence in the overall 'Natural Risk/Geohazards' theme. However, its inclusion towards the overall total remains relevant due to the significant quantitative presence of 'Flood' data available from within the INSPIRE Indicator source (Table 21).

Table 20: 'Natural Risk/Geohazards' datasets sub-categorized from the questionnaire dataset name and descriptions fields

Proportional Output for the Natural Risk/Geohazards theme

	Member States	Karsts	Flood	Erosion	Multi	Landslides	Earthquakes	Contamination	Radon	Mining	Theme Contribution (%)
1	Czech Republic	0.00%	0.00%	0.00%	0.00%	2.94%	2.94%	5.88%	8.82%	20.59%	41.18%
2	United Kingdom	0.00%	5.88%	2.94%	8.82%	0.00%	0.00%	0.00%	2.94%	2.94%	23.53%
3	Greece	0.00%	0.00%	0.00%	0.00%	8.82%	0.00%	0.00%	0.00%	0.00%	8.82%
4	Ireland	2.94%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	5.88%
5	Italy	2.94%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	5.88%
6	Poland	0.00%	2.94%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	5.88%
7	Portugal	0.00%	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	2.94%
8	Spain	0.00%	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	2.94%
9	Ukraine	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	2.94%
10	Croatia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	Denmark	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	Finland	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	Romania	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	SubCat weighting	5.88%	8.82%	2.94%	8.82%	23.52%	8.82%	5.88%	11.76%	23.53%	100%



Following population of the new 'categories' field, two sub-category themed datasets ('Mineral Resources' and 'Flood') were identified as compatible with the chosen INSPIRE Indicator data. The sum of all data identified within these sub-categories was then used to help show the results of the pan-European search query facility.

6 Pan-European project outputs

A questionnaire was completed by project staff to ascertain the types of datasets available via online portals and based on some of the EC projects identified in EGDI Task 3.1. As the projects were pan-European it was thought that this might capture some information not returned by individual countries. A total of 28 projects were analysed, but some of the categories do not provide enough data to base results on. The results of each category, displayed as charts are contained at Appendix 4.

6.1 Themes

The dominant theme was found to be Economic/Mineral Resource/CCS (28%) followed by Geology Offshore (25%) and then Natural Risk/Geohazard (18%). Geology Onshore only had a 7% return.

6.2 Scale

A scale could not be identified for over 60% of the datasets. Over 28% of the datasets had a scale at 1:1, 000, 000 or greater.

6.3 Format

Not surprisingly for a web search based exercise, over 57% of the datasets used WMS/WFS format, with the majority of the remainder being classed as 'other' or not known.

6.4 Coverage

All datasets were interpreted to be 'Full' as in the fact that the dataset fulfilled the purposes of the project, not necessarily of 'Full' country coverage.

6.5 Cost

Over 32% of the datasets made a statement that they had no cost, but for the remainder the information could not be identified.

6.6 Metadata

Over 71% of the datasets declared that they had metadata, whilst over 14% said they had none. The remaining 14+% could not be identified.

7 Limitations

Identifying geospatial datasets via the INSPIRE Monitoring and Reporting web portal is a useful method for sourcing what data exists. INSPIRE Indicators are published annually by participating member states in a set format that is designed to facilitate data consistency, allowing users to extract Europe wide information most appropriate for projects. However, results from the analysis of the INSPIRE Indicators reveals significant inconsistencies in both cataloguing qualities and coverage (area and theme/subject). It would appear that the reliance of volunteered information does come with its problems: incomplete, inconsistent submission methods, hindering the collation of Indicators for further analysis and slow or non-existent participation.

Careful attention to missing or inconsistent Indicator information must be taken into account when attempting to produce a meaningful overview of the state of our European spatial datasets. Contacting relevant NGSO's tasked with supplying these Indicators may prove to be the most reliable method for overcoming these gaps of information and any translation problems.

The results are entirely reliant on the information made available to us through this study, it is by no means complete. It was difficult to engage with Europe-wide organisations, other than NGSOs, through the questionnaire exercise. Further analysis of relevant web sites plus direct engagement via organised workshops will be required to gain a fuller picture. Although the results provide a good overview and classification of the available datasets, caution should be used when deriving conclusions.

8 Preliminary conclusions

The results show high variants between the analyses of different information sources, as could be expected. The data that has been classified as INSPIRE-compliant, and therefore listed in the indicator data, is essentially baseline geological information, i.e. map data, with minimal 'thematic' datasets included; one exception to this are flood hazard datasets. This is primarily due to a large amount of funding having been provided to make this data available.

In order to summarise the vast amount of information that has been collated during this task, the data have been analysed to answer the following major overarching questions that may be posed or requested within the EGDI framework:

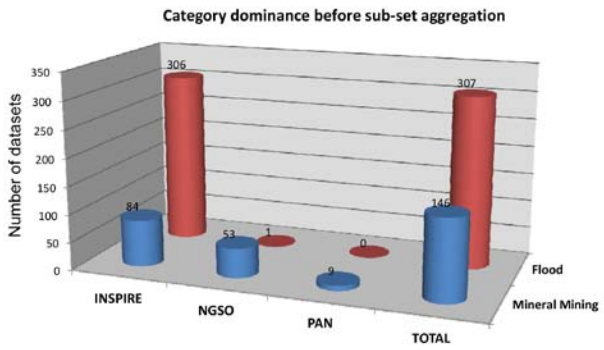
What is the most dominant geoscience category across Europe?

Overall, 'Natural Risk' proved to be the most dominant theme with 'Flood' risk appearing to be the most dominant geosciences category across Europe; although it was noted that a significant number of these datasets were identified under the 'Geology' INSPIRE Indicator theme. However, once aggregation of a dominant spike within the Flood dataset range was applied, Mineral Mining emerged as the most dominant geosciences category across Europe (Table 21).

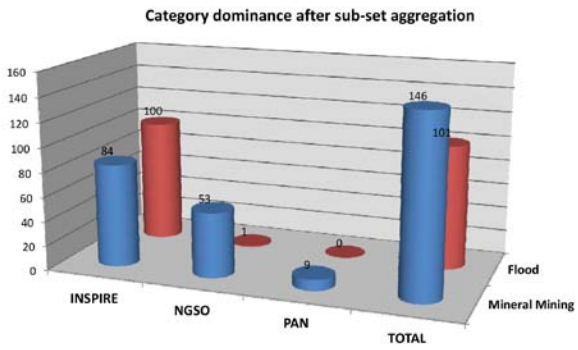
Data source	Theme
INSPIRE indicators	Mining Mineral (123 datasets) (Flooding 305)
NGSO holdings	Onshore geology data (77); and economic/mineral resources datasets (53)
Pan-European project outputs	Economic/Mineral Resource (followed by Offshore Geology and Natural Risk/Geohazard)

Table 21: The results of dataset aggregation.

	Mineral Mining	Flood
INSPIRE	84	306
NGSO	53	1
PAN	9	0
TOTAL	146	307



	Mineral Mining	Flood
INSPIRE	84	100
NGSO	53	1
PAN	9	0
TOTAL	146	101



What category has the most spatial coverage/extent across Europe?

For availability of complete spatial coverage datasets, Flood is the most dominant numerically (Figure 3) with Mineral & Mining following up with 50 datasets classed as 100% complete in coverage and 91 part complete (Figure 4).

Data source	~~Theme~~ Category
INSPIRE indicators	Flood*[1]
NGSO holdings	Multiple*[2]
Pan-European project outputs	Landslides; Radon*[3]

***[1] Inspire = flooding datasets –** 68.32% of these datasets have known full coverage.

Out of a total 101 datasets, only 76 contain information on the coverage. Of these 76 datasets, 70 are classed as 100% coverage and 6 have part coverage.

*[2] **NGSO holdings -** Most NGSOs reported full coverage for many of their datasets. Further analysis is now needed for potential priority datasets when planning development of a methodology for producing derived datasets (Task 3.3). Any datasets chosen for this exercise will need significant coverage across all NGSOs, although account will also be taken of any data made available under INSPIRE or as part of past/ongoing projects.

*[3] **pan-European project outputs -** pan-European coverage is available for all dataset themes by definition, however, groupings of countries e.g. Alpine countries, Scandinavian often exist. This is partly a result of the topic of research however, the creation of more truly pan-European datasets need to be investigated.

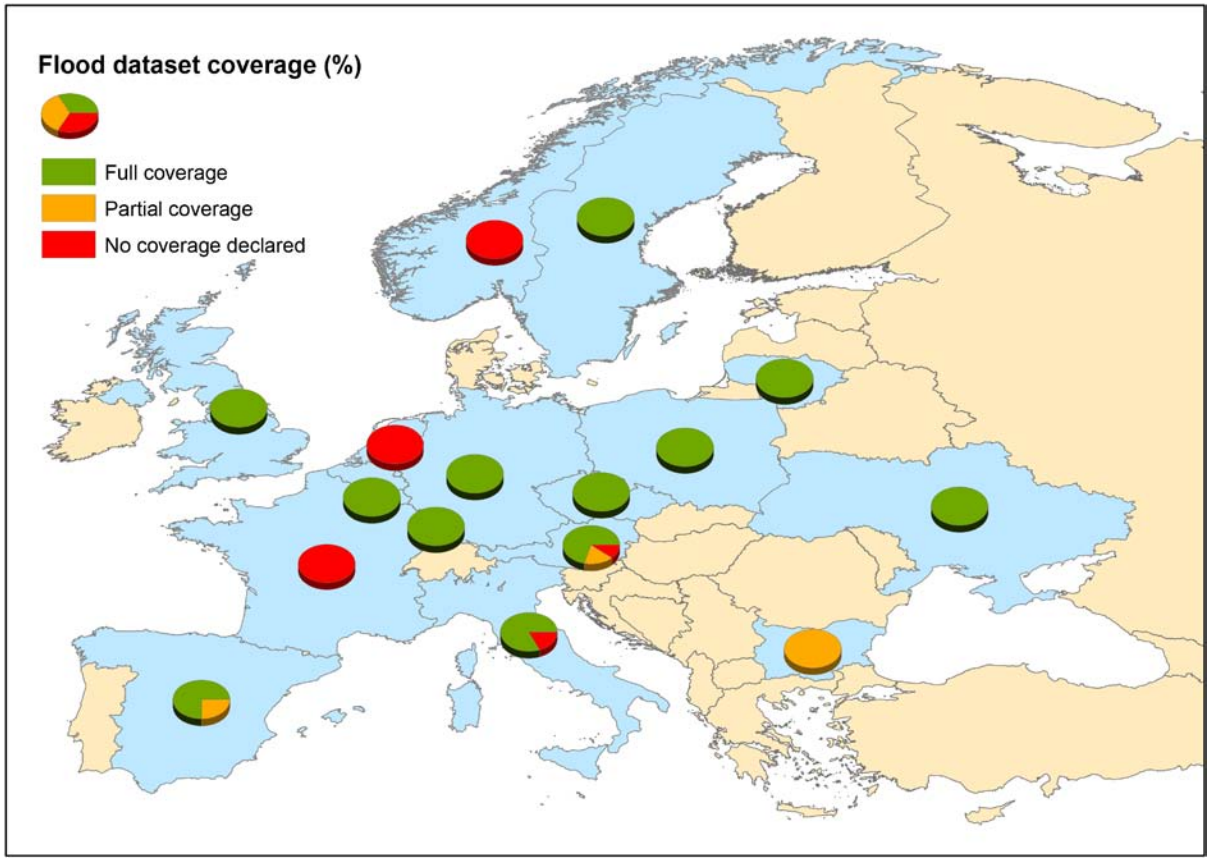


Figure 3: Flood category dataset level of coverage (%)

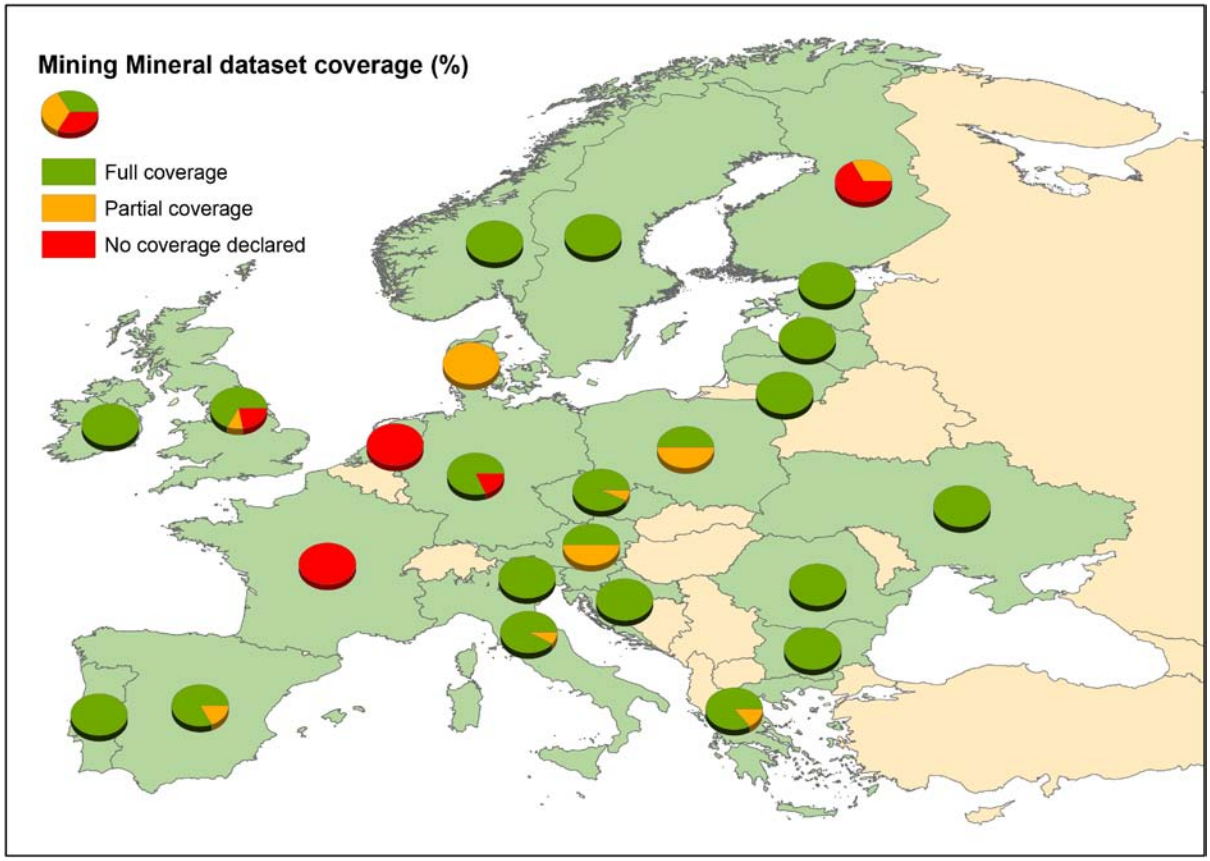


Figure 4: Mineral Mining category dataset level of coverage (%)

What is the resolution of the top 2 dataset categories?

Data source	Category
INSPIRE indicators	Scale not systematically collated. Further work needed to extract from title (Description) or return to individual organisation for further information provision.
NGSO holdings	Onshore Geology: multi-scale resolutions available; Natural Risk/Geohazards: large range again, from 1:10,000 to 1:1,000,000. 1:50,000 is dominant but the consistency and spatial distribution of this data varies greatly between countries.
Pan-European project outputs	These datasets tend to be smaller scale datasets e.g. Onegeology-Europe at 1:1,000,000 scale.

The format and metadata availability of datasets is primarily multi-functional and flexible; essentially most organisations are able to, and do, provide data in a number of formats. The availability of metadata again varies but essentially, some form of metadata usually exists.

Information on the cost and licensing restrictions of datasets has only been available via the information provided directly by NGSO's and this will require further analysis with a more focused approach.

9 Summary

In order to look into more detail at the data availability, the above findings were concluded as follows: the most dominant pan-European projects from task 3.1 were Natural Risk/Geohazards and Mineral Resources. These themes also score highly in both the INSPIRE in-scope datasets and national survey organisation's datasets.

It is clear that INSPIRE data mainly represents baseline scientific data that has a high degree of coverage in-country, available at a range of scales and in a variety of formats. This data would be highly suitable to form the initial baseline input into the EGDI framework and form the foundation of the infrastructure. From this data, a range of 'thematic' products could be derived.

The pan-European projects have, as would be expected, been primarily funded to produce more specific derived or 'thematic' data, but this is still sporadic in spatial distribution. The most dominant natural risk hazard currently available, from across Europe, are flood datasets.

For the purpose of the EGDI-scope, and moving towards task 3.3 (proposed methodologies for derived datasets), we therefore select two themes and their sub-topic on which to concentrate further studies; these will be **Mineral Resources** and **Geohazards**.

It is proposed that the information already available to the EGDI-scope project will now be investigated in greater detail to further assess the scope and potential for proposing methodologies within these two themes. Further input from WP2 (stakeholder analysis) will aid this assessment and information will also feed into WP5 (legal issues). In addition, this more focussed phase of the study will enable a targeted collation of information and input/feedback from the initial nominated contacts throughout Europe therefore enabling a focussed analysis of specific **Mineral Resources** and **Geohazards** data.

10 References

Commission, E. (2008). Commission Regulation (EC) No 1205/2008 of 3 December 2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards. *Official Journal of the European Union , 51* (L 326), 12-30.

Commission, E. (2009). Commission Regulation (EC) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services. *Official Journal of the European Union , 9* (274), 1-10.

Commission, E. (2007). Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). *Official Journal of the European Union , 50*, 1 -14.

Eurostat, M. a. (2009, July 10). *Monitoring and Reporting Drafting Team and European Commission - Eurostat.* (E. Commission, Ed.) Retrieved February 21, 2013, from INSPIRE Directive: http://inspire.jrc.ec.europa.eu/index.cfm/pageid/182/list/1

Appendix 1: INSPIRE Indicators (summary)

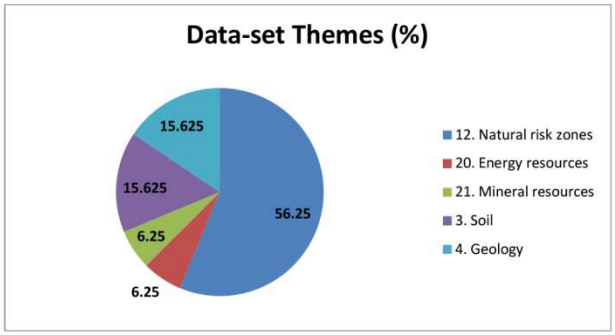
All INSPIRE Indicators are collated, summarized and presented for each member state. Missing data or erroneous entries are corrected, where possible.

KEY to categories:

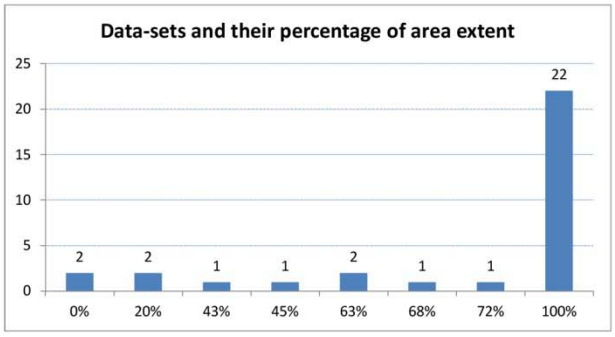
FLOOD: Flooding; **MULTI**: Multiple use; **SOIL**: Soil data; **GEOLITH**: Geolithological data; **RENEW**: Renewables; **HYDRO**: Hydrogeological; **SUBS**: Subsidence; **CHEM**: Geochemical data; **GEOPHS**: Geophysical data; **SEA**: Marine/Ocean data.

Austria

	Values	
Themes	Data-sets (%)	Data-sets
12. Natural risk zones	56.25	18
20. Energy resources	6.25	2
21. Mineral resources	6.25	2
3. Soil	15.625	5
4. Geology	15.625	5
Total	100	32



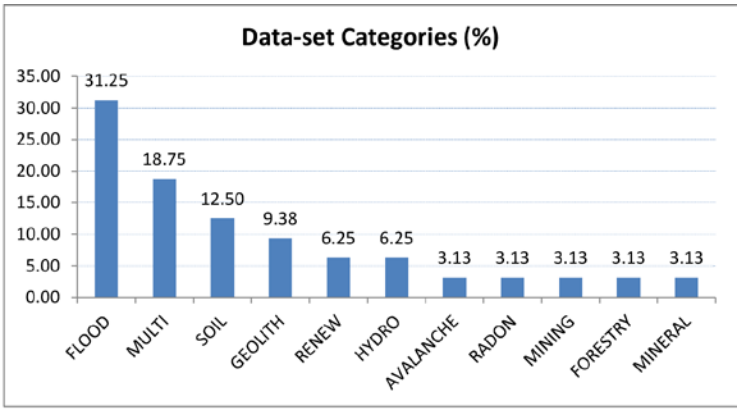
Coverage	Data-sets	Data-sets (%)
0%	2	6.25
20%	2	6.25
43%	1	3.13
45%	1	3.13
63%	2	6.25
68%	1	3.13
72%	1	3.13
100%	22	68.75
Total	32	100



	Values					
	Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	32	15	6	5	1	0
%	100	46.875	18.75	15.625	3.125	0

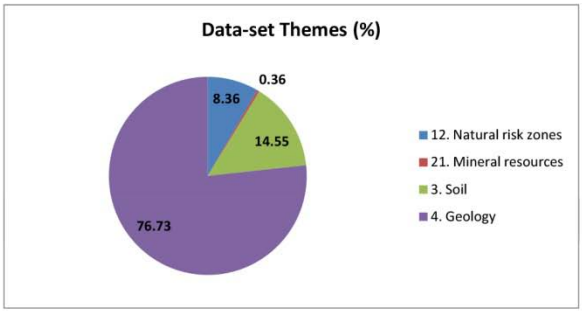
Subcategories derived from INSPIRE Indicator theme descriptions.

	Values	
Categories	Data-sets (%)	Data-sets
FLOOD	31.25	10
MULTI	18.75	6
SOIL	12.50	4
GEOLITH	9.38	3
RENEW	6.25	2
HYDRO	6.25	2
AVALANCHE	3.13	1
RADON	3.13	1
MINING	3.13	1
FORESTRY	3.13	1
MINERAL	3.13	1
Total	100	32

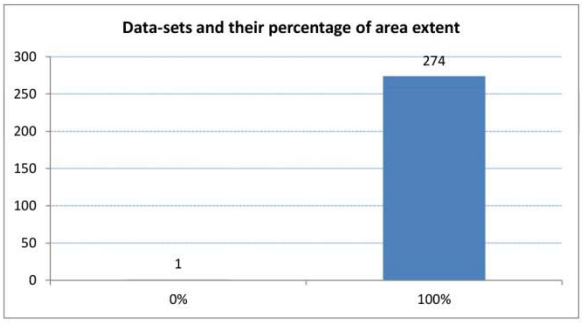


Belgium

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	8.36	23
21. Mineral resources	0.36	1
3. Soil	14.55	40
4. Geology	76.73	211
Total	100	275



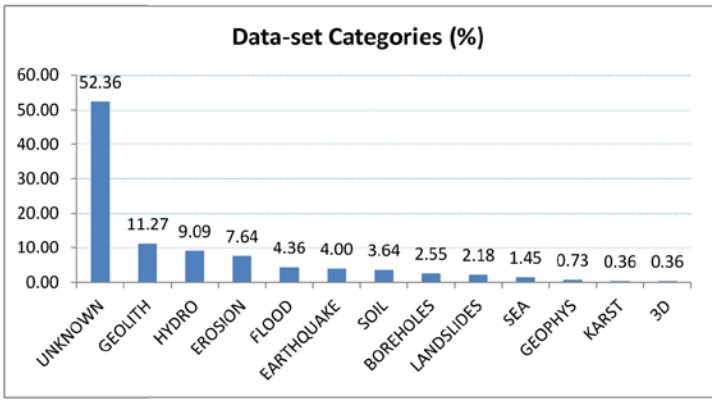
Coverage	Data-sets	Data-sets (%)
0%	1	0.36
100%	274	99.64
Total	275	100



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	275	269	203	138	158	122
%	100	97.82	73.82	50.18	57.45	44.36

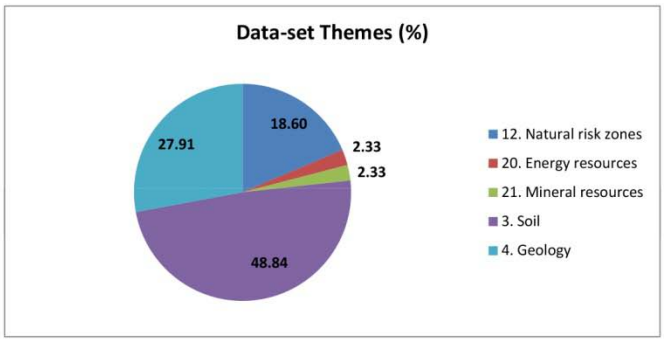
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
UNKNOWN	52.36	144
GEOLITH	11.27	31
HYDRO	9.09	25
EROSION	7.64	21
FLOOD	4.36	12
EARTHQUAKE	4.00	11
SOIL	3.64	10
BOREHOLES	2.55	7
LANDSLIDES	2.18	6
SEA	1.45	4
GEOPHYS	0.73	2
KARST	0.36	1
3D	0.36	1
Total	100	275

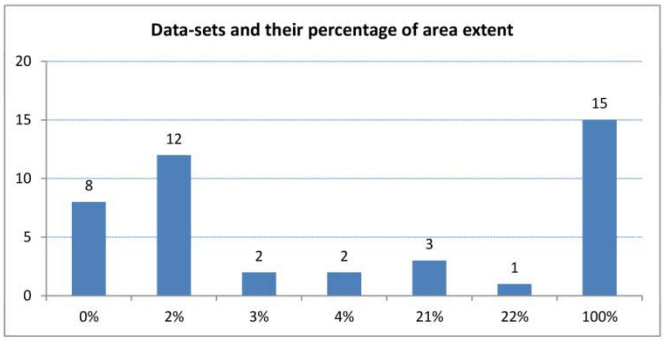


Bulgaria

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	18.60	8
20. Energy resources	2.33	1
21. Mineral resources	2.33	1
3. Soil	48.84	21
4. Geology	27.91	12
Total	**100**	**43**



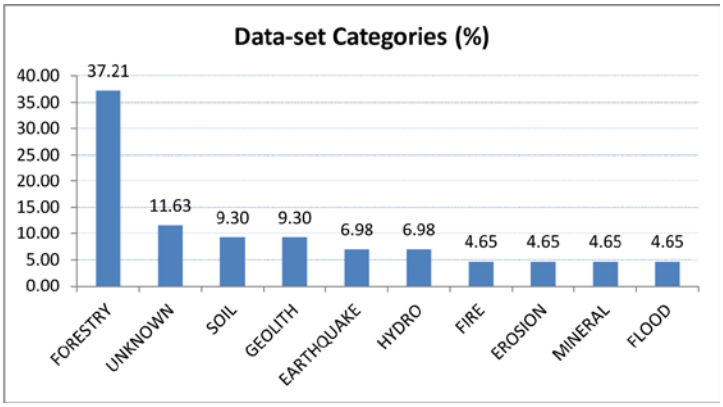
Coverage	Data-sets	Data-sets (%)
0%	8	18.60
2%	12	27.91
3%	2	4.65
4%	2	4.65
21%	3	6.98
22%	1	2.33
100%	15	34.88
Total	**43**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	43	2	2	2	0	0
%	100	4.65	4.65	4.65	0.00	0.00

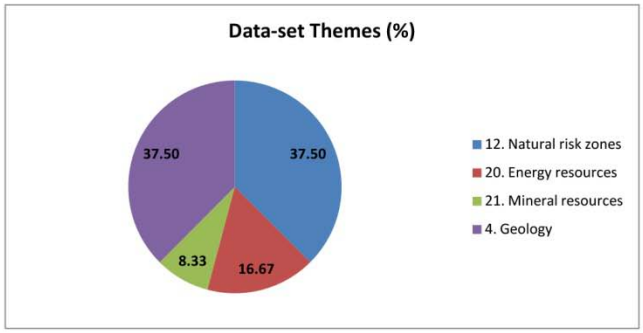
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
FORESTRY	37.21	16
UNKNOWN	11.63	5
SOIL	9.30	4
GEOLITH	9.30	4
EARTHQUAKE	6.98	3
HYDRO	6.98	3
FIRE	4.65	2
EROSION	4.65	2
MINERAL	4.65	2
FLOOD	4.65	2
Total	**100**	**43**

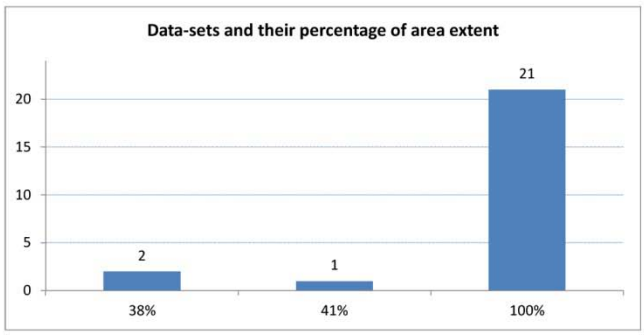


Czech Republic

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	37.50	9
20. Energy resources	16.67	4
21. Mineral resources	8.33	2
4. Geology	37.50	9
Total	100	24



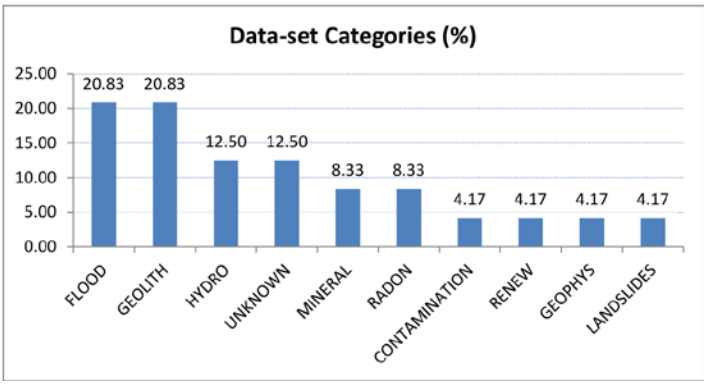
Coverage	Data-sets	Data-sets (%)
38%	2	8.33
41%	1	4.17
100%	21	87.50
Total	24	100



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	24	20	18	18	8	2
%	100	83.33	75.00	75.00	33.33	8.33

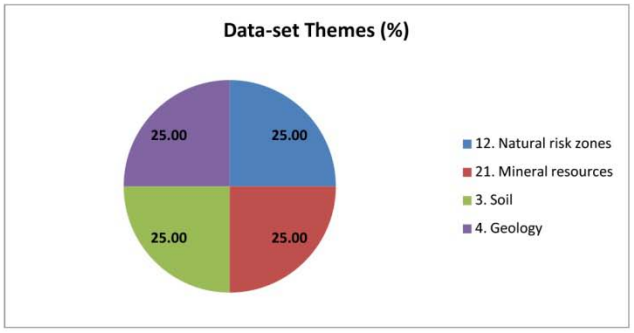
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
FLOOD	20.83	5
GEOLITH	20.83	5
HYDRO	12.50	3
UNKNOWN	12.50	3
MINERAL	8.33	2
RADON	8.33	2
CONTAMINATION	4.17	1
RENEW	4.17	1
GEOPHYS	4.17	1
LANDSLIDES	4.17	1
Total	100	24

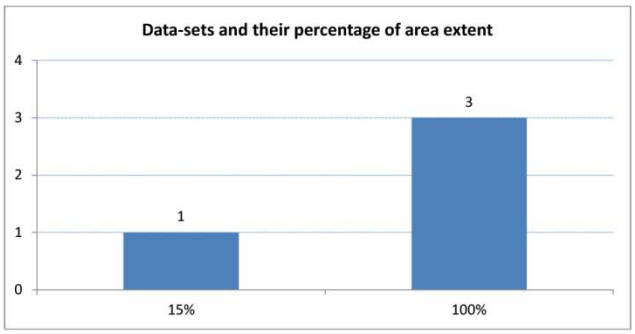


Estonia

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	25.00	1
21. Mineral resources	25.00	1
3. Soil	25.00	1
4. Geology	25.00	1
Total	**100**	**4**



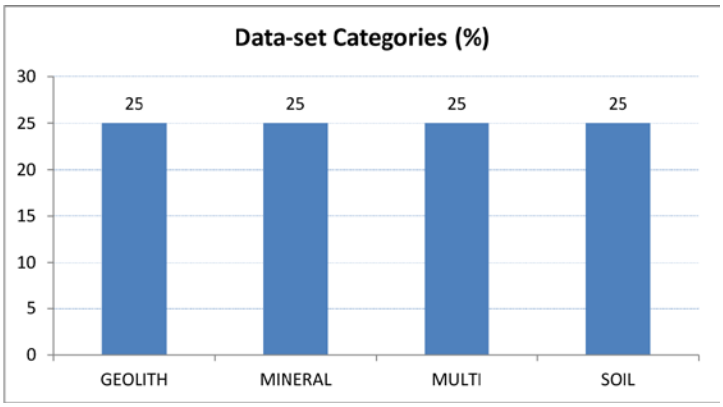
Coverage	Data-sets	Data-sets (%)
15%	1	25
100%	3	75
Total	**4**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	4	3	2	1	3	0
%	100	75.00	50.00	25.00	75.00	0.00

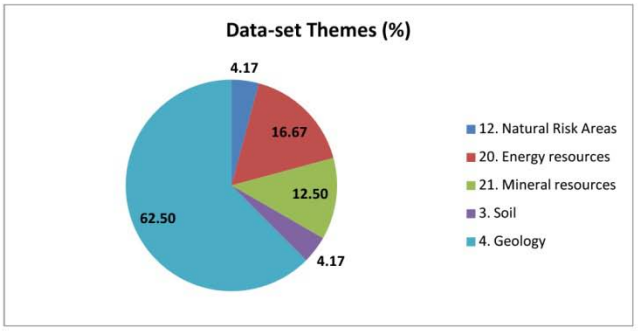
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	25	1
MINERAL	25	1
MULTI	25	1
SOIL	25	1
Total	**100**	**4**

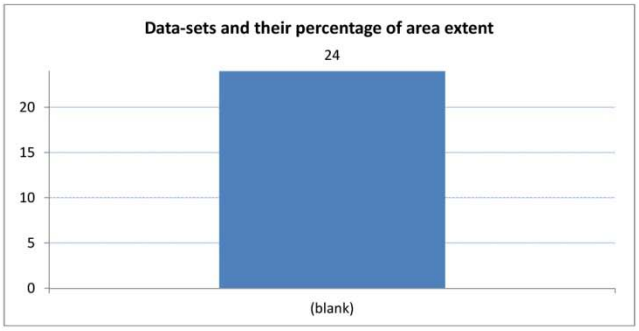


Finland

Themes	Values Data-sets (%)	Data-sets
12. Natural Risk Areas	4.17	1
20. Energy resources	16.67	4
21. Mineral resources	12.50	3
3. Soil	4.17	1
4. Geology	62.50	15
Total	**100**	**24**



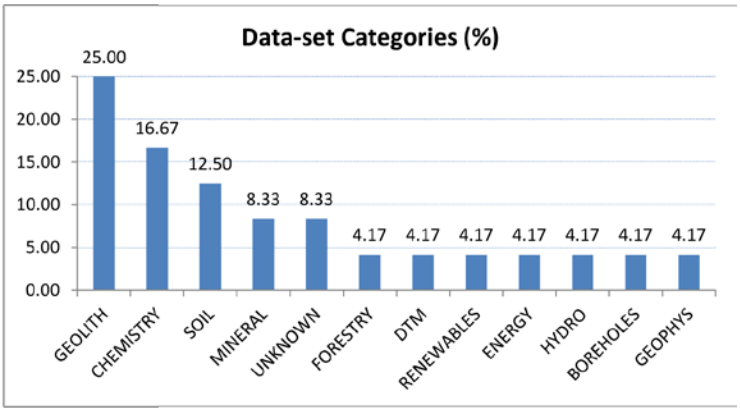
Coverage	Data-sets	Data-sets (%)
(blank)	24	100
Total	**24**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	24	22			20	5
%	100	91.67	0.00	0.00	83.33	20.83

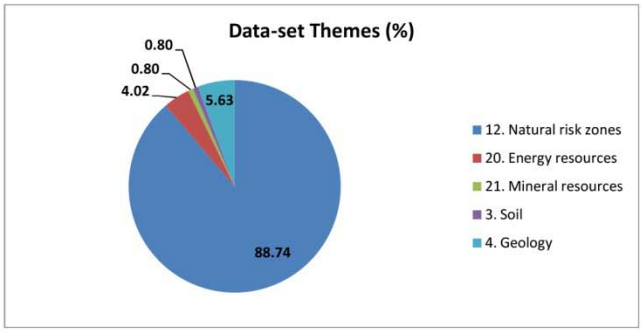
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	25.00	6
CHEMISTRY	16.67	4
SOIL	12.50	3
MINERAL	8.33	2
UNKNOWN	8.33	2
FORESTRY	4.17	1
DTM	4.17	1
RENEWABLES	4.17	1
ENERGY	4.17	1
HYDRO	4.17	1
BOREHOLES	4.17	1
GEOPHYS	4.17	1
Total	**100**	**24**

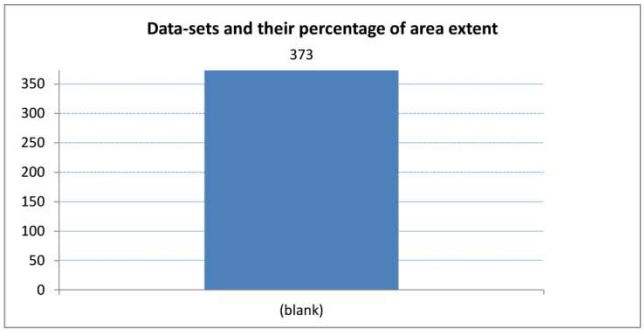


France

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	88.74	331
20. Energy resources	4.02	15
21. Mineral resources	0.80	3
3. Soil	0.80	3
4. Geology	5.63	21
Total	**100**	**373**



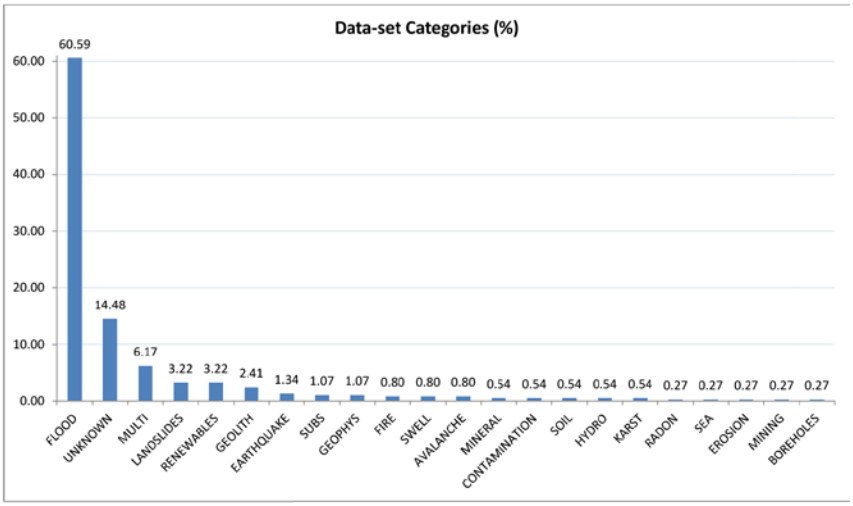
Coverage	Data-sets	Data-sets (%)
(blank)	373	100
Total	**373**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	373	373	113	373	283	223
%	100	100.00	30.29	100.00	75.87	59.79

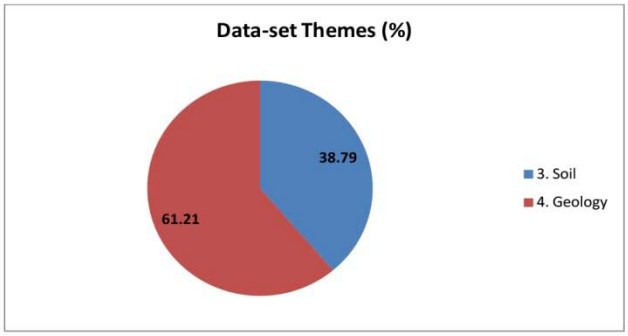
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
FLOOD	60.59	226
UNKNOWN	14.48	54
MULTI	6.17	23
LANDSLIDES	3.22	12
RENEWABLES	3.22	12
GEOLITH	2.41	9
EARTHQUAKE	1.34	5
SUBS	1.07	4
GEOPHYS	1.07	4
FIRE	0.80	3
SWELL	0.80	3
AVALANCHE	0.80	3
MINERAL	0.54	2
CONTAMINATION	0.54	2
SOIL	0.54	2
HYDRO	0.54	2
KARST	0.54	2
RADON	0.27	1
SEA	0.27	1
EROSION	0.27	1
MINING	0.27	1
BOREHOLES	0.27	1
Total	**100**	**373**

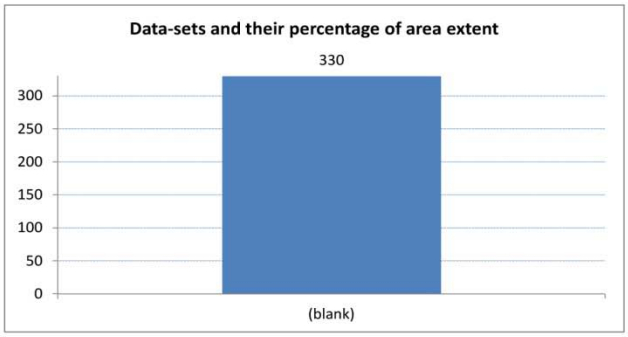


Germany

Themes	Values Data-sets (%)	Data-sets
3. Soil	38.79	128
4. Geology	61.21	202
Total	**100**	**330**



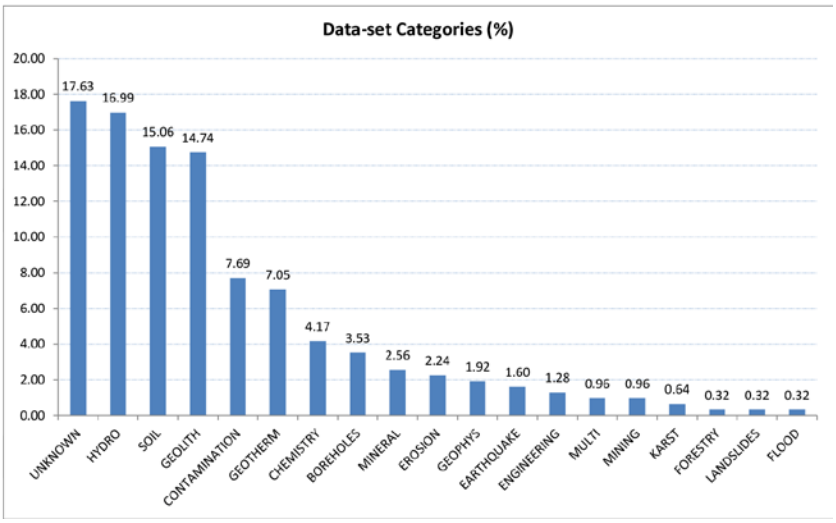
Coverage	Data-sets	Data-sets (%)
(blank)	330	100
Total	**330**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	330					
%	100	0	0	0	0	0

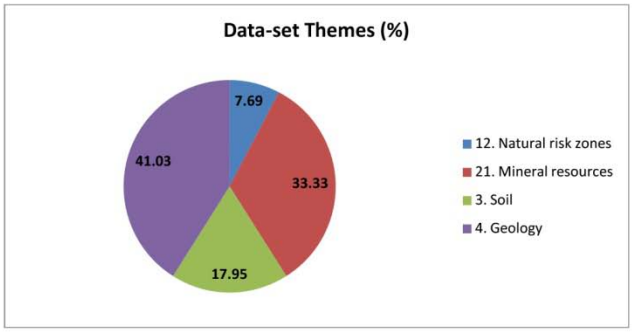
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
UNKNOWN	17.63	55
HYDRO	16.99	53
SOIL	15.06	47
GEOLITH	14.74	46
CONTAMINATION	7.69	24
GEOTHERM	7.05	22
CHEMISTRY	4.17	13
BOREHOLES	3.53	11
MINERAL	2.56	8
EROSION	2.24	7
GEOPHYS	1.92	6
EARTHQUAKE	1.60	5
ENGINEERING	1.28	4
MULTI	0.96	3
MINING	0.96	3
KARST	0.64	2
FORESTRY	0.32	1
LANDSLIDES	0.32	1
FLOOD	0.32	1
Total	**100**	**312**

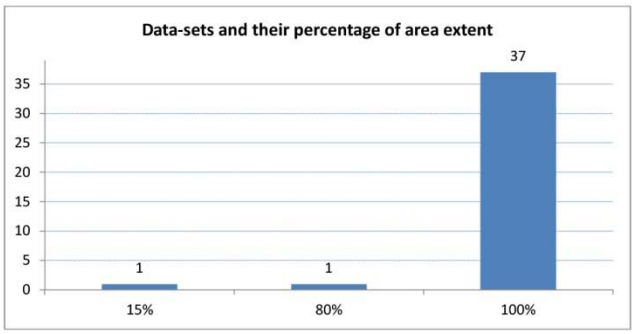


Greece

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	7.69	3
21. Mineral resources	33.33	13
3. Soil	17.95	7
4. Geology	41.03	16
Total	100	39



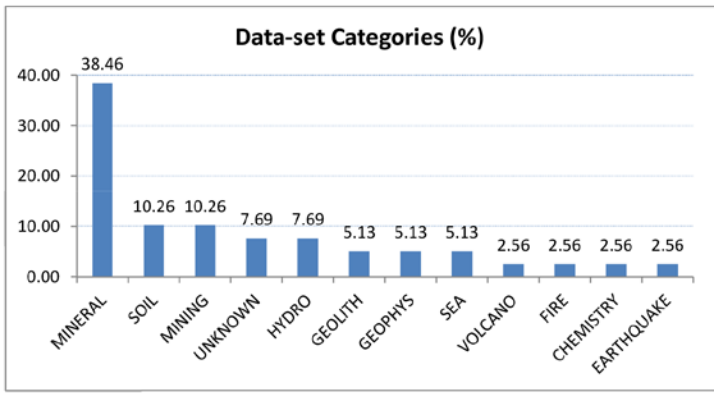
Coverage	Data-sets	Data-sets (%)
15%	1	2.56
80%	1	2.56
100%	37	94.87
Total	39	100



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	39	14	4	4	8	5
%	100	35.90	10.26	10.26	20.51	12.82

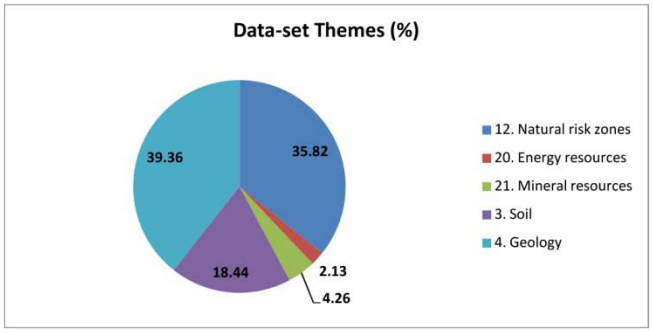
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
MINERAL	38.46	15
SOIL	10.26	4
MINING	10.26	4
UNKNOWN	7.69	3
HYDRO	7.69	3
GEOLITH	5.13	2
GEOPHYS	5.13	2
SEA	5.13	2
VOLCANO	2.56	1
FIRE	2.56	1
CHEMISTRY	2.56	1
EARTHQUAKE	2.56	1
Total	100	39

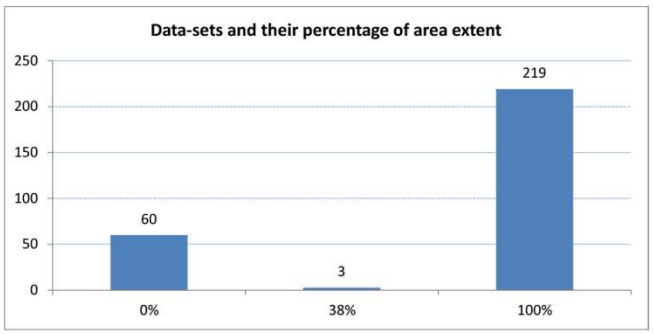


Italy

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	35.82	101
20. Energy resources	2.13	6
21. Mineral resources	4.26	12
3. Soil	18.44	52
4. Geology	39.36	111
Total	**100**	**282**



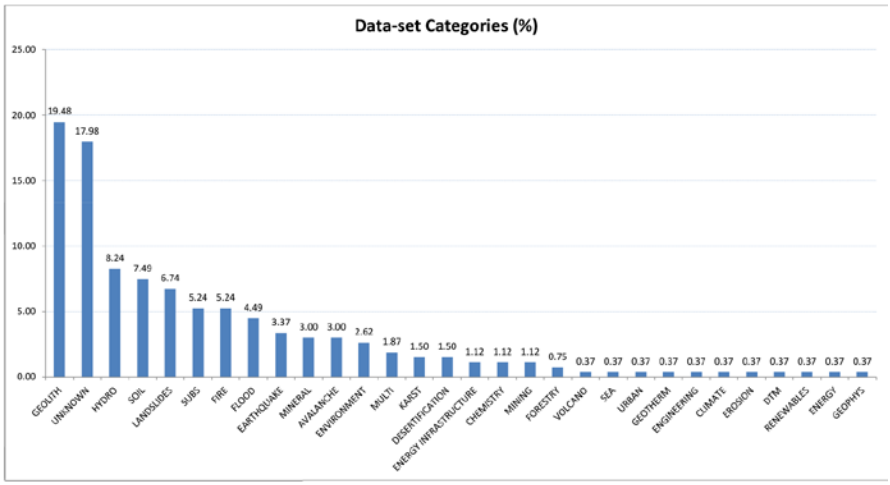
Coverage	Data-sets	Data-sets (%)
0%	60	21.28
38%	3	1.06
100%	219	77.66
Total	**282**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	282	233	186	184	170	129
%	100	82.62	65.96	65.25	60.28	45.74

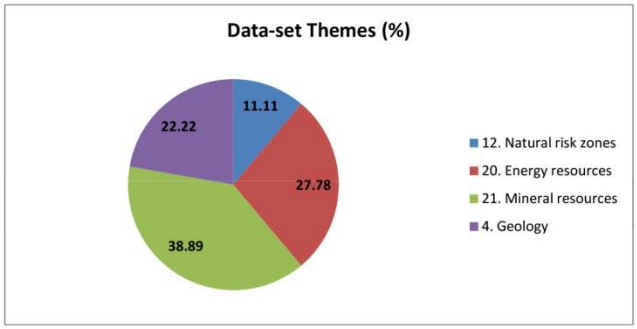
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	19.48	52
UNKNOWN	17.98	48
HYDRO	8.24	22
SOIL	7.49	20
LANDSLIDES	6.74	18
SUBS	5.24	14
FIRE	5.24	14
FLOOD	4.49	12
EARTHQUAKE	3.37	9
MINERAL	3.00	8
AVALANCHE	3.00	8
ENVIRONMENT	2.62	7
MULTI	1.87	5
KARST	1.50	4
DESERTIFICATION	1.50	4
ENERGY INFRASTRUCTURE	1.12	3
CHEMISTRY	1.12	3
MINING	1.12	3
FORESTRY	0.75	2
VOLCANO	0.37	1
SEA	0.37	1
URBAN	0.37	1
GEOTHERM	0.37	1
ENGINEERING	0.37	1
CLIMATE	0.37	1
EROSION	0.37	1
DTM	0.37	1
RENEWABLES	0.37	1
ENERGY	0.37	1
GEOPHYS	0.37	1
Total	100	267

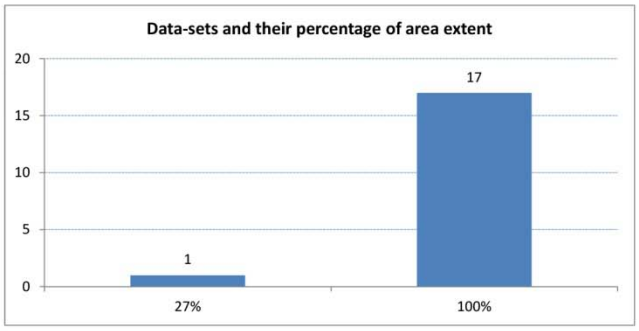


Latvia

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	11.11	2
20. Energy resources	27.78	5
21. Mineral resources	38.89	7
4. Geology	22.22	4
Total	**100**	**18**



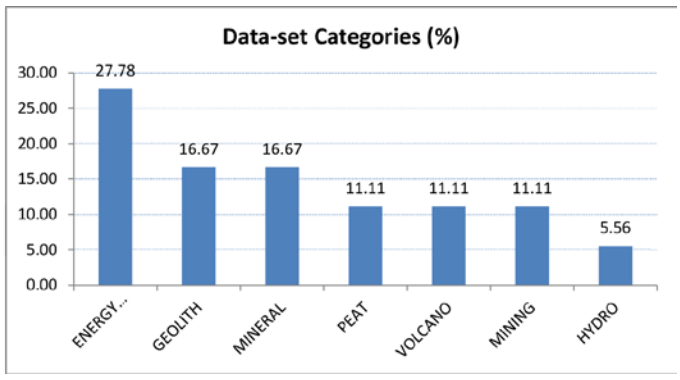
Coverage	Data-sets	Data-sets (%)
27%	1	5.56
100%	17	94.44
Total	**18**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	18	8	9	9	18	9
%	100	44.44	50.00	50.00	100.00	50.00

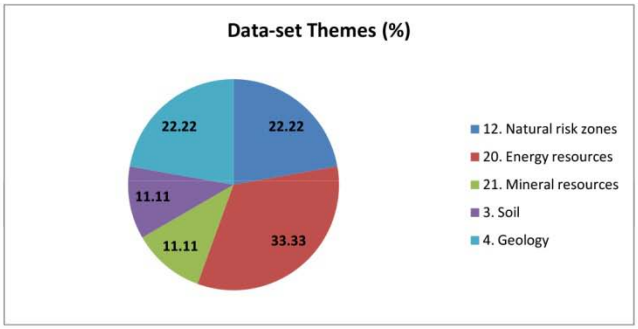
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
ENERGY INFRASTRUCTURE	27.78	5
GEOLITH	16.67	3
MINERAL	16.67	3
PEAT	11.11	2
VOLCANO	11.11	2
MINING	11.11	2
HYDRO	5.56	1
Total	**100**	**18**

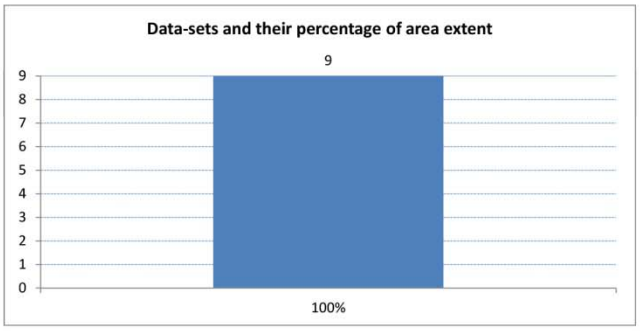


Lithuania

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	22.22	2
20. Energy resources	33.33	3
21. Mineral resources	11.11	1
3. Soil	11.11	1
4. Geology	22.22	2
Total	**100**	**9**



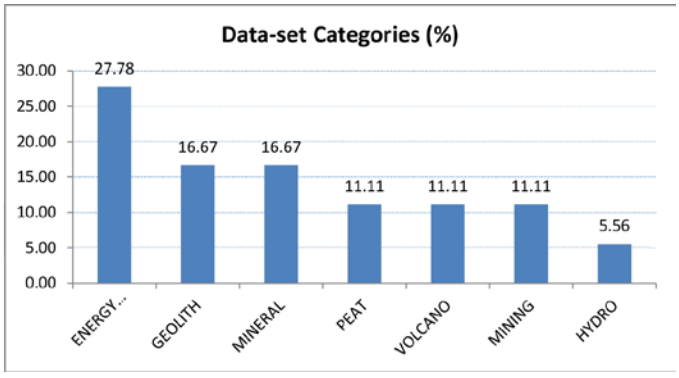
Coverage	Data-sets	Data-sets (%)
100%	9	100
Total	**9**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	9	9	9	9	1	1
%	100	100.00	100.00	100.00	11.11	11.11

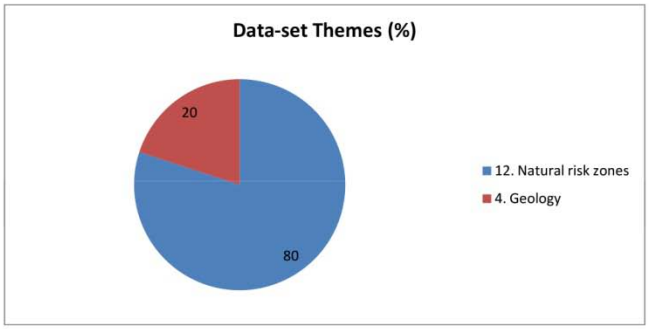
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
ENERGY INFRASTRUCTURE	27.78	5
GEOLITH	16.67	3
MINERAL	16.67	3
PEAT	11.11	2
VOLCANO	11.11	2
MINING	11.11	2
HYDRO	5.56	1
Total	**100**	**18**

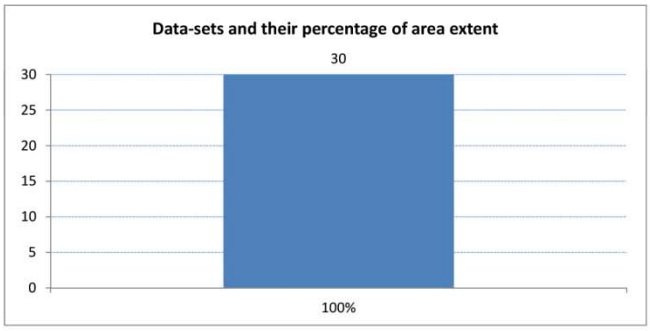


Luxembourg

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	80	24
4. Geology	20	6
Total	**100**	**30**



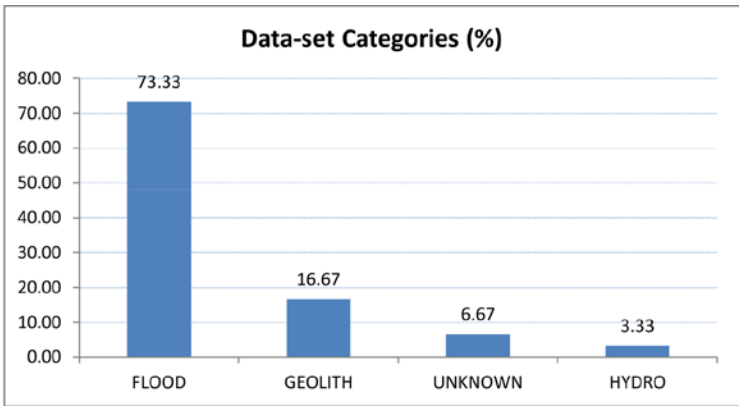
Coverage	Data-sets	Data-sets (%)
100%	30	100
Total	**30**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	30	30	30	30	30	30
%	100	100.00	100.00	100.00	100.00	100.00

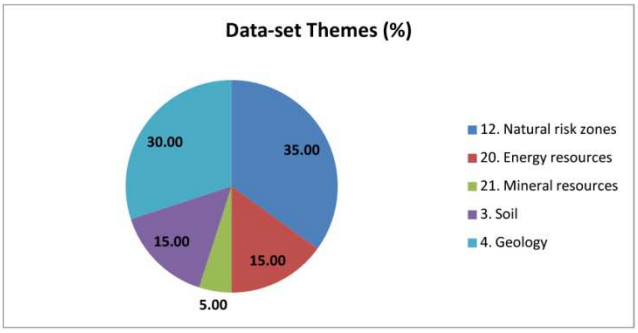
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
FLOOD	73.33	22
GEOLITH	16.67	5
UNKNOWN	6.67	2
HYDRO	3.33	1
Total	**100**	**30**

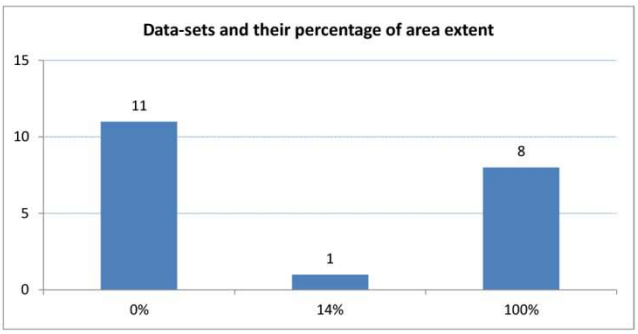


Netherlands

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	35.00	7
20. Energy resources	15.00	3
21. Mineral resources	5.00	1
3. Soil	15.00	3
4. Geology	30.00	6
Total	**100**	**20**



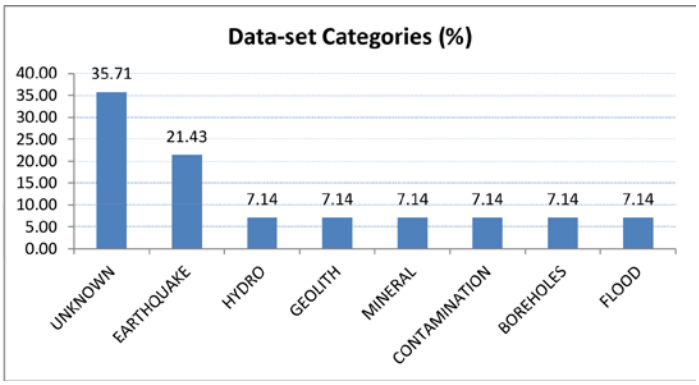
Coverage	Data-sets	Data-sets (%)
0%	11	55.00
14%	1	5.00
100%	8	40.00
Total	**20**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	20	9	6	9	9	9
%	100	45.00	30.00	45.00	45.00	45.00

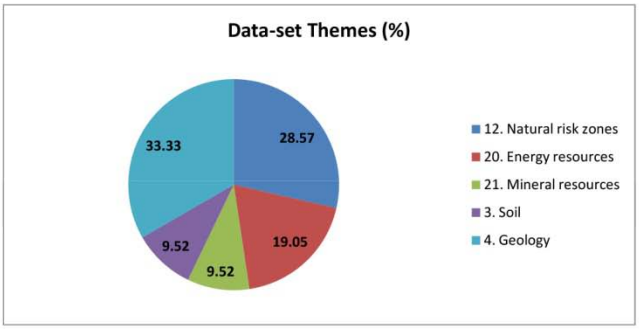
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
UNKNOWN	35.71	5
EARTHQUAKE	21.43	3
HYDRO	7.14	1
GEOLITH	7.14	1
MINERAL	7.14	1
CONTAMINATION	7.14	1
BOREHOLES	7.14	1
FLOOD	7.14	1
Total	**100**	**14**

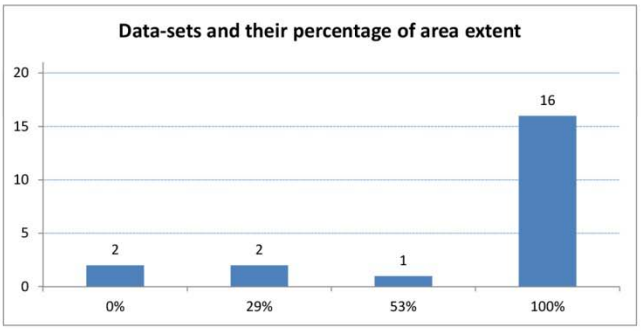


Norway

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	28.57	6
20. Energy resources	19.05	4
21. Mineral resources	9.52	2
3. Soil	9.52	2
4. Geology	33.33	7
Total	**100**	**21**



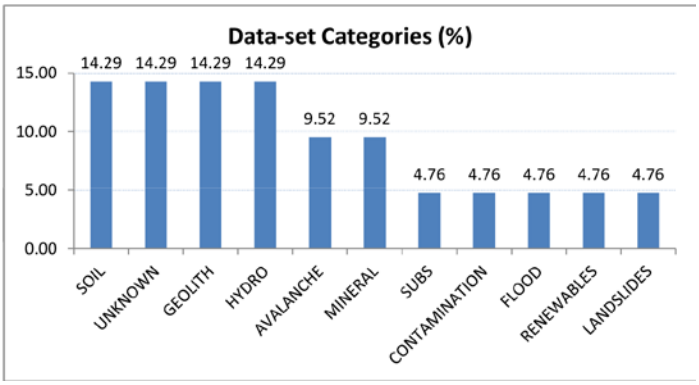
Coverage	Data-sets	Data-sets (%)
0%	2	9.52
29%	2	9.52
53%	1	4.76
100%	16	76.19
Total	**21**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	21	13	0	12	18	10
%	100	61.90	0.00	57.14	85.71	47.62

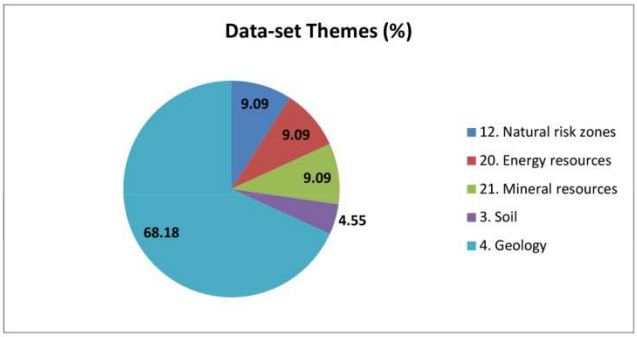
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
SOIL	14.29	3
UNKNOWN	14.29	3
GEOLITH	14.29	3
HYDRO	14.29	3
AVALANCHE	9.52	2
MINERAL	9.52	2
SUBS	4.76	1
CONTAMINATION	4.76	1
FLOOD	4.76	1
RENEWABLES	4.76	1
LANDSLIDES	4.76	1
Total	**100**	**21**

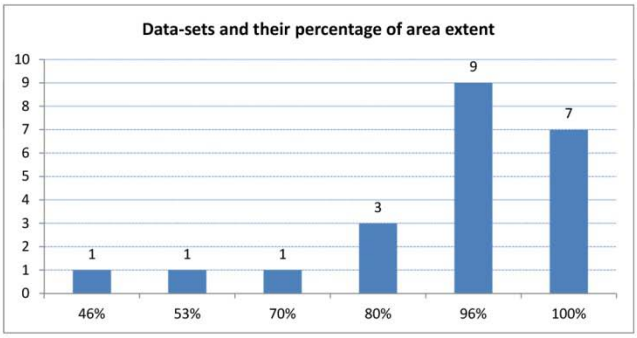


Poland

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	9.09	2
20. Energy resources	9.09	2
21. Mineral resources	9.09	2
3. Soil	4.55	1
4. Geology	68.18	15
Total	**100**	**22**



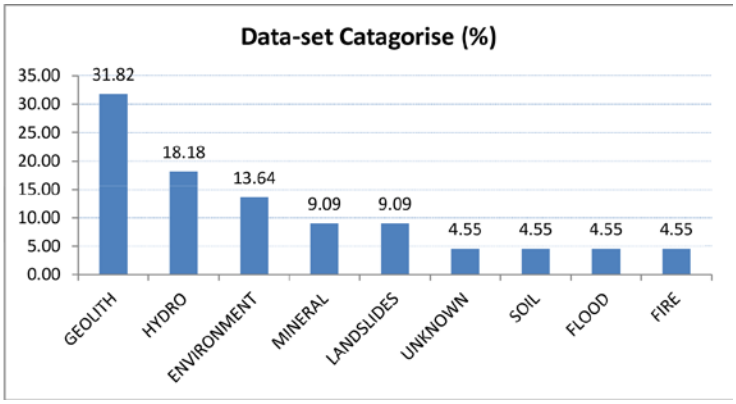
Coverage	Data-sets	Data-sets (%)
46%	1	4.55
53%	1	4.55
70%	1	4.55
80%	3	13.64
96%	9	40.91
100%	7	31.82
Total	**22**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloads
Count	22	20	18	18	21	1
%	100	90.91	81.82	81.82	95.45	4.55

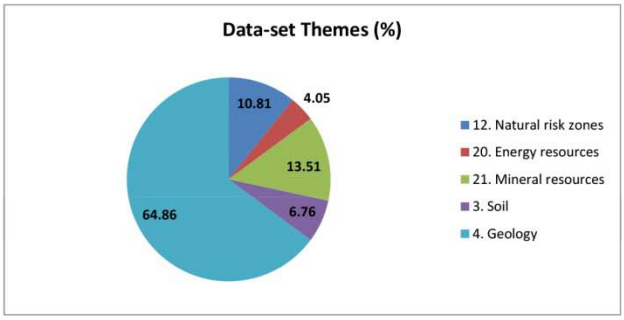
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	31.82	7
HYDRO	18.18	4
ENVIRONMENT	13.64	3
MINERAL	9.09	2
LANDSLIDES	9.09	2
UNKNOWN	4.55	1
SOIL	4.55	1
FLOOD	4.55	1
FIRE	4.55	1
Total	**100**	**22**

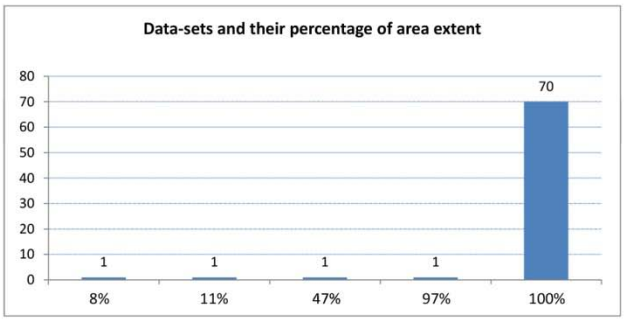


Portugal

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	10.81	8
20. Energy resources	4.05	3
21. Mineral resources	13.51	10
3. Soil	6.76	5
4. Geology	64.86	48
Total	100	74



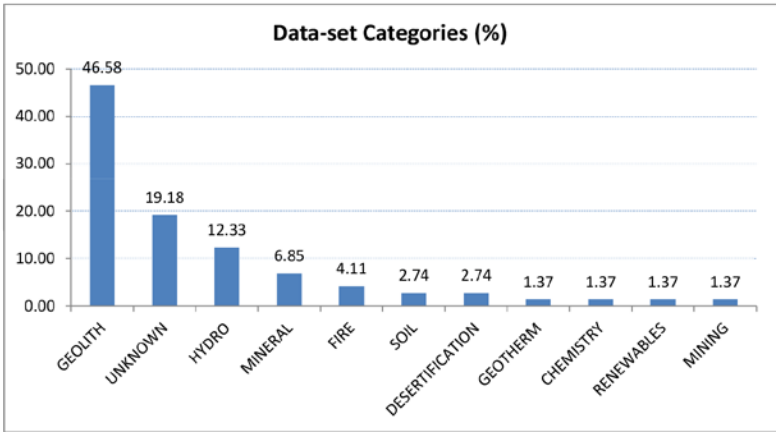
Coverage	Count of Country	Data-sets (%)
8%	1	1.35
11%	1	1.35
47%	1	1.35
97%	1	1.35
100%	70	94.59
Total	74	100.00



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	74	71	65	12	6	6
%	100	95.95	87.84	16.22	8.11	8.11

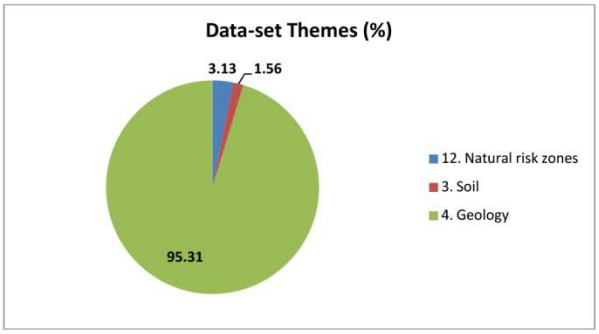
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	46.58	34
UNKNOWN	19.18	14
HYDRO	12.33	9
MINERAL	6.85	5
FIRE	4.11	3
SOIL	2.74	2
DESERTIFICATION	2.74	2
GEOTHERM	1.37	1
CHEMISTRY	1.37	1
RENEWABLES	1.37	1
MINING	1.37	1
Total	100	73

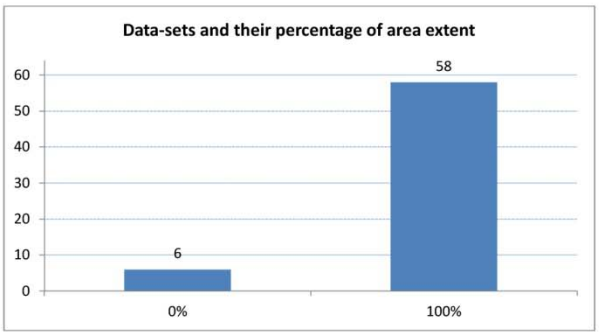


Slovakia

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	3.13	2
3. Soil	1.56	1
4. Geology	95.31	61
Total	**100**	**64**



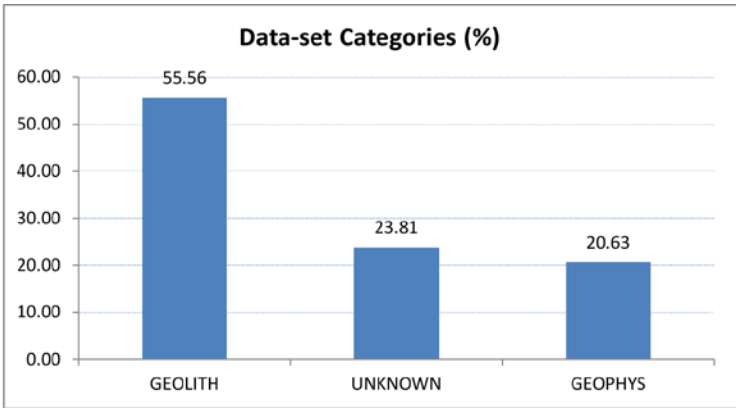
Coverage	Data-sets	Data-sets (%)
0%	6	9.38
100%	58	90.63
Total	**64**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	64	61	61	61	1	0
%	100	95.31	95.31	95.31	1.56	0.00

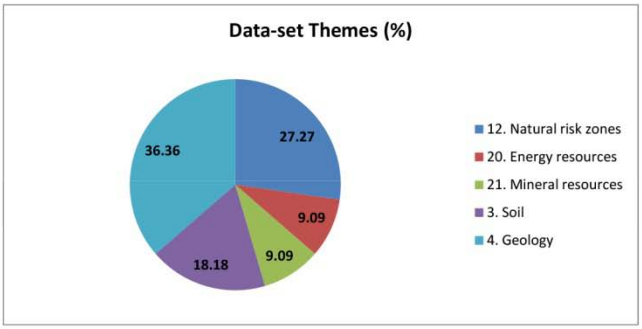
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	55.56	35
UNKNOWN	23.81	15
GEOPHYS	20.63	13
Total	**100**	**63**

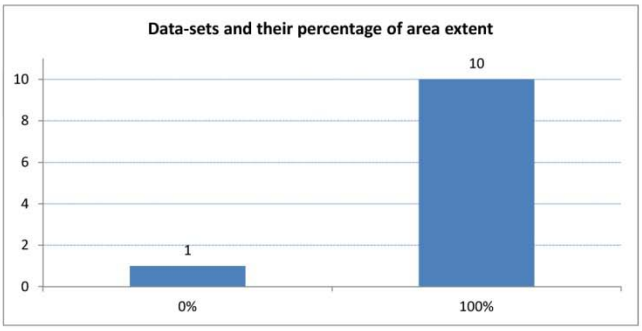


Slovenia

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	27.27	3
20. Energy resources	9.09	1
21. Mineral resources	9.09	1
3. Soil	18.18	2
4. Geology	36.36	4
Total	**100**	**11**



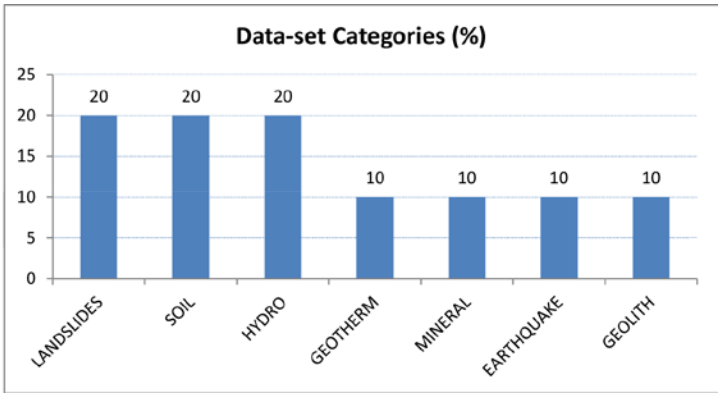
Coverage	Data-sets	Data-sets (%)
0%	1	9.09
100%	10	90.91
Total	**11**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	11	9	0	10	10	3
%	100	81.82	0.00	90.91	90.91	27.27

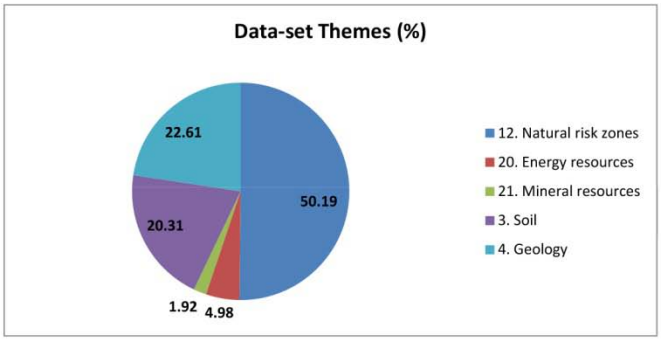
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
LANDSLIDES	20	2
SOIL	20	2
HYDRO	20	2
GEOTHERM	10	1
MINERAL	10	1
EARTHQUAKE	10	1
GEOLITH	10	1
Total	**100**	**10**

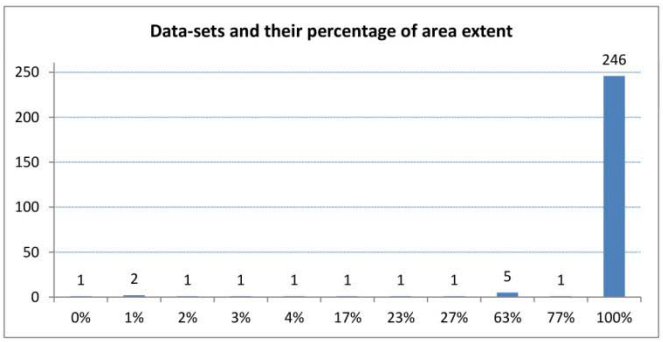


Spain

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	50.19	131
20. Energy resources	4.98	13
21. Mineral resources	1.92	5
3. Soil	20.31	53
4. Geology	22.61	59
Total	**100**	**261**



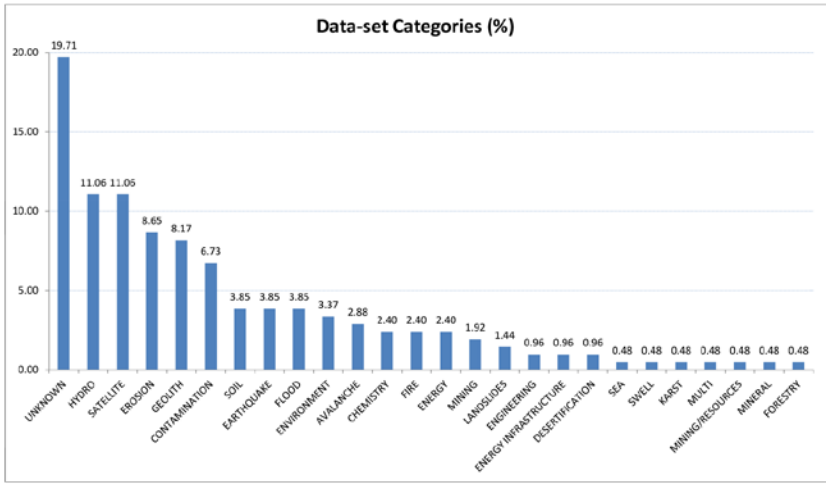
Coverage	Data-sets	Data-sets (%)
0%	1	0.38
1%	2	0.77
2%	1	0.38
3%	1	0.38
4%	1	0.38
17%	1	0.38
23%	1	0.38
27%	1	0.38
63%	5	1.92
77%	1	0.38
100%	246	94.25
Total	**261**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	261	255	58	190	136	24
%	100	97.70	21.71	15.81	8.24	0.76

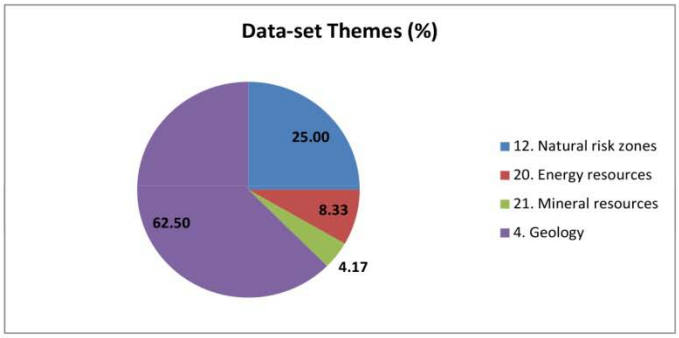
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
UNKNOWN	19.71	41
HYDRO	11.06	23
SATELLITE	11.06	23
EROSION	8.65	18
GEOLITH	8.17	17
CONTAMINATION	6.73	14
SOIL	3.85	8
EARTHQUAKE	3.85	8
FLOOD	3.85	8
ENVIRONMENT	3.37	7
AVALANCHE	2.88	6
CHEMISTRY	2.40	5
FIRE	2.40	5
ENERGY	2.40	5
MINING	1.92	4
LANDSLIDES	1.44	3
ENGINEERING	0.96	2
ENERGY INFRASTRUCTURE	0.96	2
DESERTIFICATION	0.96	2
SEA	0.48	1
SWELL	0.48	1
KARST	0.48	1
MULTI	0.48	1
MINING/RESOURCES	0.48	1
MINERAL	0.48	1
FORESTRY	0.48	1
Total	100	208

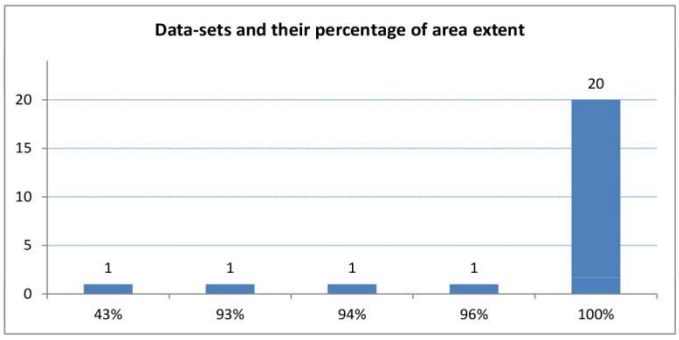


Sweden

Themes	Values Data-sets (%)	Data-sets
12. Natural risk z	25.00	6
20. Energy resou	8.33	2
21. Mineral reso	4.17	1
4. Geology	62.50	15
Total	**100**	**24**



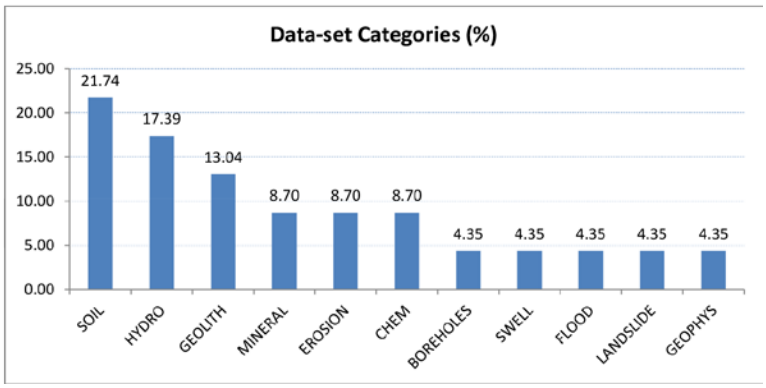
Coverage	Data-sets	Data-sets (%)
43%	1	4.17
93%	1	4.17
94%	1	4.17
96%	1	4.17
100%	20	83.33
Total	**24**	**100**



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	24	24	22	20	13	2
%	100	100.00	91.67	83.33	54.17	8.33

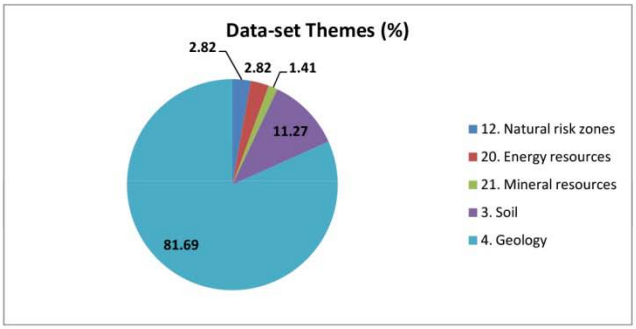
Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
SOIL	21.74	5
HYDRO	17.39	4
GEOLITH	13.04	3
MINERAL	8.70	2
EROSION	8.70	2
CHEM	8.70	2
BOREHOLES	4.35	1
SWELL	4.35	1
FLOOD	4.35	1
LANDSLIDE	4.35	1
GEOPHYS	4.35	1
Total	**100**	**23**

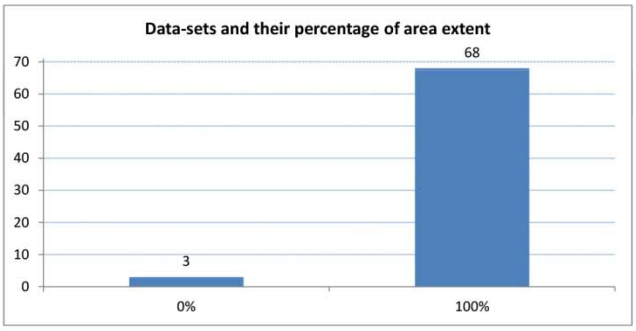


United Kingdom

Themes	Values Data-sets (%)	Data-sets
12. Natural risk zones	2.82	2
20. Energy resources	2.82	2
21. Mineral resources	1.41	1
3. Soil	11.27	8
4. Geology	81.69	58
Total	100	71



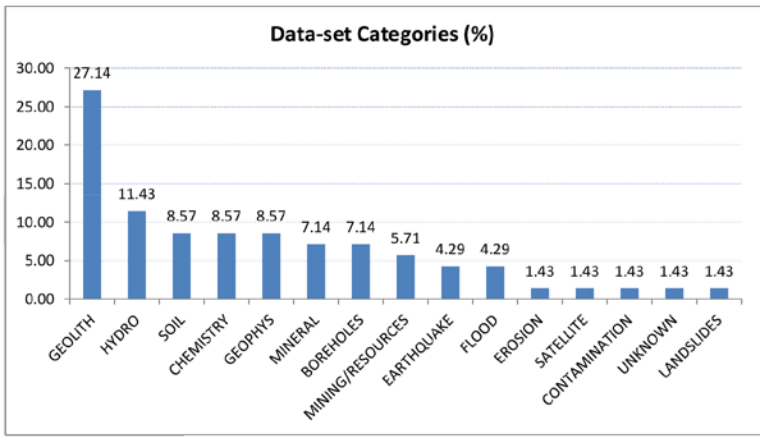
Coverage	Data-sets	Data-sets (%)
0%	3	4.23
100%	68	95.77
Total	71	100



	Values Data-sets	MetaData	Compliant MetaData	MetaData access	Viewable	Downloadable
Count	71	60	58	58	58	0
%	100	84.51	81.69	81.69	81.69	0.00

Subcategories derived from INSPIRE Indicator theme descriptions.

Categories	Values Data-sets (%)	Data-sets
GEOLITH	27.14	19
HYDRO	11.43	8
SOIL	8.57	6
CHEMISTRY	8.57	6
GEOPHYS	8.57	6
MINERAL	7.14	5
BOREHOLES	7.14	5
MINING/RESOURCES	5.71	4
EARTHQUAKE	4.29	3
FLOOD	4.29	3
EROSION	1.43	1
SATELLITE	1.43	1
CONTAMINATION	1.43	1
UNKNOWN	1.43	1
LANDSLIDES	1.43	1
Total	100	70



Appendix 2: Questionnaire

An example of the questionnaire template distributed to all NGSOs and other Europe-wide organisations requesting details of additional datasets held within their organisations.

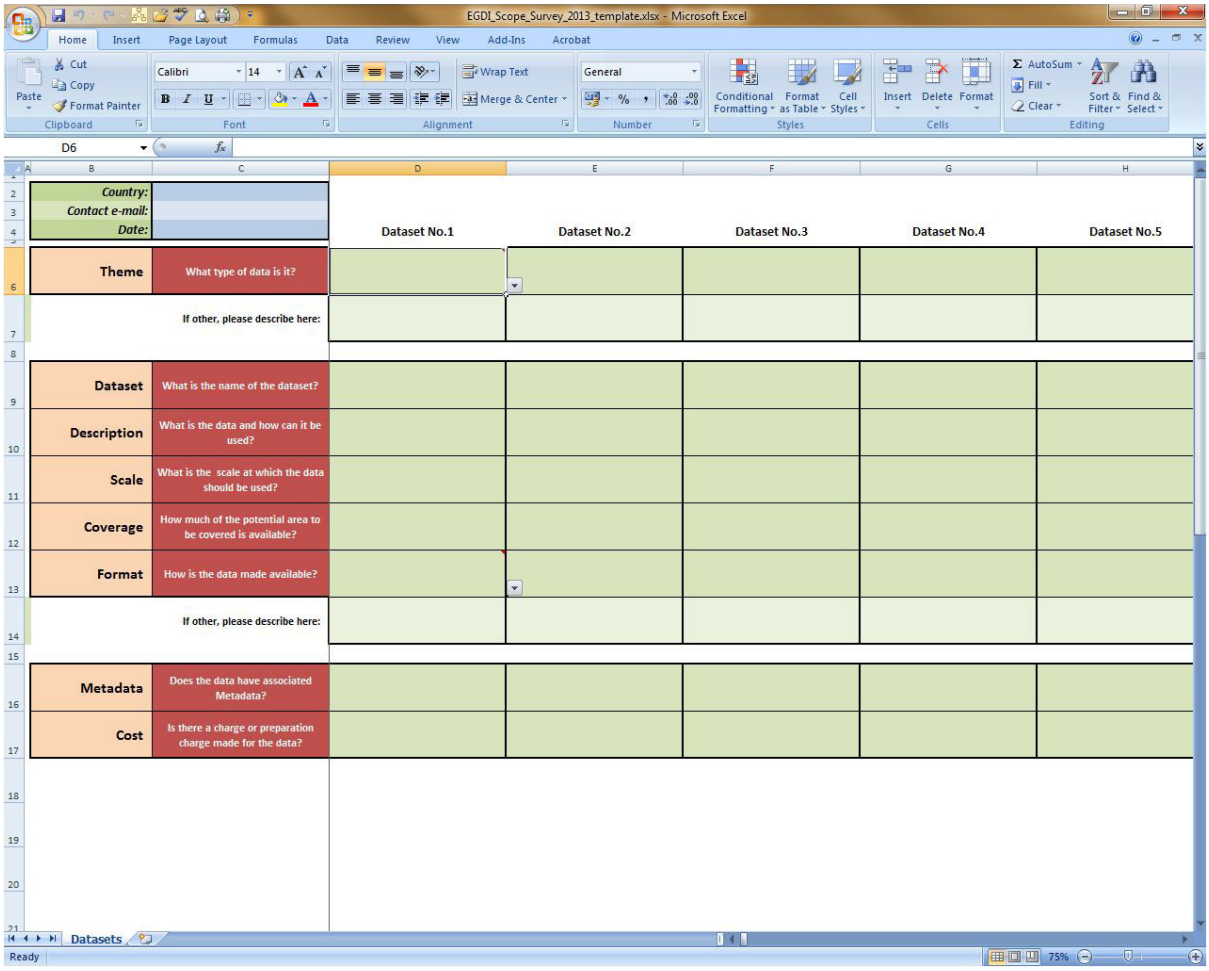


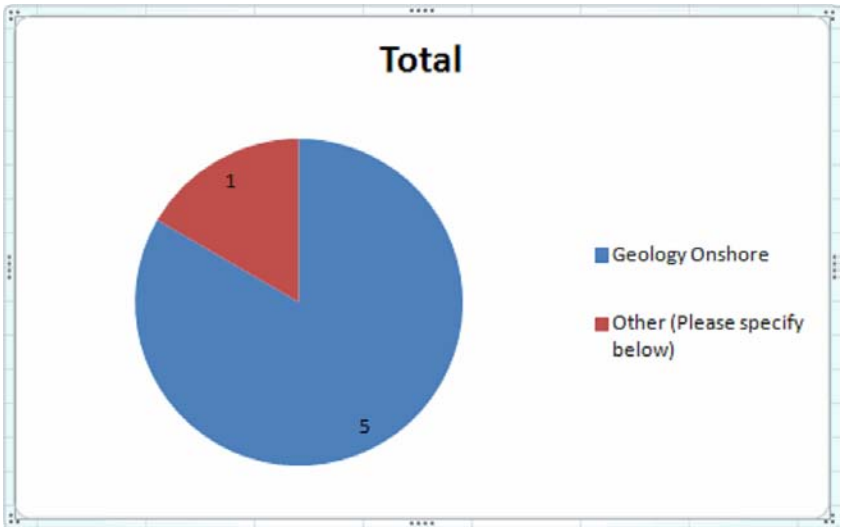
Figure 5: Questionnaire interface

Appendix 3: Questionnaire results (summary)

All questionnaire returns are collated, summarized and presented for each member state. Missing data or erroneous entries are corrected, where possible.

Austria

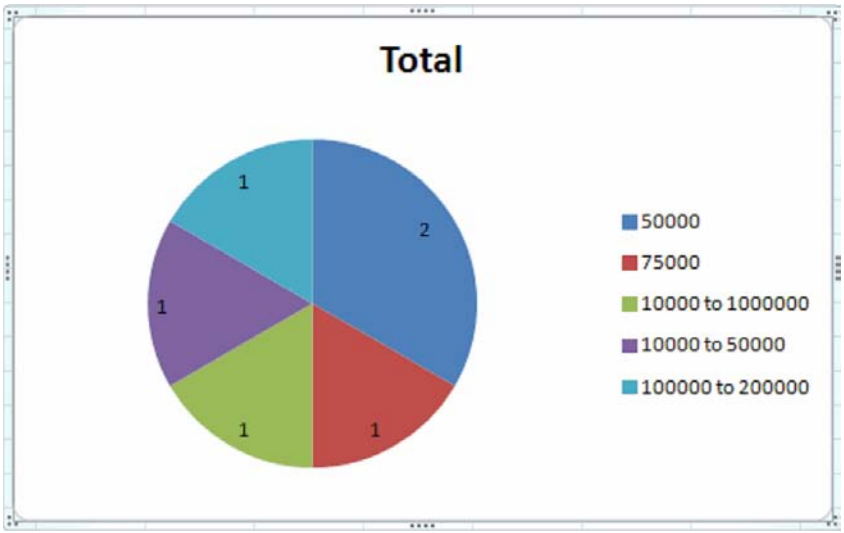
Theme



Theme	Count of Theme	%
Geology Onshore	5	83.3
Other (Please specify below)	1	16.7
Grand Total	6	100.0

Other theme =’Geoscientific vocabulary’

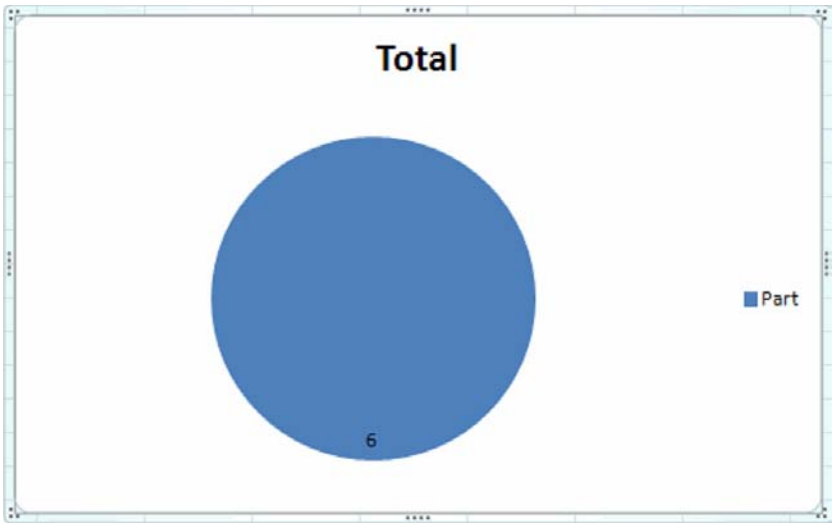
Scale



Scale	Count of Scale	%
50000	2	33.3

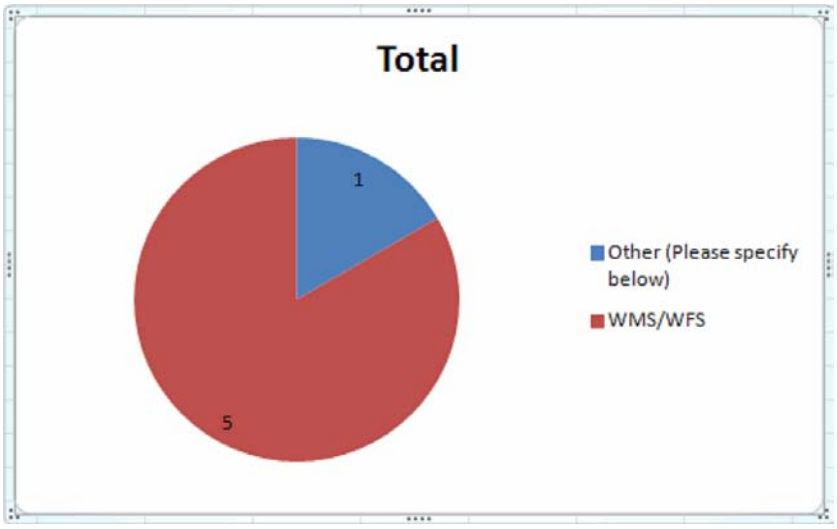
75000	1	16.7
10000 to 1000000	1	16.7
10000 to 50000	1	16.7
100000 to 200000	1	16.7
Grand Total	6	100.0

Coverage



Coverage	Count of Coverage	%
Part	6	100.0
Grand Total	6	100.0

Format

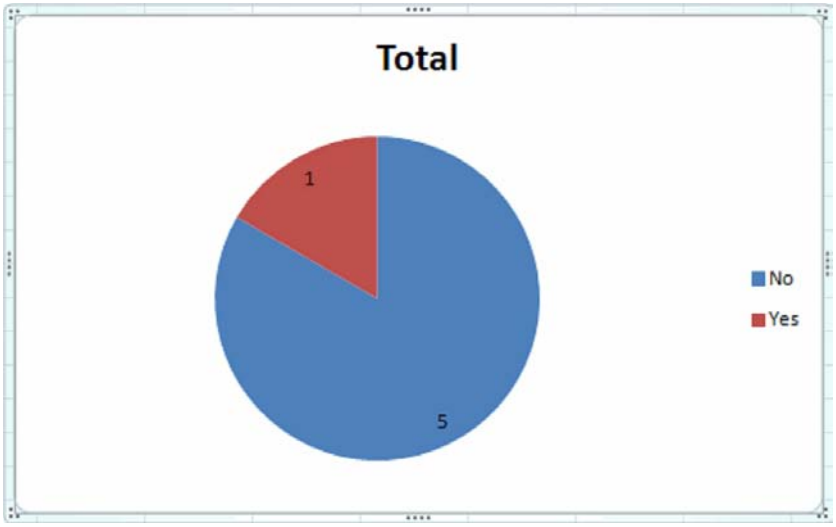


Format	Count of Format	%
Other (Please specify below)	1	16.7
WMS/WFS	5	83.3
Grand Total	6	100.0

Other formats:

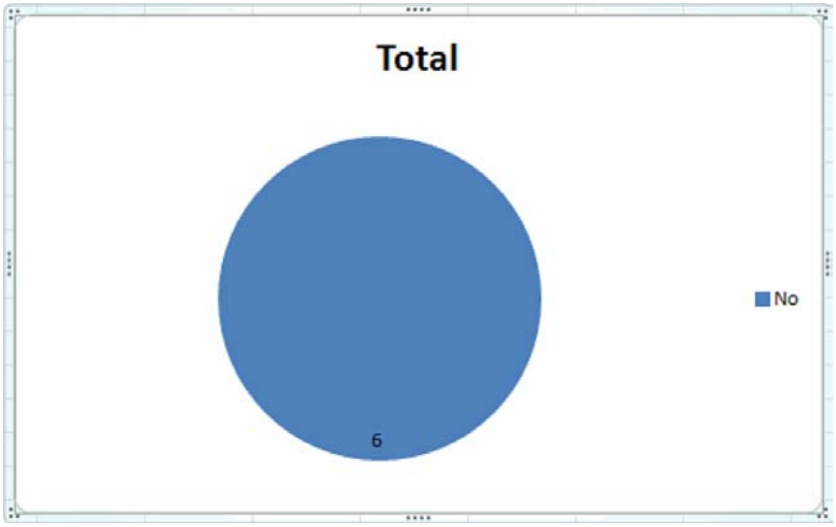
add. ArcGIS-Imageservice x5 (WMS entries) and RDF, XML, SKOS.

Metadata



Metadata	Count of Metadata	%
No	5	83.3
Yes	1	16.7
Grand Total	6	100.0

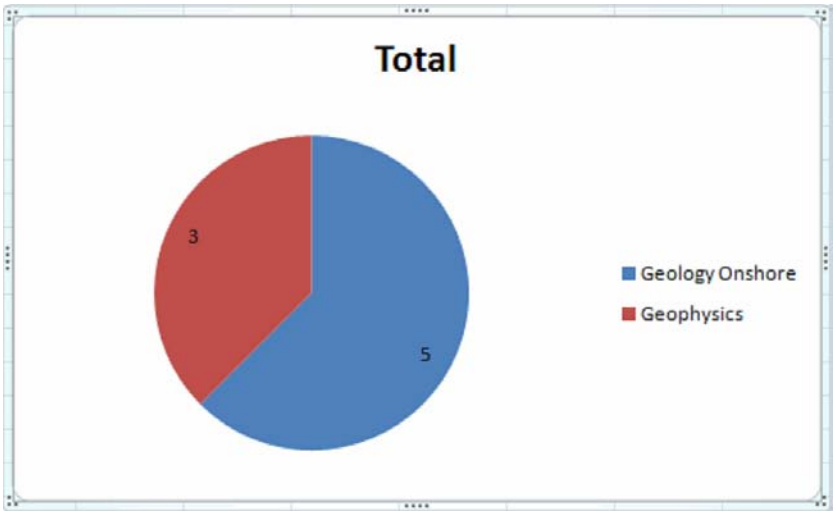
Cost



Cost	Count of Cost	%
No	6	100.0
Grand Total	6	100.0

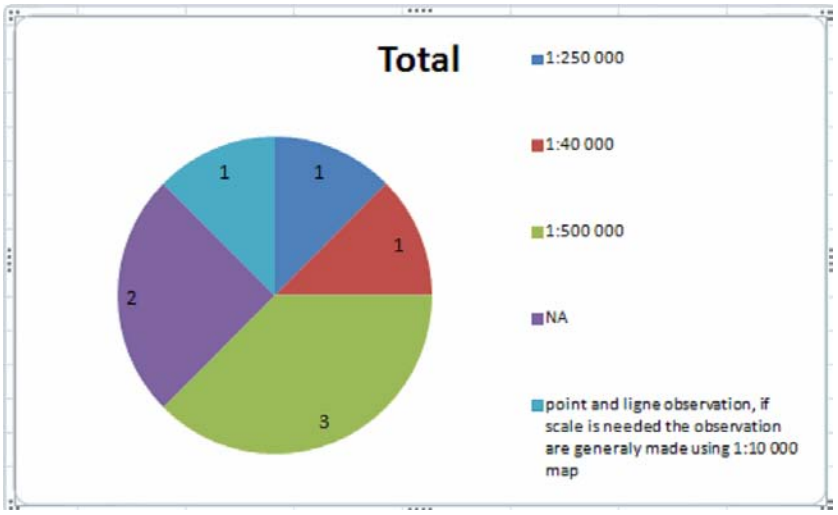
Belgium

Theme



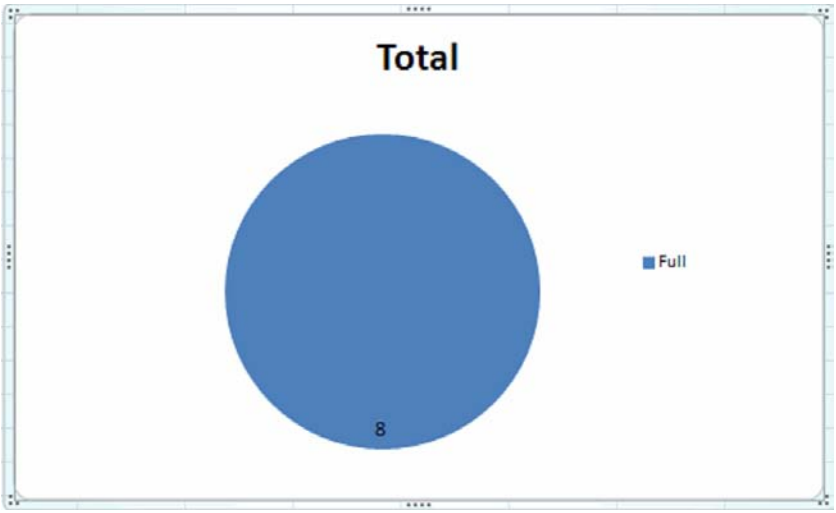
Theme	Count of Theme	%
Geology Onshore	5	62.5
Geophysics	3	37.5
Grand Total	8	100

Scale



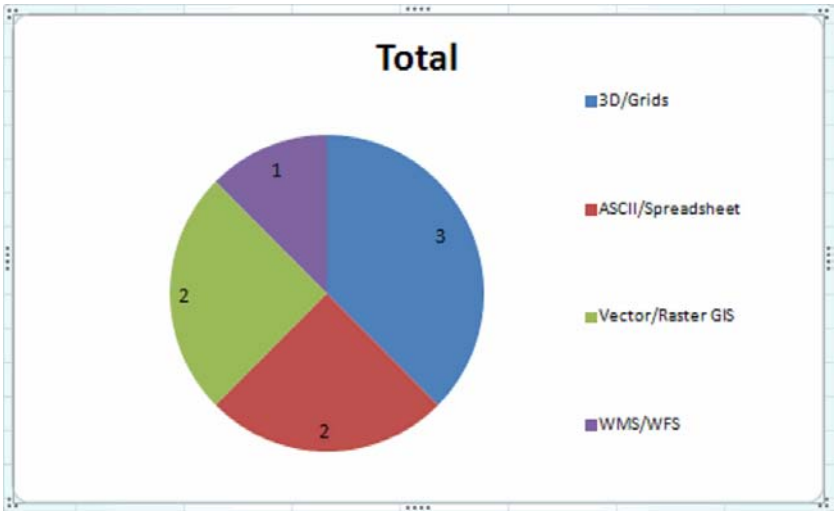
Scale	Count of Scale	%
1:250 000	1	12.5
1:40 000	1	12.5
1:500 000	3	37.5
NA	2	25
1:10 000	1	12.5
Grand Total	8	100

Coverage



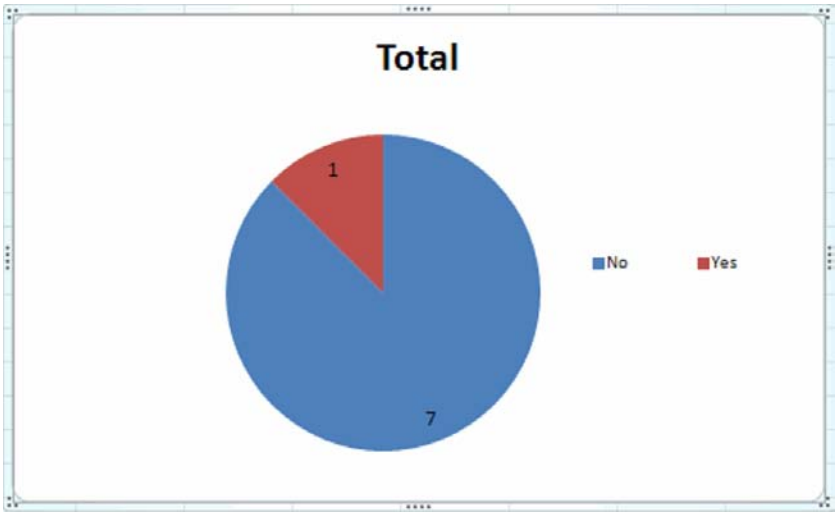
Coverage	Count of Coverage	%
Full	8	100
Grand Total	8	100

Format



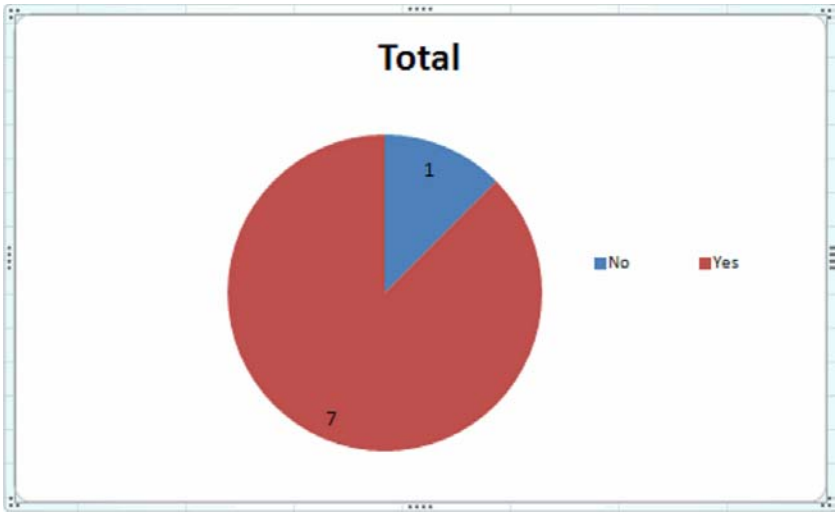
Format	Count of Format	%
3D/Grids	3	37.5
ASCII/Spreadsheet	2	25
Vector/Raster GIS	2	25
WMS/WFS	1	12.5
Grand Total	8	100

Metadata



Metadata	Count of Metadata	%
No	7	87.5
Yes	1	12.5
Grand Total	8	100

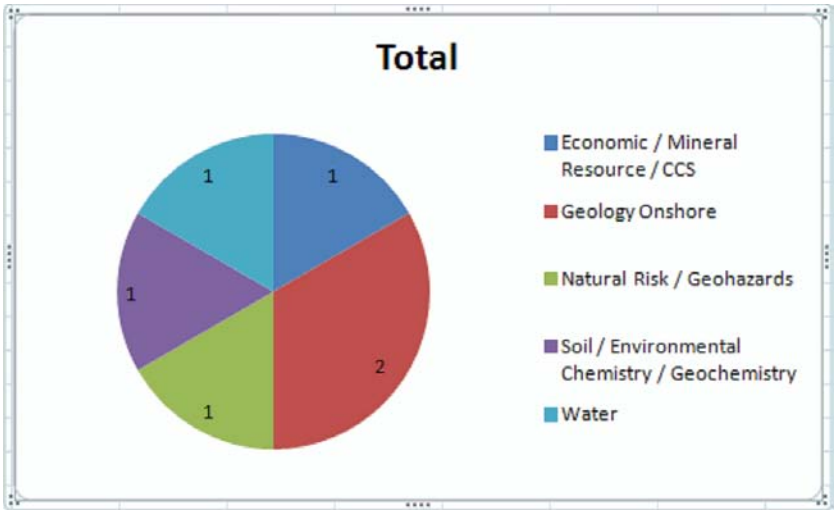
Cost



Cost	Count of Cost	%
No	1	12.5
Yes	7	87.5
Grand Total	8	100

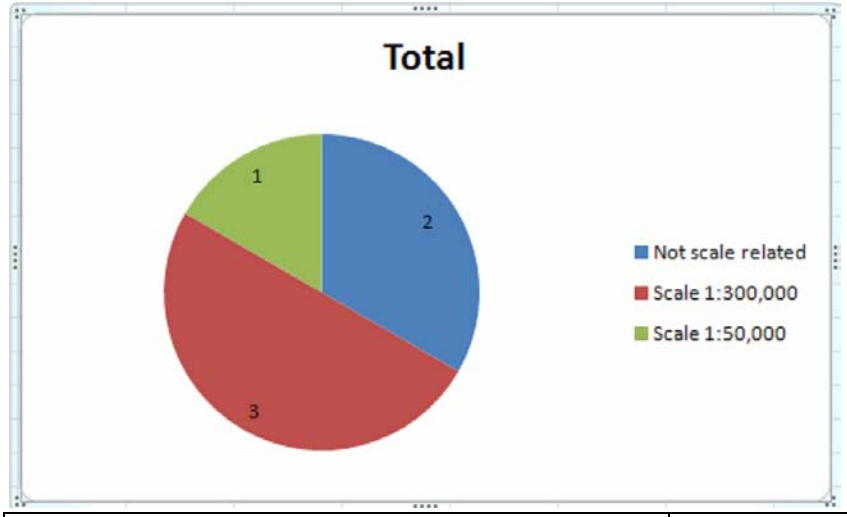
Croatia

Theme



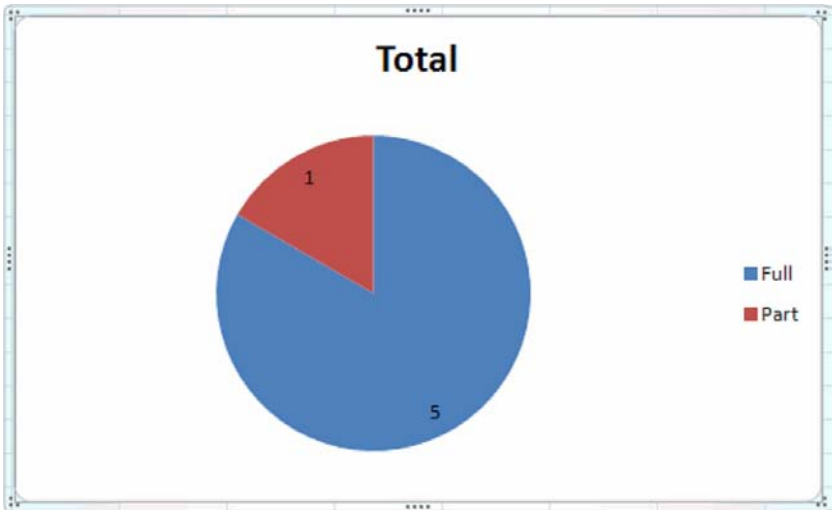
Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	16.7
Geology Onshore	2	33.3
Natural Risk / Geohazards	1	16.7
Soil / Environmental Chemistry / Geochemistry	1	16.7
Water	1	16.7
Grand Total	6	100.0

Scale



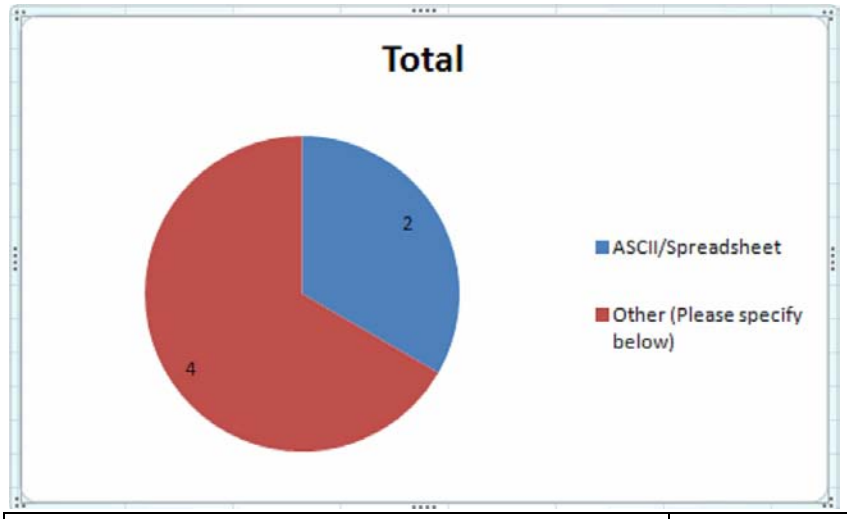
Scale	Count of Scale	%
Not scale related	2	33.3
Scale 1:300,000	3	50.0
Scale 1:50,000	1	16.7
Grand Total	6	100.0

Coverage



Coverage	Count of Coverage	%
Full	5	83.3
Part	1	16.7
Grand Total	6	100.0

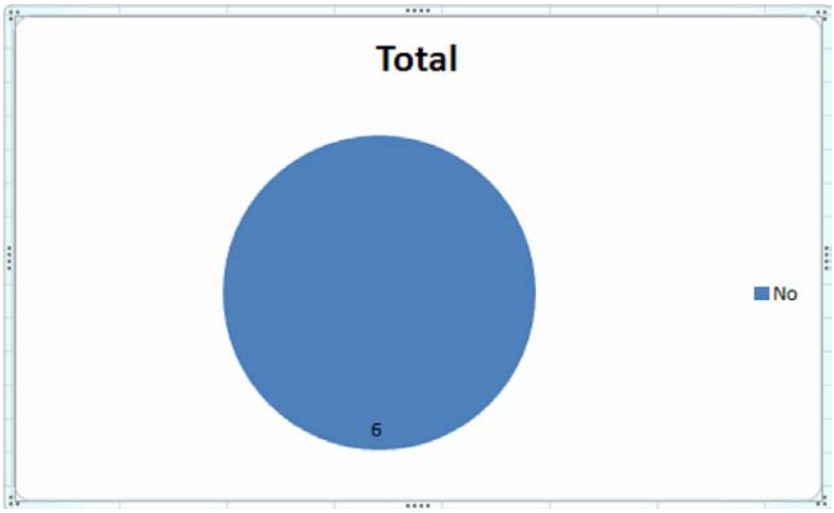
Format



Format	Count of Format	%
ASCII/Spreadsheet	2	33.3
Other (Please specify below)	4	66.7
Grand Total	6	100.0

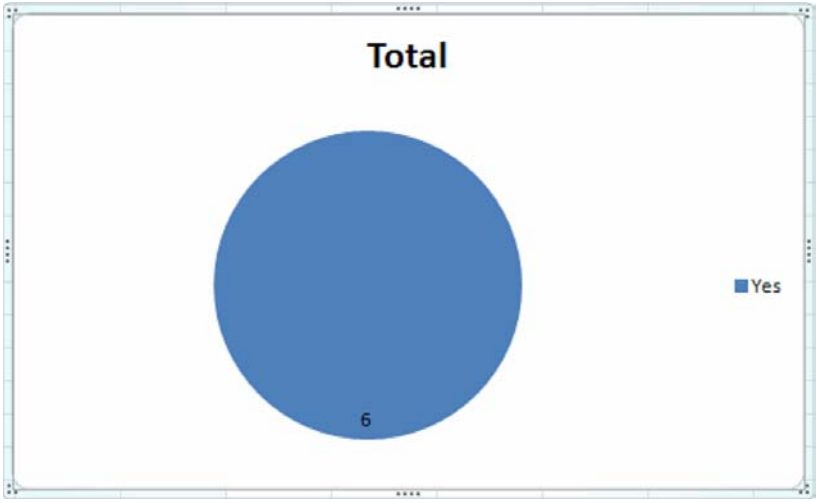
Other formats: Shapefile x4

Metadata



Metadata	Count of Metadata	%
No	6	100.0
Grand Total	6	100.0

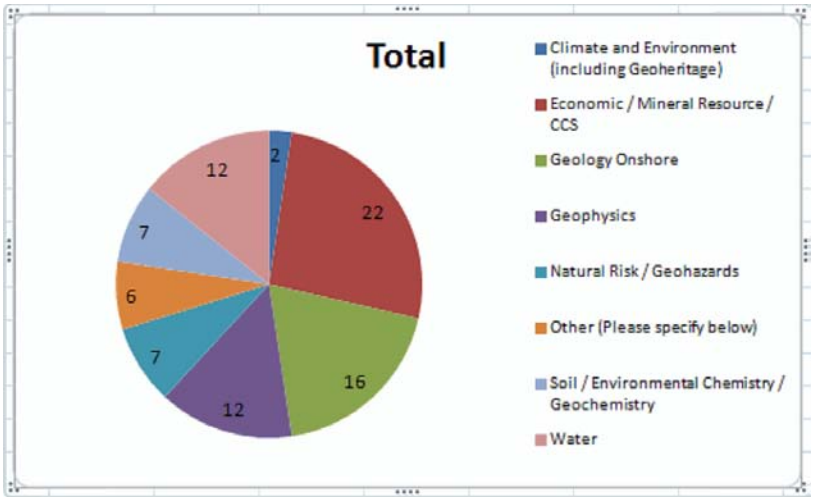
Cost



Cost	Count of Cost	%
Yes	6	100.0
Grand Total	6	100.0

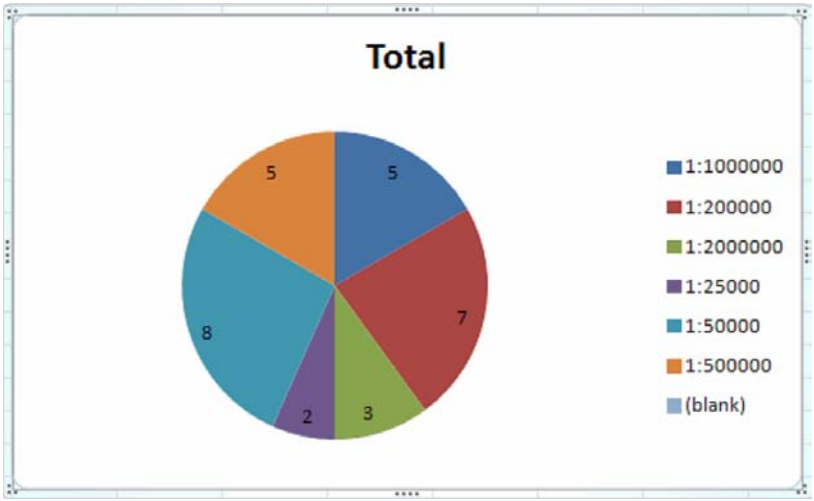
Czech Republic

Theme



Theme	Count of Theme	%
Climate and Environment (including Geoheritage)	2	2.4
Economic / Mineral Resource / CCS	22	26.2
Geology Onshore	16	19.0
Geophysics	12	14.3
Natural Risk / Geohazards	7	8.3
Other (Please specify below)	6	7.1
Soil / Environmental Chemistry / Geochemistry	7	8.3
Water	12	14.3
Grand Total	84	100.0

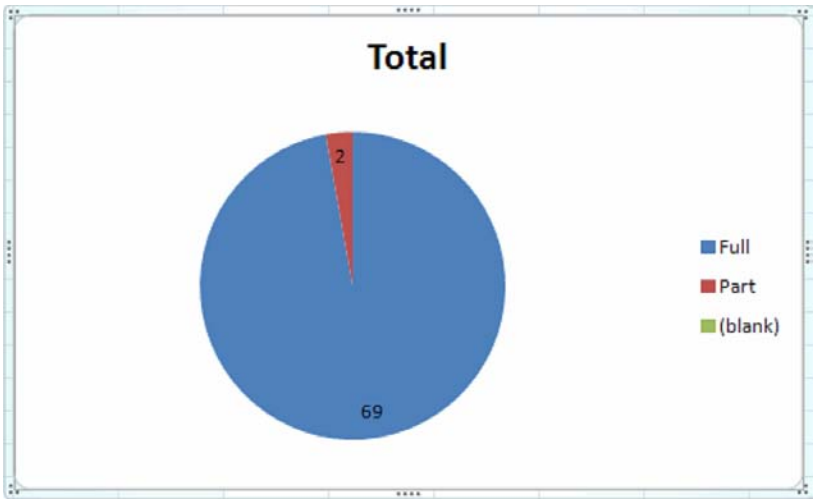
Scale



Scale	Count of Scale	%
1:1000000	5	6.0
1:200000	7	8.3
1:2000000	3	3.6

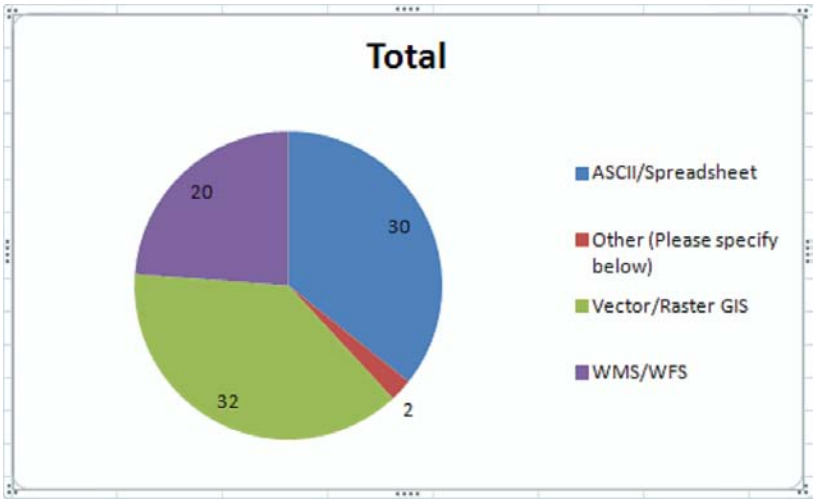
1:25000	2	2.4
1:50000	8	9.5
1:500000	5	6.0
(blank)	54	64.3
Grand Total	84	100.0

Coverage



Coverage	Count of Coverage	%
Full	69	82.1
Part	2	2.4
(blank)	13	15.5
Grand Total	84	100.0

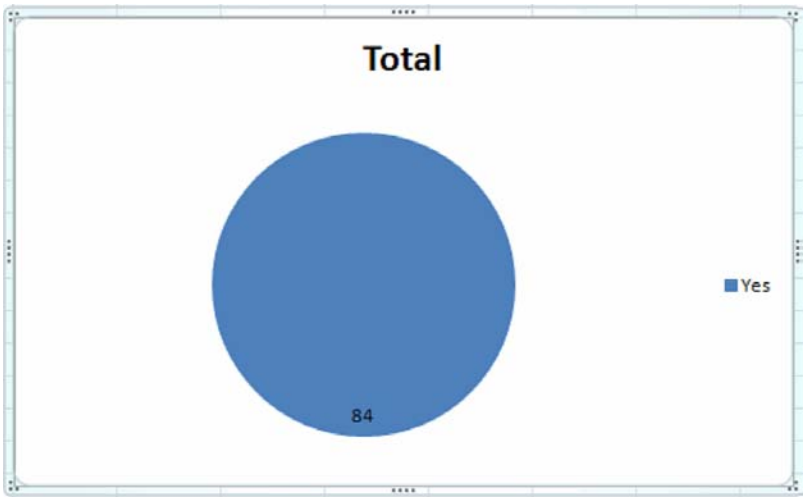
Format



Format	Count of Format	%
ASCII/Spreadsheet	30	35.7
Other (Please specify below)	2	2.4
Vector/Raster GIS	32	38.1

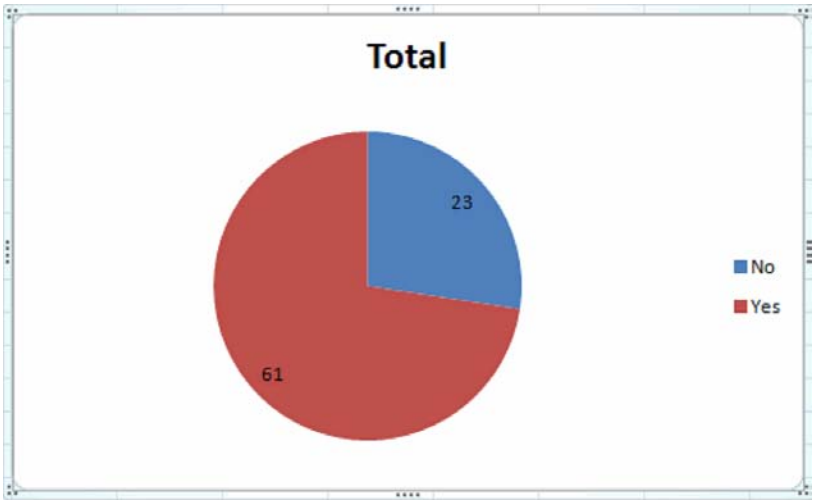
WMS/WFS	20	23.8
Grand Total	84	100.0

Metadata



Metadata	Count of Metadata	%
Yes	84	100.0
Grand Total	84	100.0

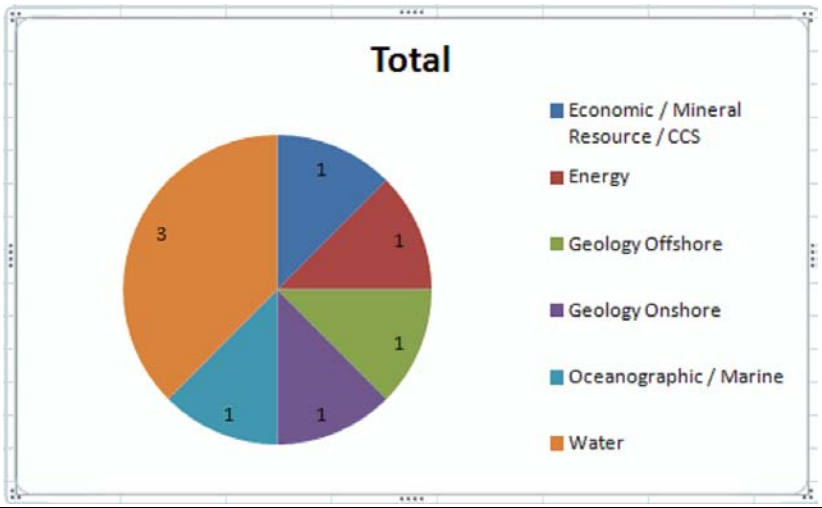
Cost



Cost	Count of Cost	%
No	23	27.4
Yes	61	72.6
Grand Total	84	100.0

Denmark

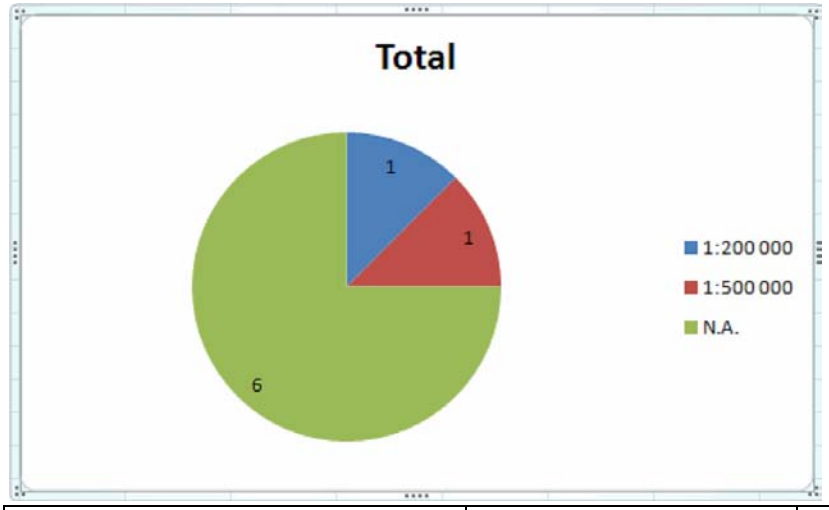
Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	12.5
Energy	1	12.5
Geology Offshore	1	12.5
Geology Onshore	1	12.5
Oceanographic / Marine	1	12.5
Water	3	37.5
Grand Total	8	100

Soil map classed as 'Geology onshore'.

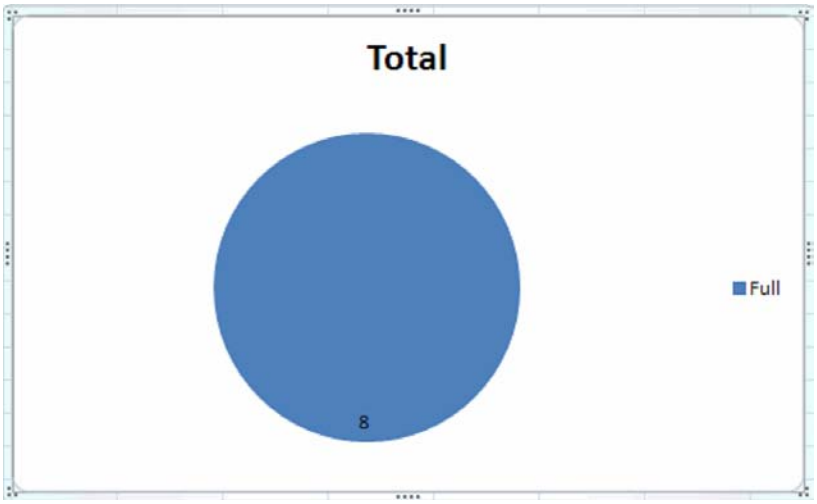
Scale



Scale	Count of Scale	%
1:200 000	1	12.5
1:500 000	1	12.5
N.A.	6	75

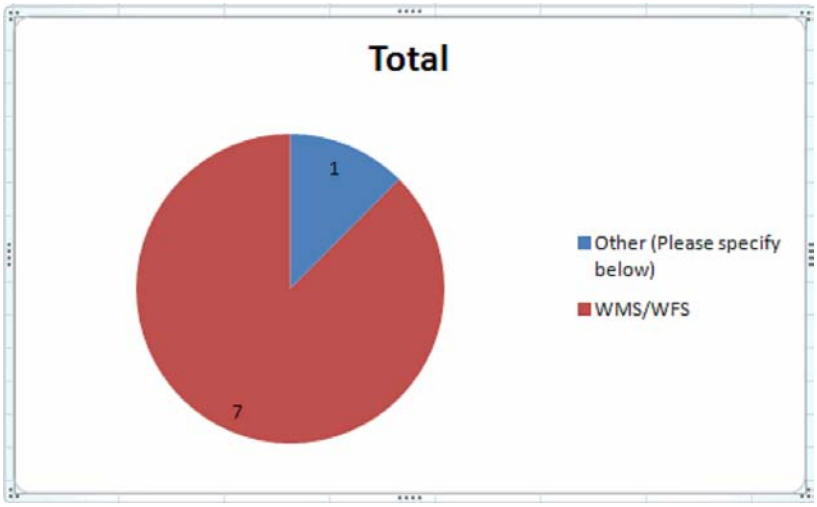
Grand Total	8	100

Coverage



Coverage	Count of Coverage	%
Full	8	100
Grand Total	8	100

Format

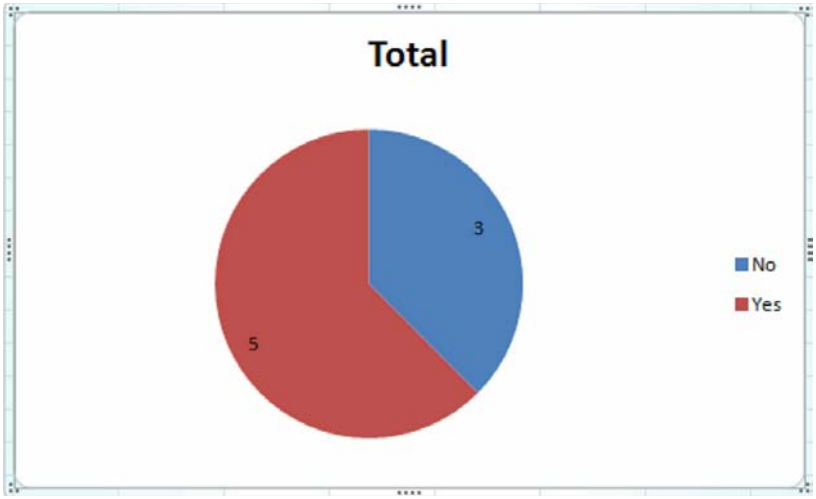


Format	Count of Format	%
Other (Please specify below)	1	12.5
WMS/WFS	7	87.5
Grand Total	8	100

Other formats:
The occurrences are available through an interactive web map and information sheets can be downloaded as PDF files.
+++ 3x WMS/WFS entries-Can be downloaded as relational databases (MS Access 97 & 2000, Interbase/Firebird, SQL Server and Oracle) .
2x WMS/WFS entries- Vector data can be purchased from GEUS for DKK 1,500 *(at odds with Cost entry).*

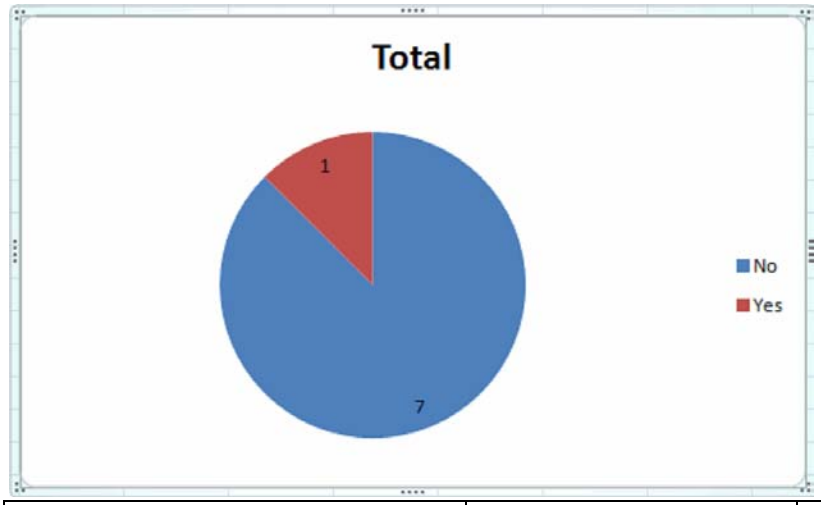
1x WMS/WFS entry- Released data can be bought in various formats (mainly SegY and LAS) *(at odds with Cost entry).*

Metadata



Metadata	Count of Metadata	%
No	3	37.5
Yes	5	62.5
Grand Total	8	100

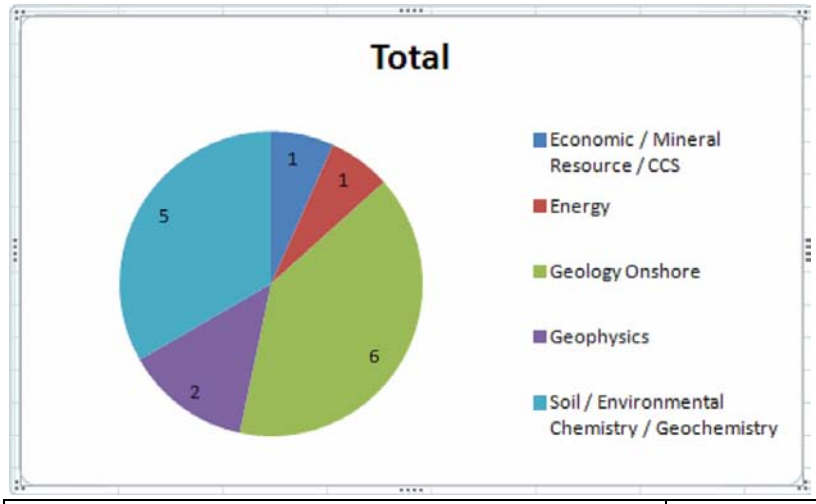
Cost



Cost	Count of Cost	%
No	7	87.5
Yes	1	12.5
Grand Total	8	100

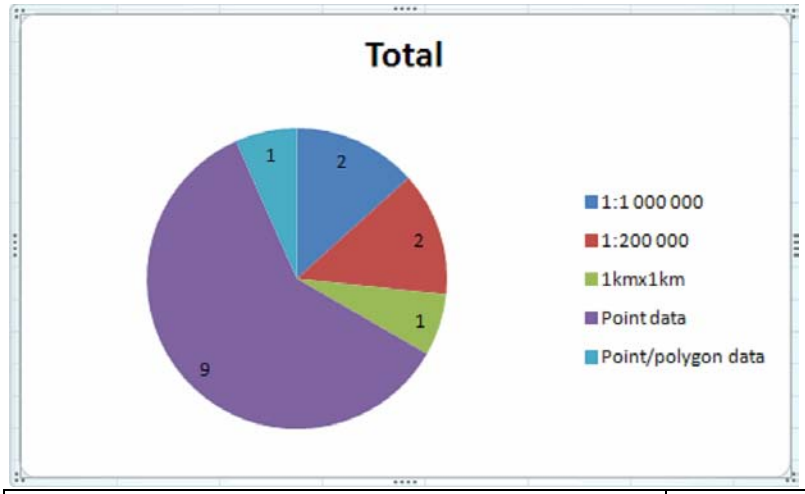
Finland

Theme



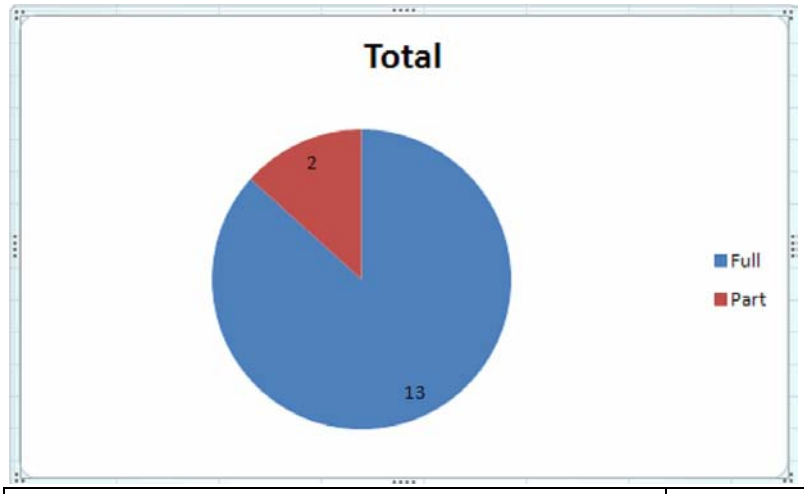
Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	6.7
Energy	1	6.7
Geology Onshore	6	40.0
Geophysics	2	13.3
Soil / Environmental Chemistry / Geochemistry	5	33.3
Grand Total	15	100.0

Scale



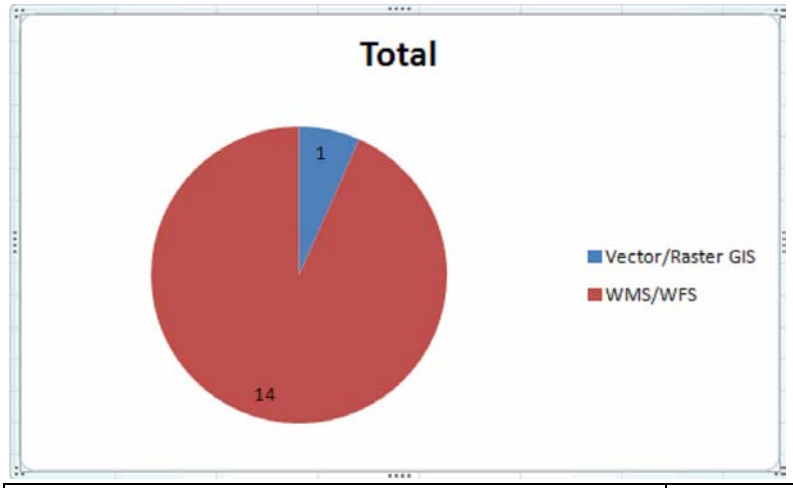
Scale	Count of Scale	%
1:1 000 000	2	13.3
1:200 000	2	13.3
1kmx1km	1	6.7
Point data	9	60.0
Point/polygon data	1	6.7
Grand Total	15	100.0

Coverage



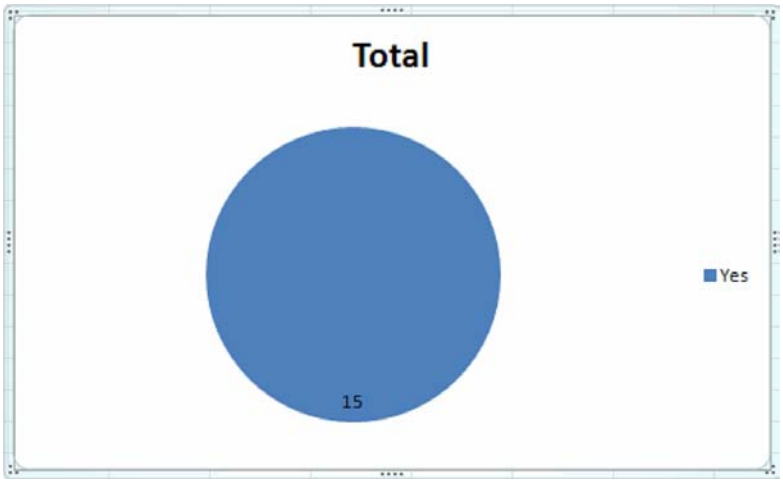
Coverage	Count of Coverage	%
Full	13	86.7
Part	2	13.3
Grand Total	15	100.0

Format



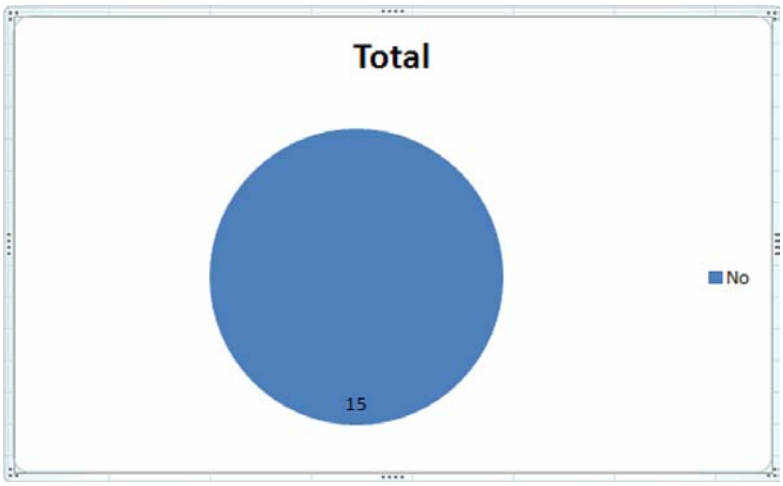
Format	Count of Format	%
Vector/Raster GIS	1	6.7
WMS/WFS	14	93.3
Grand Total	15	100.0

Metadata



Metadata	Count of Metadata	%
Yes	15	100.0
Grand Total	15	100.0

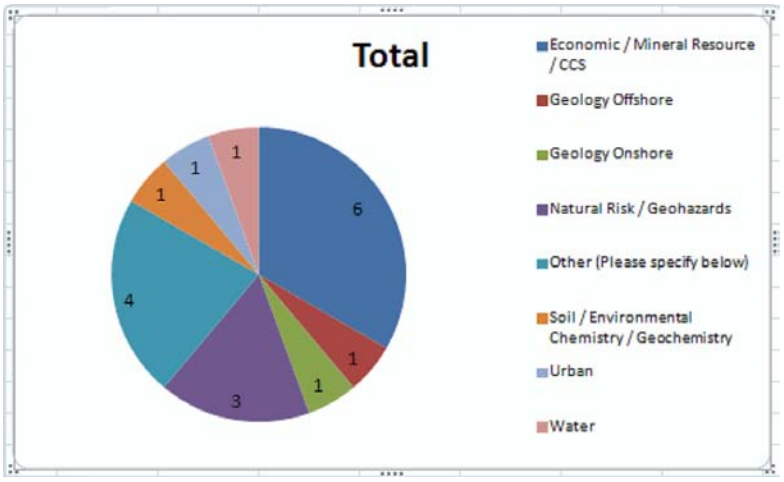
Cost



Cost	Count of Cost	%
No	15	100.0
Grand Total	15	100.0

Greece

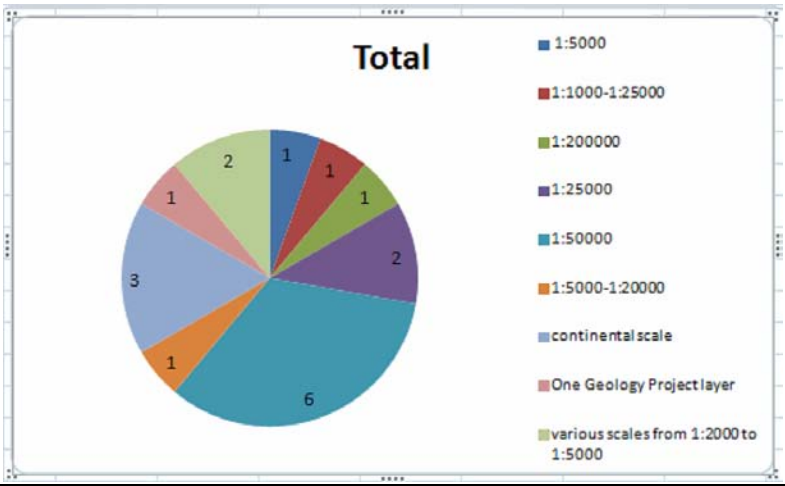
Theme



Theme	Total	%
Economic / Mineral Resource / CCS	6	33.3
Geology Offshore	1	5.6
Geology Onshore	1	5.6
Natural Risk / Geohazards	3	16.7
Other (Please specify below)	4	22.2
Soil / Environmental Chemistry / Geochemistry	1	5.6
Urban	1	5.6
Water	1	5.6
Grand Total	18	100.0

Other themes are: Geotechnics (1), Regional and follow up stream sediment geochemical data (x2), and stream sediments, stream water, residual soil, floodplain sediments, overbank sediments (1).

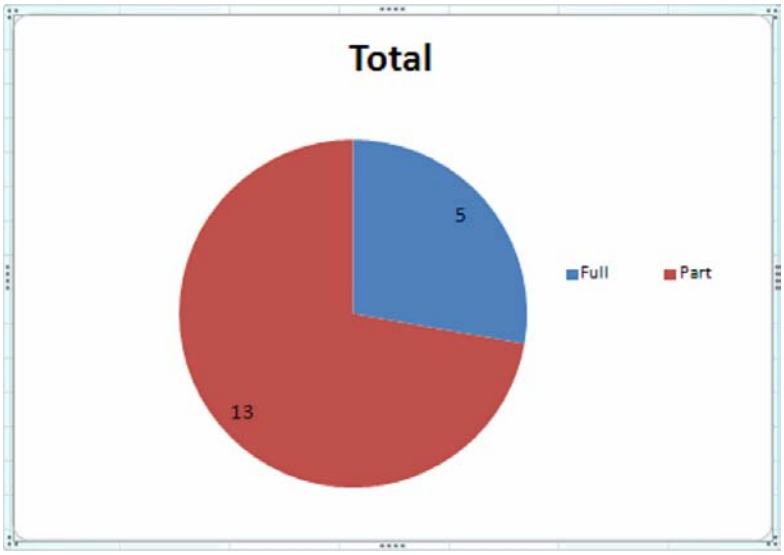
Scale



Scale	Count of Scale	%
1:5000	1	5.6

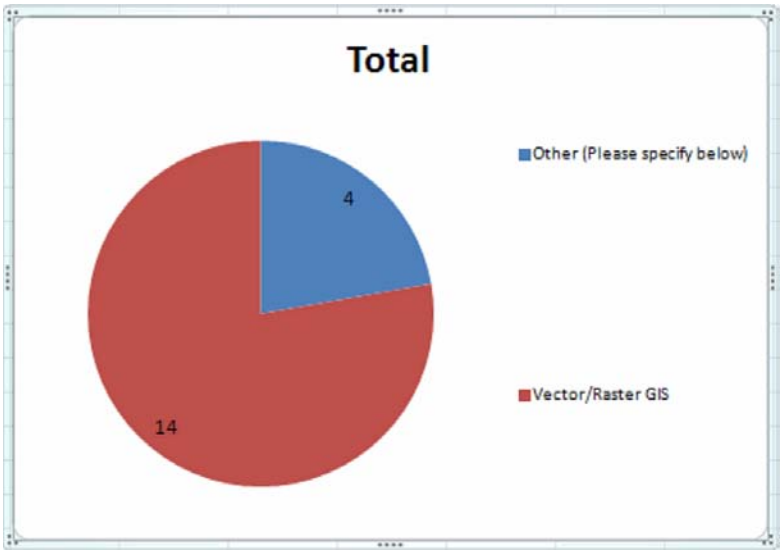
1:1000-1:25000	1	5.6
1:200000	1	5.6
1:25000	2	11.1
1:50000	6	33.3
1:5000-1:20000	1	5.6
continental scale	3	16.7
One Geology Project layer	1	5.6
various scales from 1:2000 to 1:5000	2	11.1
Grand Total	18	100.0

Coverage



Coverage	Count of Coverage	%
Full	5	27.8
Part	13	72.2
Grand Total	18	100.0

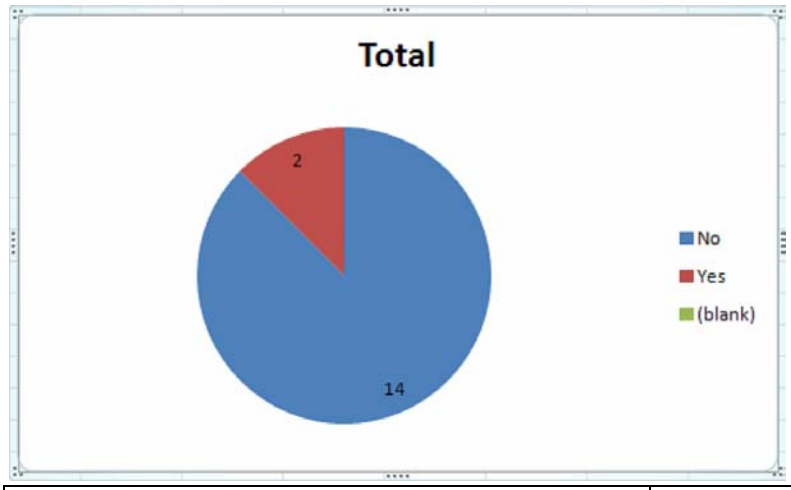
Format



Format	Count of Format	%
Other (Please specify below)	4	22.2
Vector/Raster GIS	14	77.8
Grand Total	18	100.0

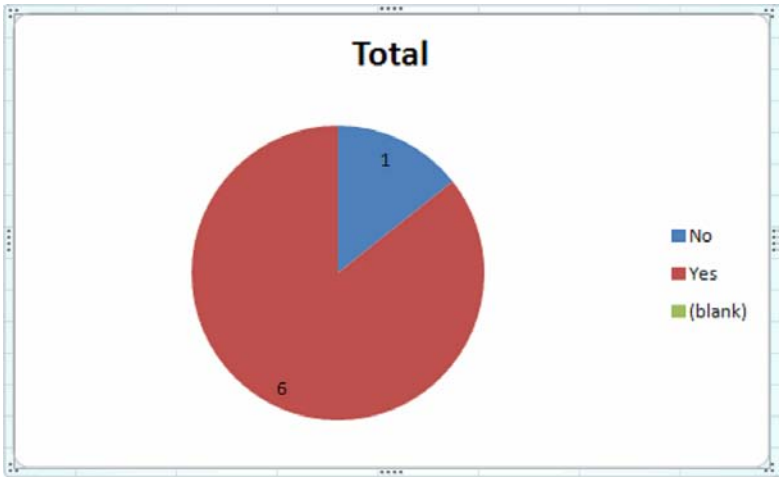
Other entries: 'partly vector and partly raster' (4).

Metadata



Metadata	Count of Metadata	%
No	14	87.5
Yes	2	12.5
(blank)	0	0.0
Grand Total	16	100.0

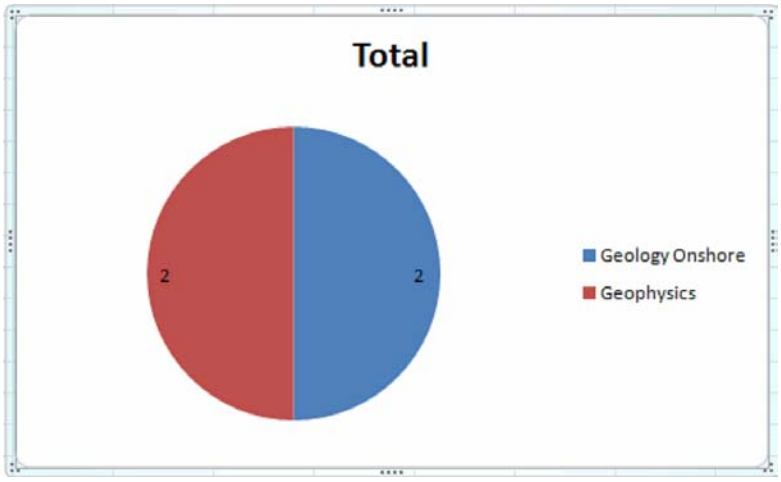
Cost



Cost	Count of Cost	%
No	1	14.3
Yes	6	85.7
Grand Total	7	100.0

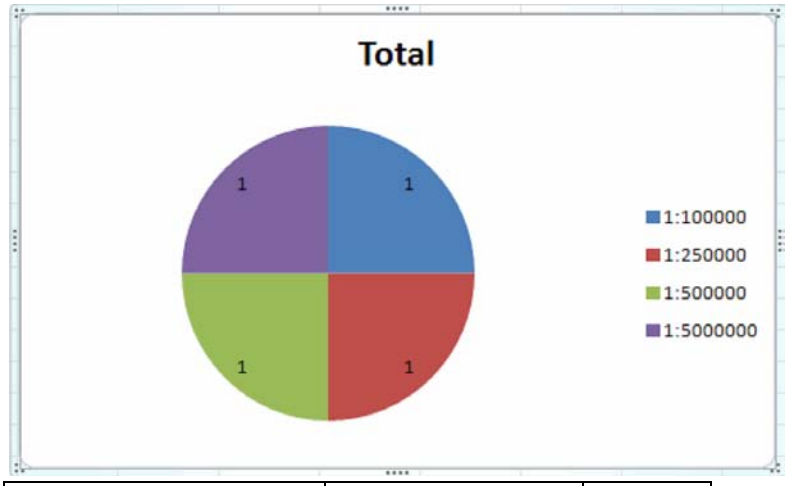
Hungary

Theme



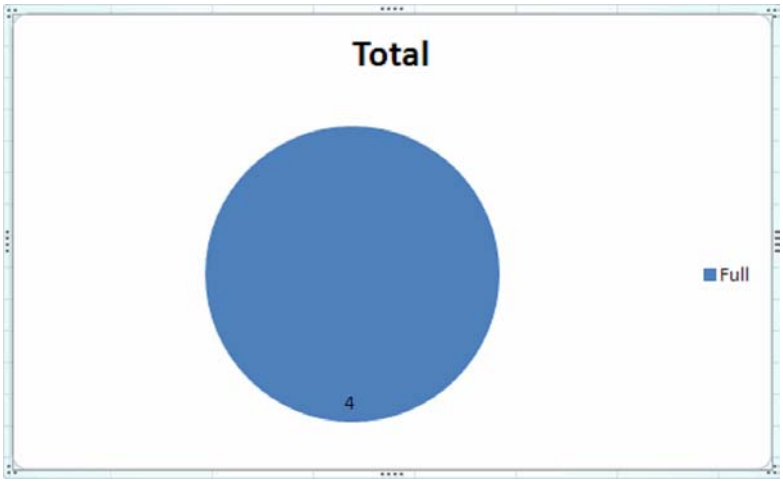
Theme	Count of Theme	%
Geology Onshore	2	50
Geophysics	2	50
Grand Total	4	100

Scale



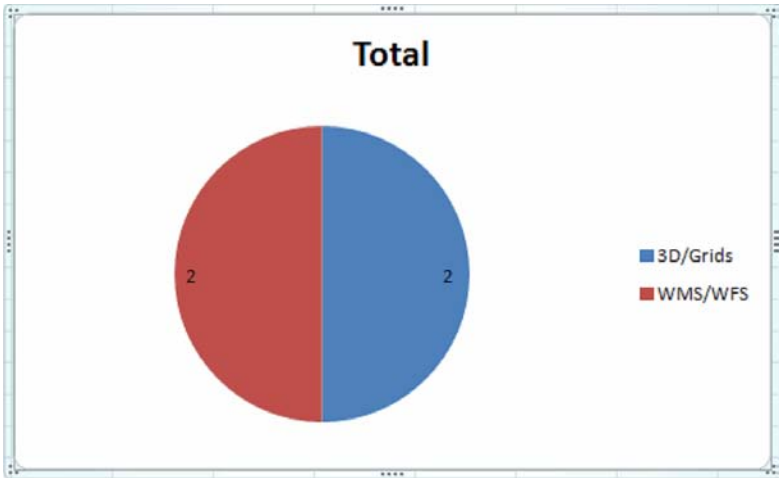
Scale	Count of Scale	%
1:100000	1	25
1:250000	1	25
1:500000	1	25
1:5000000	1	25
Grand Total	4	100

Coverage



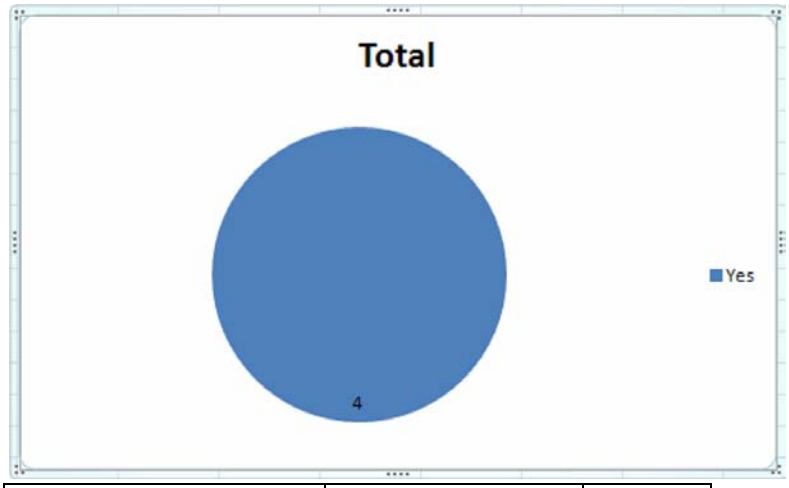
Coverage	Count of Coverage	%
Full	4	100
Grand Total	4	100

Format



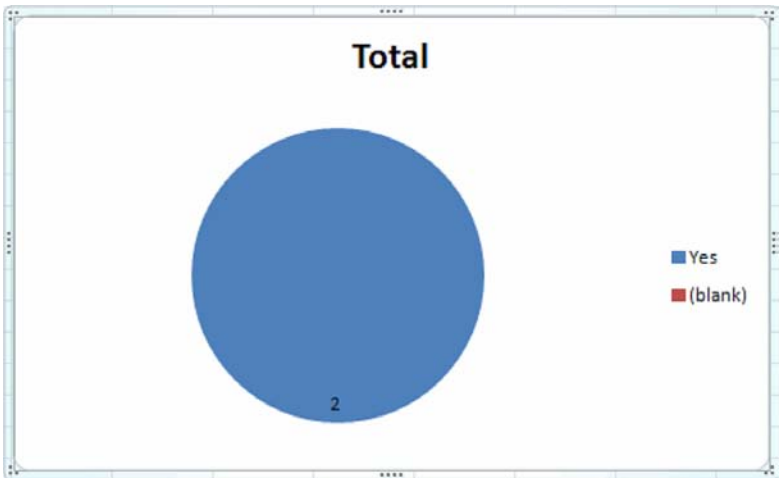
Format	Count of Format	%
3D/Grids	2	50
WMS/WFS	2	50
Grand Total	4	100

Metadata



Metadata	Count of Metadata	%
Yes	4	100
Grand Total	4	100

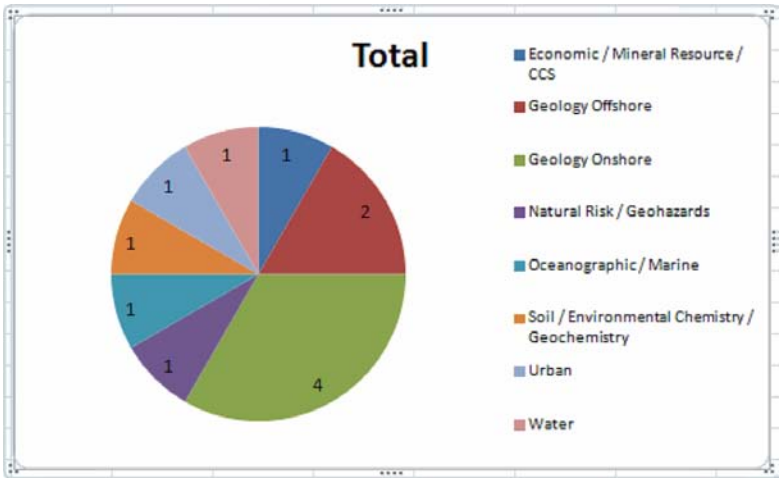
Cost



Cost	Count of Cost	%
Yes	2	50
(blank)	2	50
Grand Total	4	100

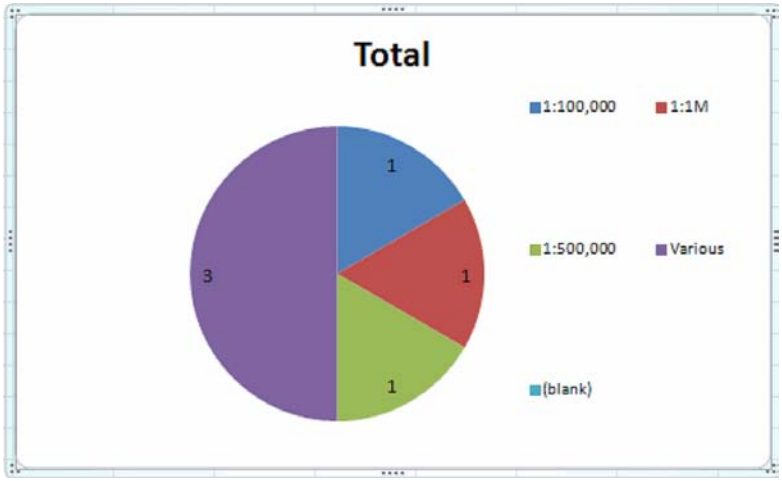
Ireland

Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	8.3
Geology Offshore	2	16.7
Geology Onshore	4	33.3
Natural Risk / Geohazards	1	8.3
Oceanographic / Marine	1	8.3
Soil / Environmental Chemistry / Geochemistry	1	8.3
Urban	1	8.3
Water	1	8.3
Grand Total	12	100.0

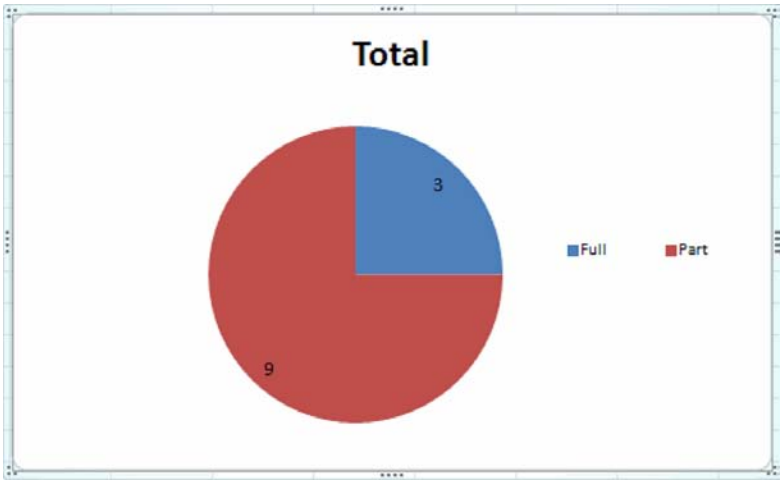
Scale



Scale	Count of Scale	%
1:100,000	1	8.3
1:1M	1	8.3
1:500,000	1	8.3
Various	3	25.0

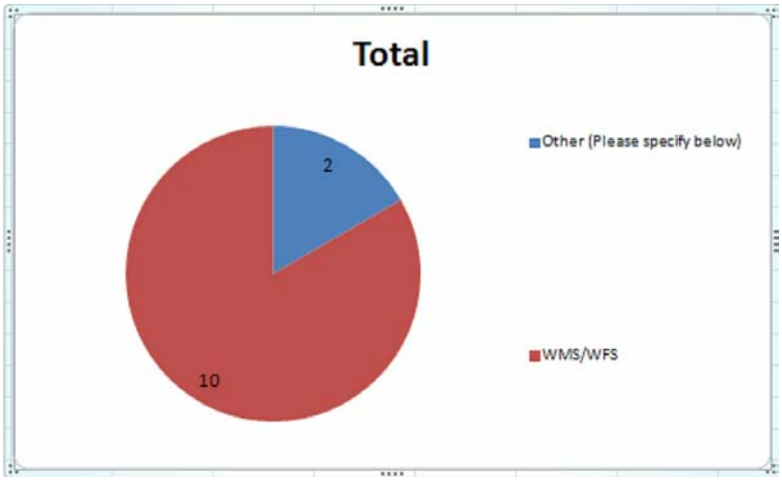
(blank)	6	50.0
Grand Total	12	100.0

Coverage



Coverage	Count of Coverage	%
Full	3	25.0
Part	9	75.0
Grand Total	12	100.0

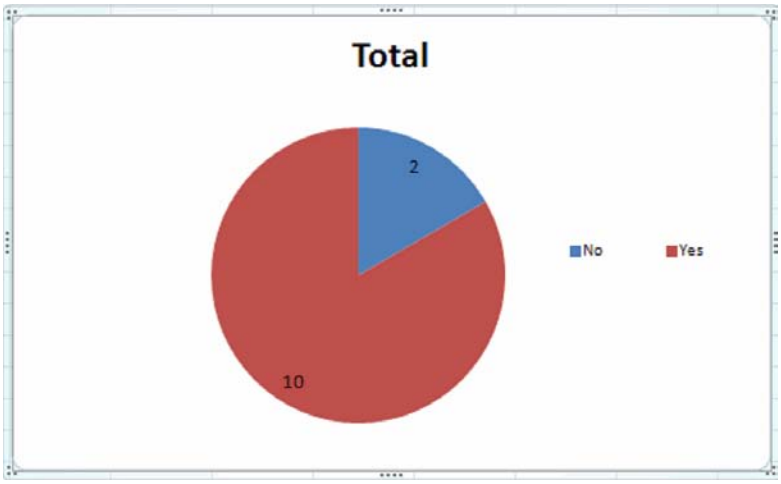
Format



Format	Count of Format	%
Other (Please specify below)	2	16.7
WMS/WFS	10	83.3
Grand Total	12	100.0

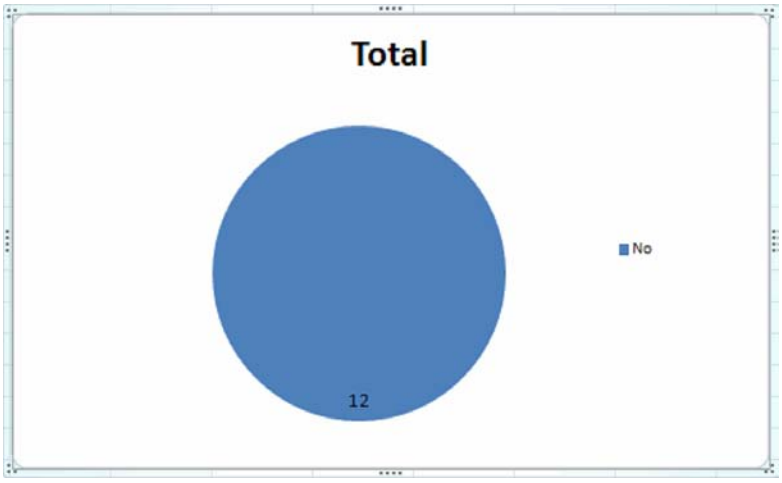
Other entries: ‘In house application’, ‘Grids, vector, raster, pdf’

Metadata



Metadata	Count of Metadata	%
No	2	16.7
Yes	10	83.3
Grand Total	12	100.0

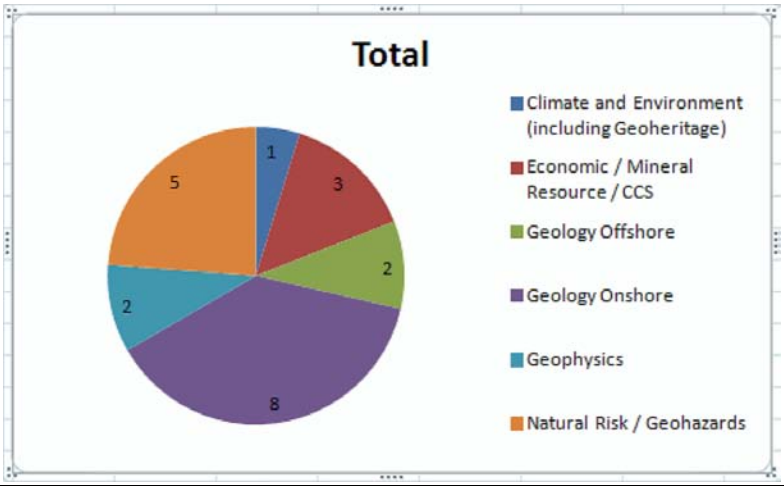
Cost



Cost	Count of Cost	%
No	12	100.0
Grand Total	12	100.0

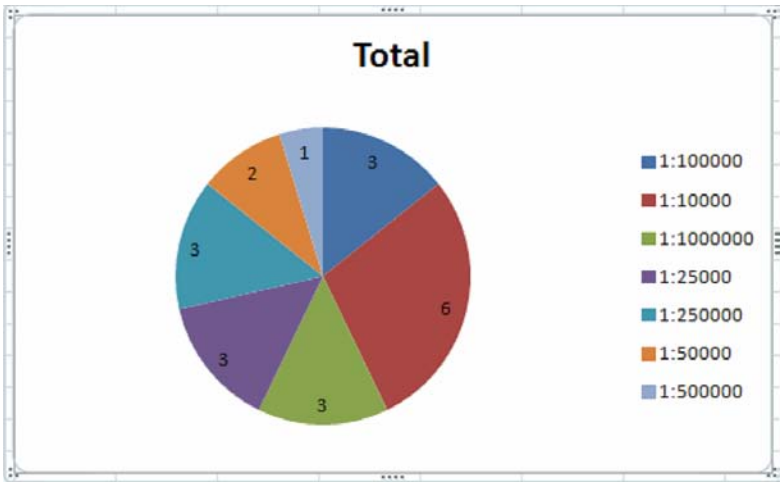
Italy

Theme



Theme	Count of Theme	%
Climate and Environment (including Geoheritage)	1	4.8
Economic / Mineral Resource / CCS	3	14.3
Geology Offshore	2	9.5
Geology Onshore	8	38.1
Geophysics	2	9.5
Natural Risk / Geohazards	5	23.8
Grand Total	21	100.0

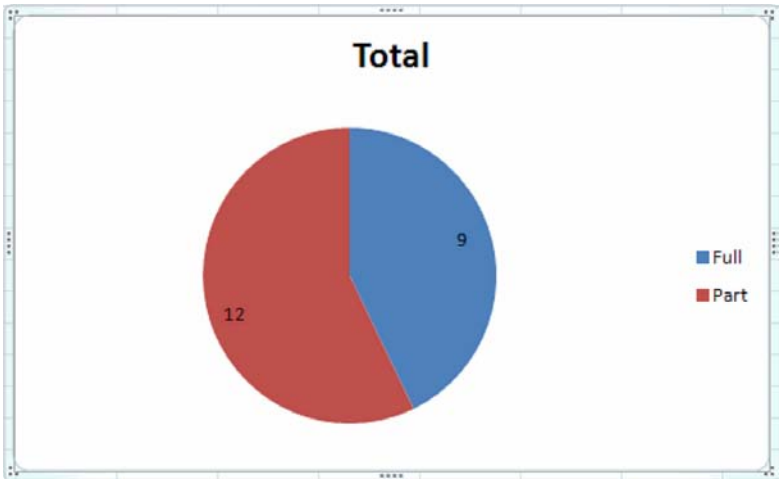
Scale



Scale	Count of Scale	%
1:10000	6	28.6
1:100000	3	14.3
1:1000000	3	14.3
1:25000	3	14.3
1:250000	3	14.3
1:50000	2	9.5

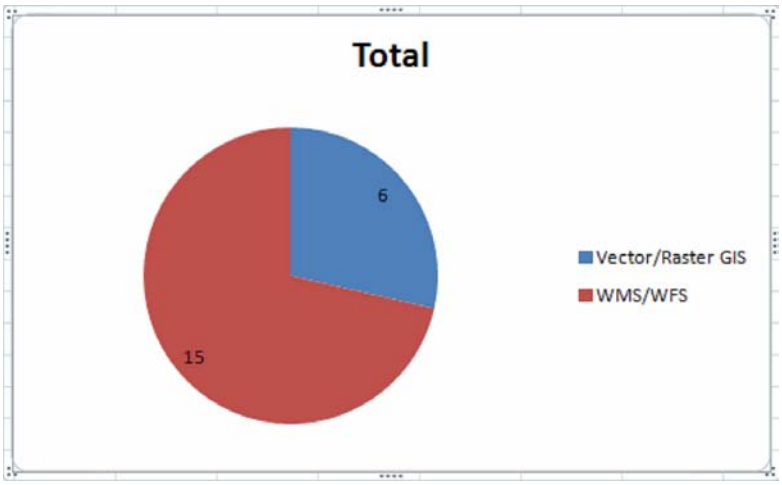
1:500000	1	4.8
Grand Total	21	100.0

Coverage



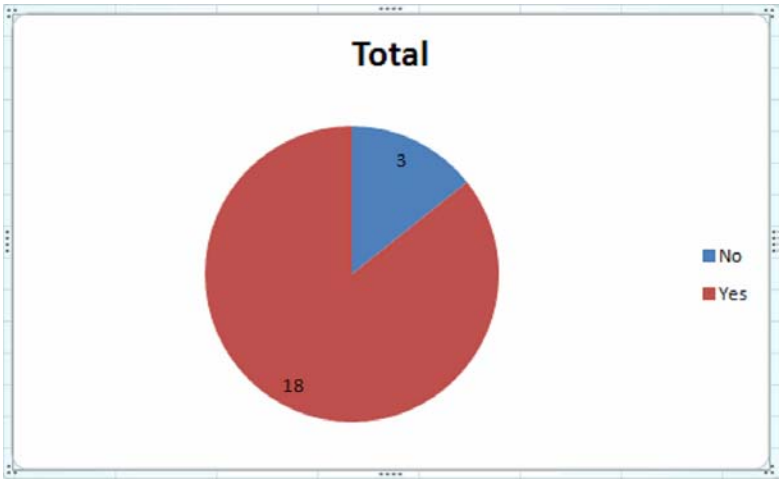
Coverage	Count of Coverage	%
Full	9	42.9
Part	12	57.1
Grand Total	21	100.0

Format



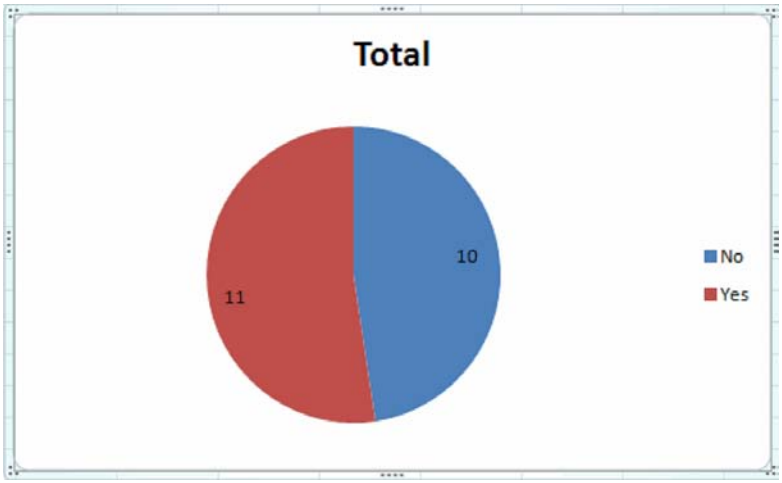
Format	Count of Format	%
Vector/Raster GIS	6	28.6
WMS/WFS	15	71.4
Grand Total	21	100.0

Metadata



Metadata	Count of Metadata	%
No	3	14.3
Yes	18	85.7
Grand Total	21	100.0

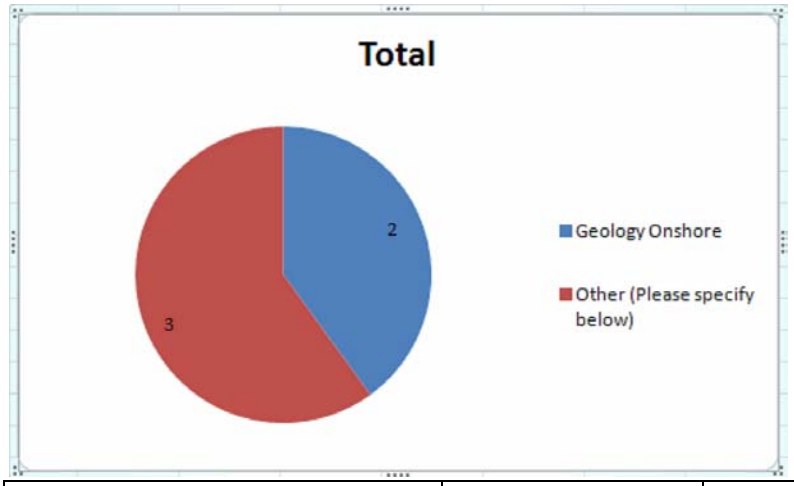
Cost



Cost	Count of Cost	%
No	10	47.6
Yes	11	52.4
Grand Total	21	100.0

Norway

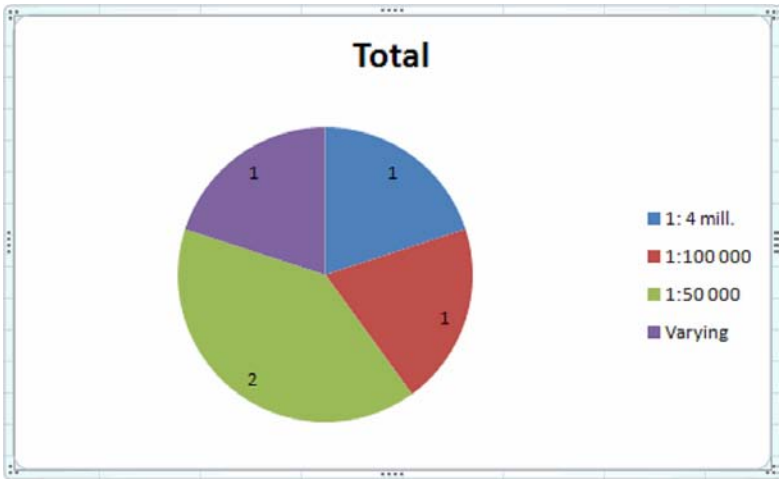
Theme



Theme	Count of Theme	%
Geology Onshore	2	40
Other (Please specify below)	3	60
Grand Total	5	100

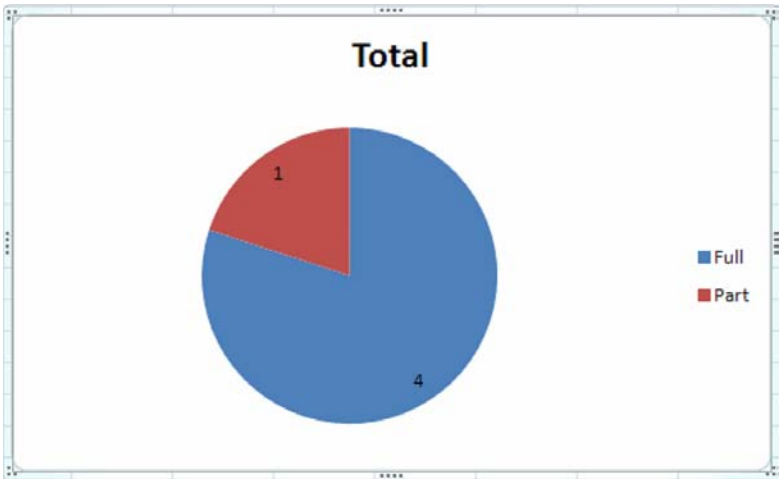
Other themes: 'Geology onshore and offshore', 'Natural Hazards' (2)

Scale



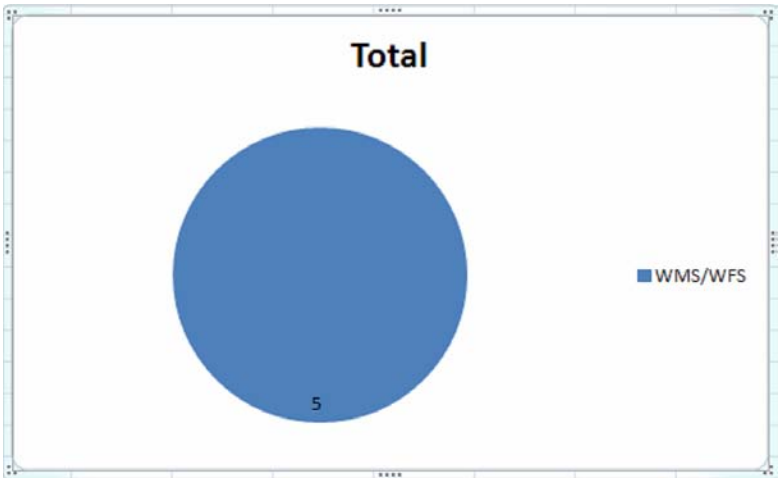
Scale	Count of Scale	%
1: 4 mill.	1	20
1:100 000	1	20
1:50 000	2	40
Varying	1	20
Grand Total	5	100

Coverage



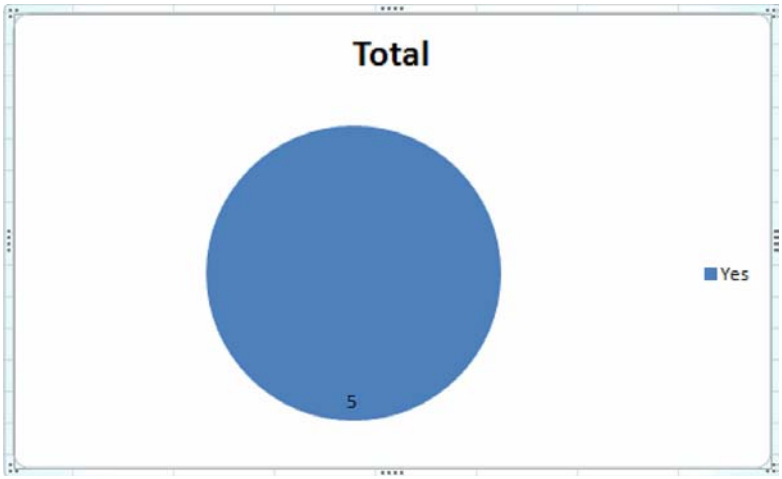
Coverage	Count of Coverage	%
Full	4	80
Part	1	20
Grand Total	5	100

Format



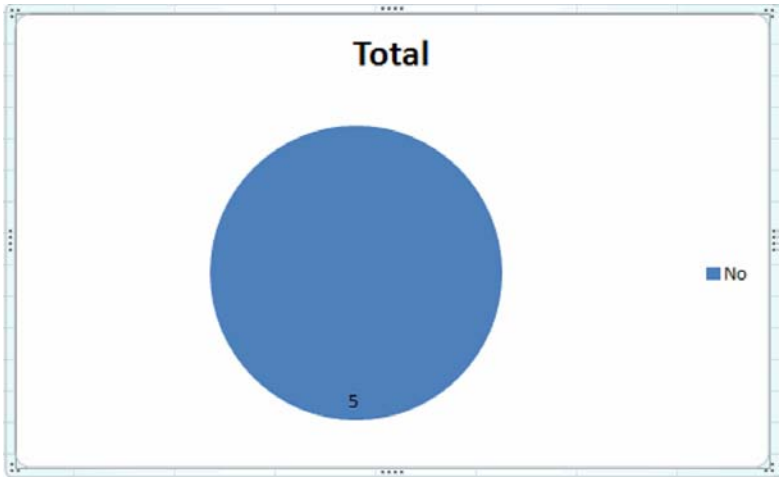
Format	Count of Format	%
WMS/WFS	5	100
Grand Total	5	100

Metadata



Metadata	Count of Metadata	%
Yes	5	100
Grand Total	5	100

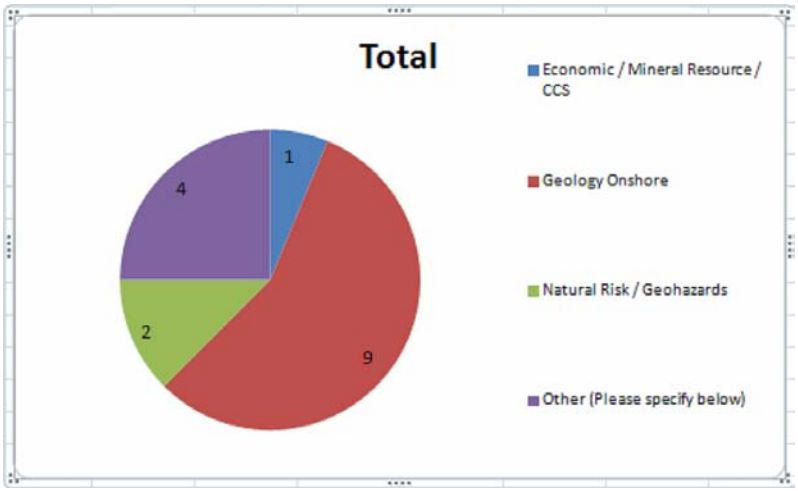
Cost



Cost	Count of Cost	%
No	5	100
Grand Total	5	100

Poland

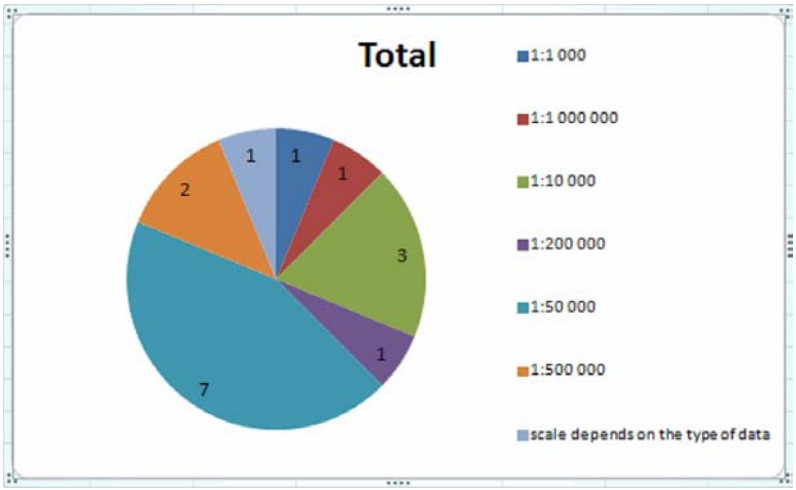
Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	6.3
Geology Onshore	9	56.3
Natural Risk / Geohazards	2	12.5
Other (Please specify below)	4	25.0
Grand Total	16	100.0

Other themes: Hydrogeology (4).

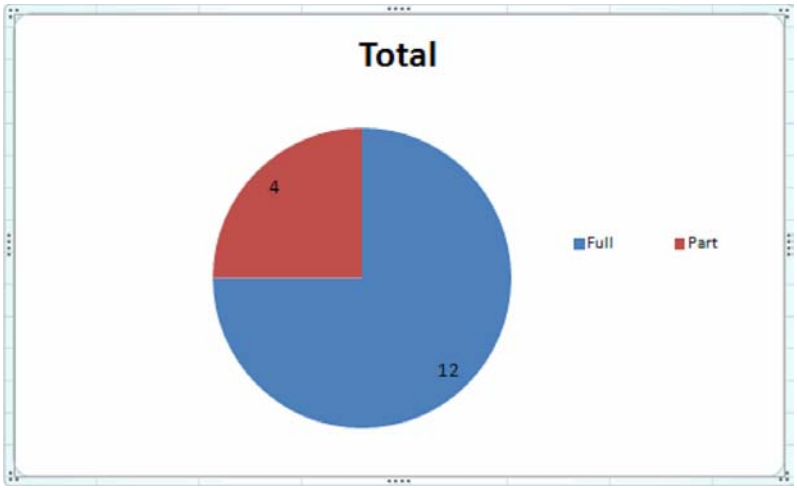
Scale



Scale	Count of Scale	%
1:1 000	1	6.3
1:1 000 000	1	6.3
1:10 000	3	18.8
1:200 000	1	6.3
1:50 000	7	43.8
1:500 000	2	12.5

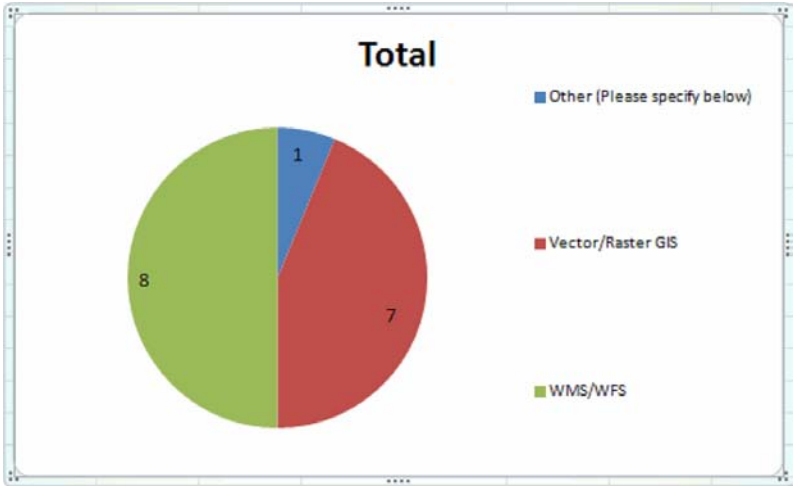
scale depends on the type of data	1	6.3
Grand Total	16	100.0

Coverage



Coverage	Count of Coverage	%
Full	12	75.0
Part	4	25.0
Grand Total	16	100.0

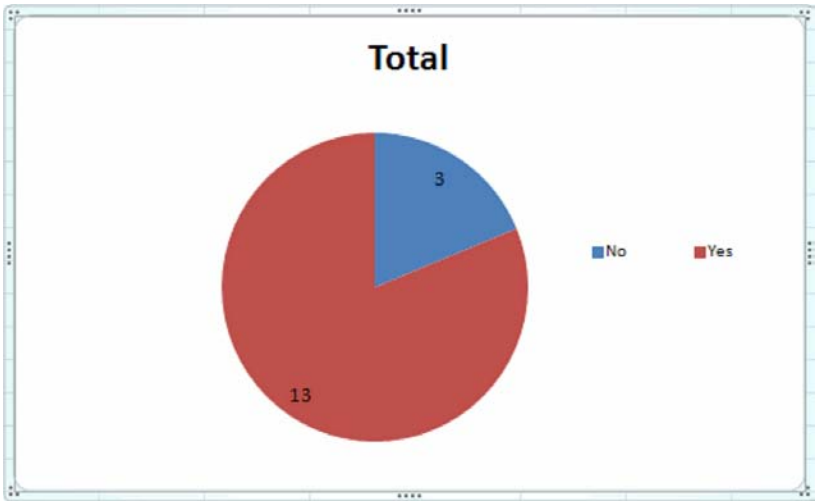
Format



Format	Count of Format	%
Other (Please specify below)	1	6.3
Vector/Raster GIS	7	43.8
WMS/WFS	8	50.0
Grand Total	16	100.0

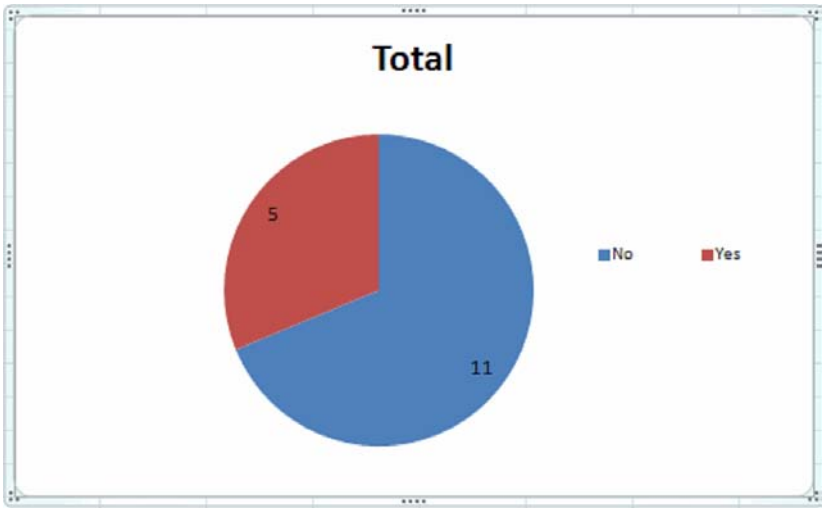
Other format: G3D

Metadata



Metadata	Count of Metadata	%
No	3	18.8
Yes	13	81.3
Grand Total	16	100.0

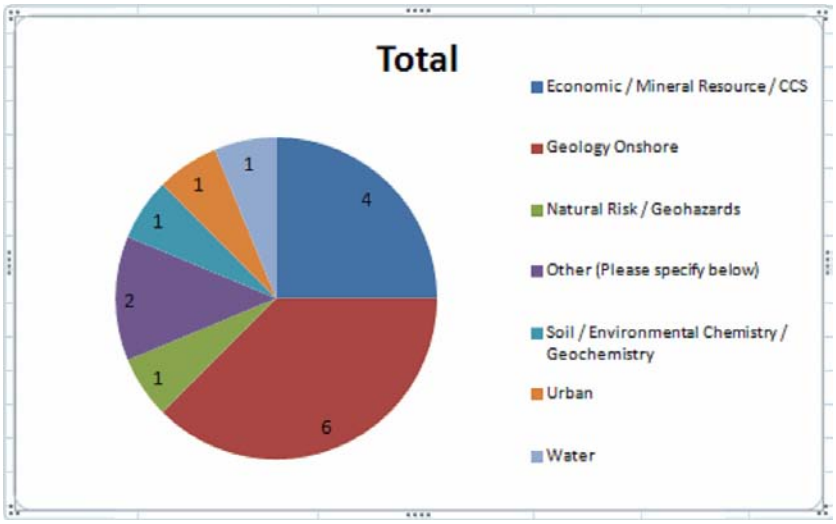
Cost



Cost	Count of Cost	%
No	11	68.8
Yes	5	31.3
Grand Total	16	100.0

Portugal

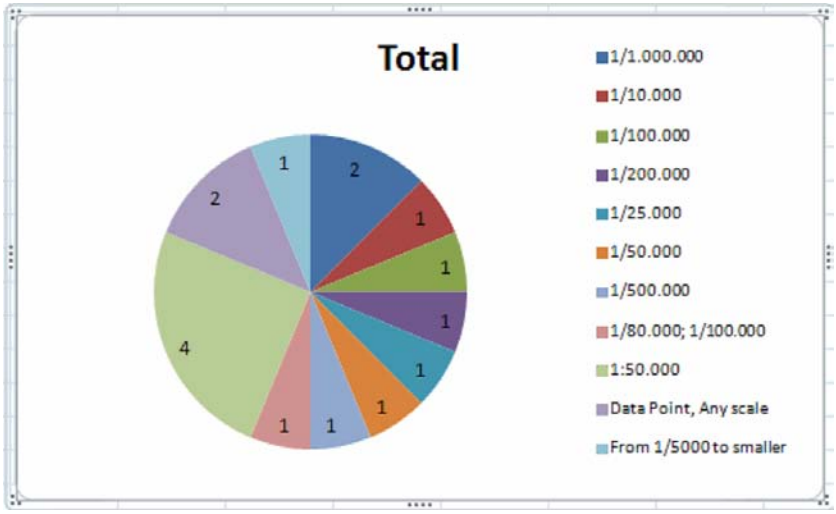
Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	4	25.0
Geology Onshore	6	37.5
Natural Risk / Geohazards	1	6.3
Other (Please specify below)	2	12.5
Soil / Environmental Chemistry / Geochemistry	1	6.3
Urban	1	6.3
Water	1	6.3
Grand Total	16	100.0

Other themes: ‘Geotourism’, ‘Drill core library’

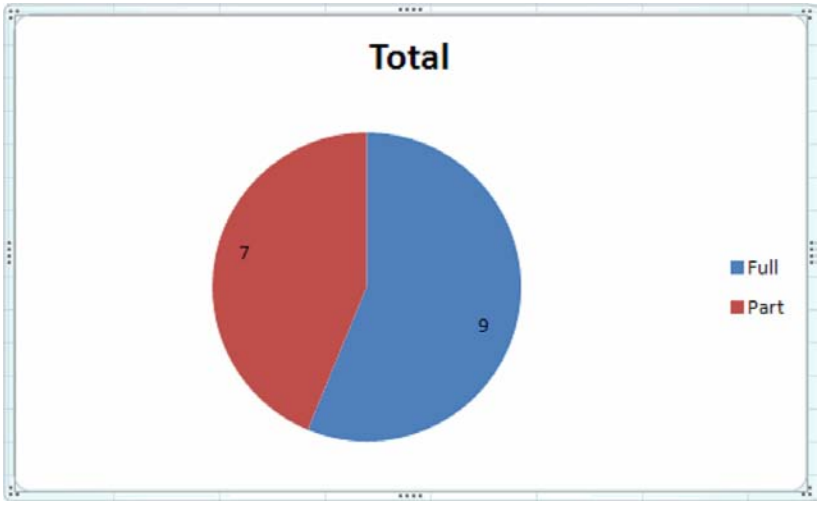
Scale



Scale	Count of Scale	%
1/1.000.000	2	12.5

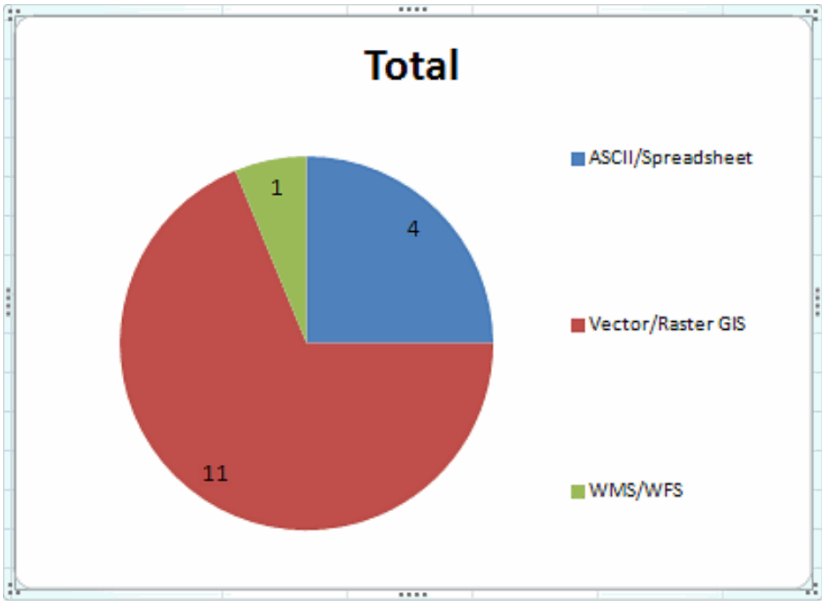
1/10.000	1	6.3
1/100.000	1	6.3
1/200.000	1	6.3
1/25.000	1	6.3
1/50.000	1	6.3
1/500.000	1	6.3
1/80.000; 1/100.000	1	6.3
1:50.000	4	25.0
Data Point, Any scale	2	12.5
From 1/5000 to smaller	1	6.3
Grand Total	16	100.0

Coverage



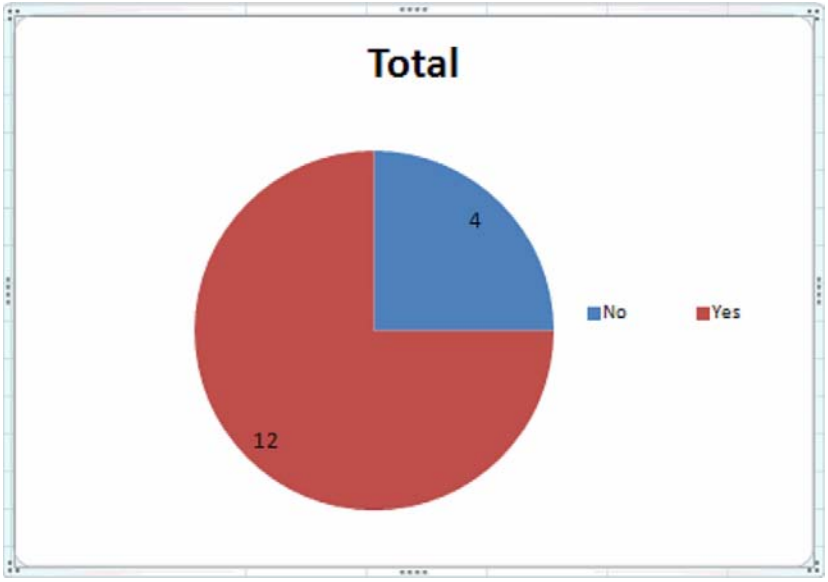
Coverage	Count of Coverage	%
Full	9	56.3
Part	7	43.8
Grand Total	16	100.0

Format



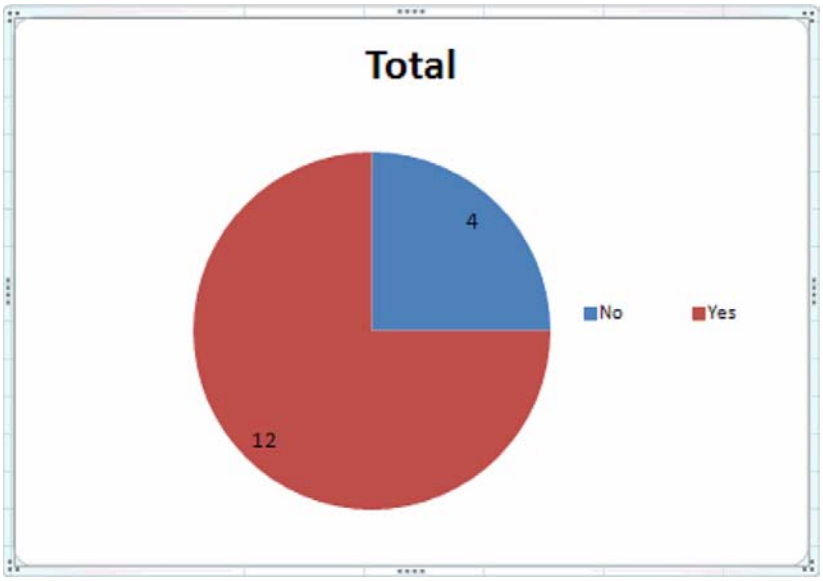
Format	Count of Format	%
ASCII/Spreadsheet	4	25.0
Vector/Raster GIS	11	68.8
WMS/WFS	1	6.3
Grand Total	16	100.0

Metadata



Metadata	Count of Metadata	%
No	4	25.0
Yes	12	75.0
Grand Total	16	100.0

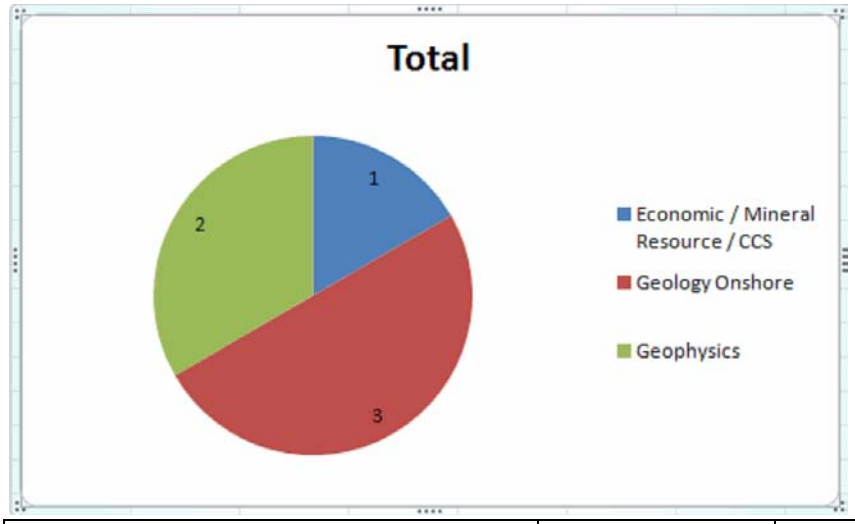
Cost



Cost	Count of cost	%
No	4	25.0
Yes	12	75.0
Grand Total	16	100.0

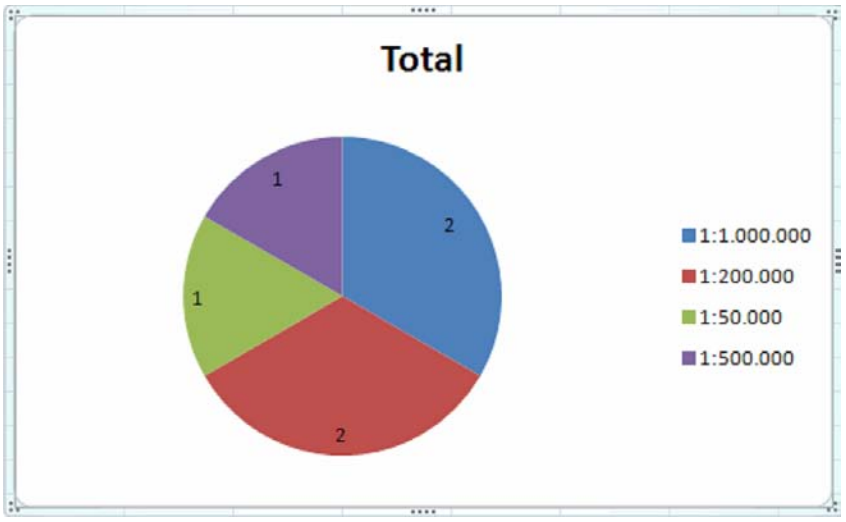
Romania

Theme



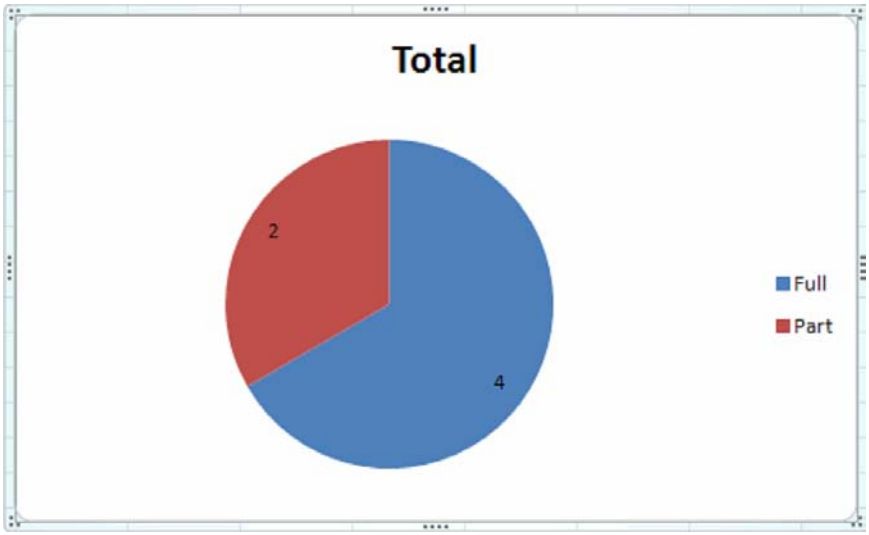
Theme	Count of Theme	%
Economic / Mineral Resource / CCS	1	16.7
Geology Onshore	3	50.0
Geophysics	2	33.3
Grand Total	6	100

Scale



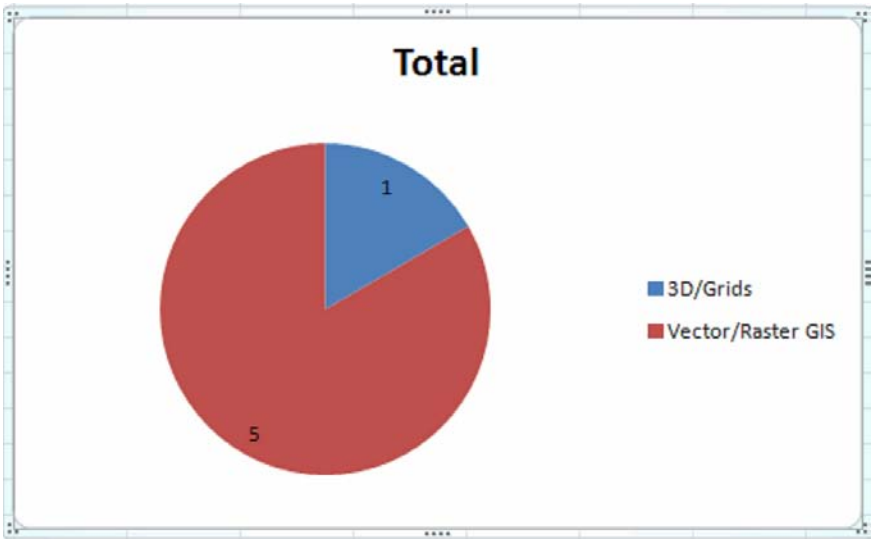
Scale	Count of Scale	%
1:1.000.000	2	33.3
1:200.000	2	33.3
1:50.000	1	16.7
1:500.000	1	16.7
Grand Total	6	100.0

Coverage



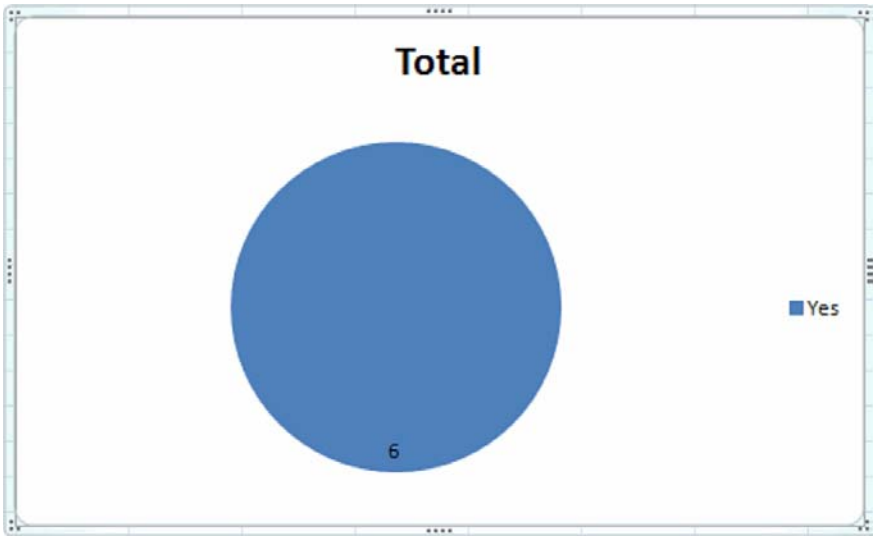
Coverage	Count of Coverage	%
Full	4	66.7
Part	2	33.3
Grand Total	6	100.0

Format



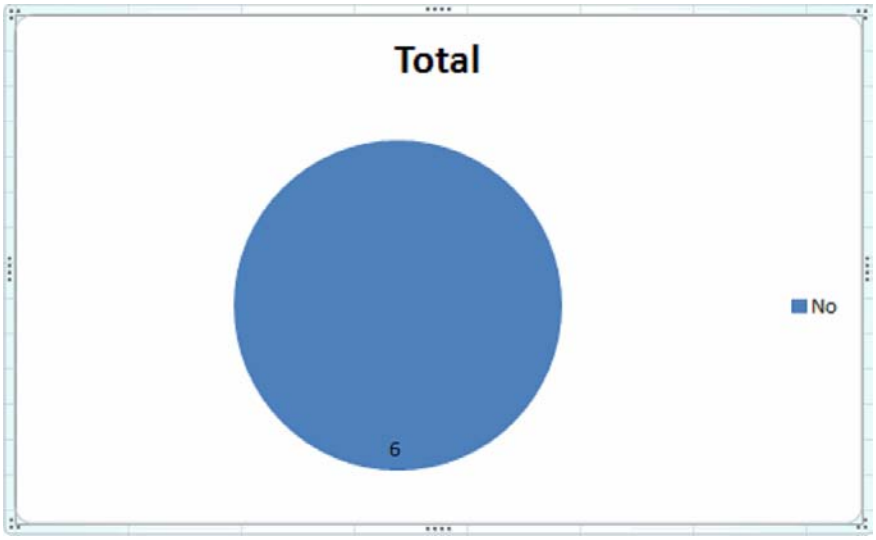
Format	Count of Format	%
3D/Grids	1	16.7
Vector/Raster GIS	5	83.3
Grand Total	6	100.0

Metadata



Metadata	Count of Metadata	%
Yes	6	100.0
Grand Total	6	100.0

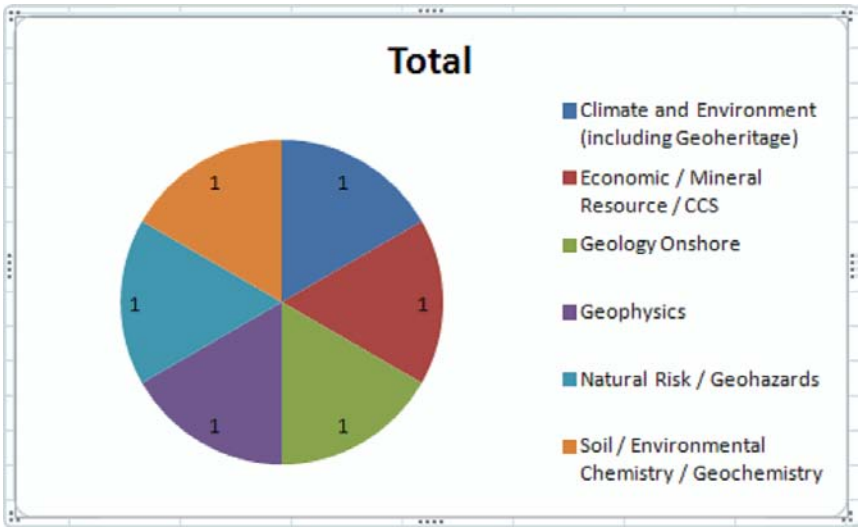
Cost



Cost	Count of Cost	%
No	6	100.0
Grand Total	6	100.0

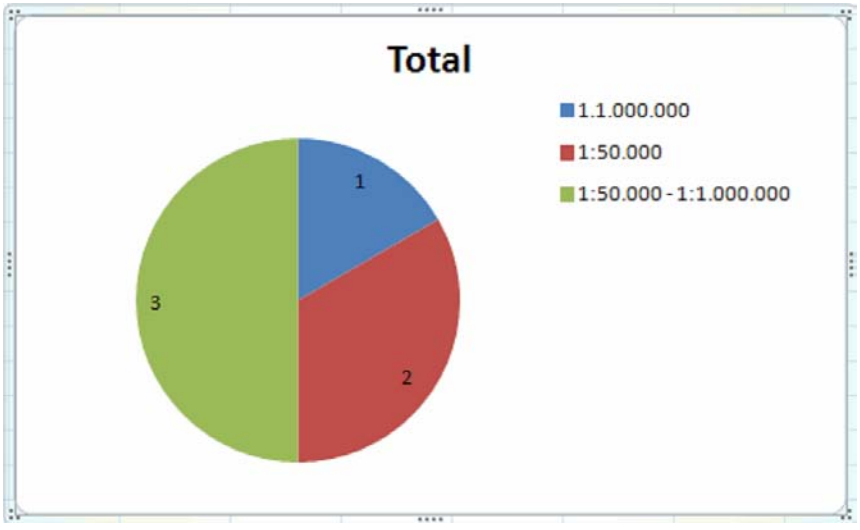
Spain

Themes



Theme	Count of Theme	%
Climate and Environment (including Geoheritage)	1	16.7
Economic / Mineral Resource / CCS	1	16.7
Geology Onshore	1	16.7
Geophysics	1	16.7
Natural Risk / Geohazards	1	16.7
Soil / Environmental Chemistry / Geochemistry	1	16.7
Grand Total	6	100.0

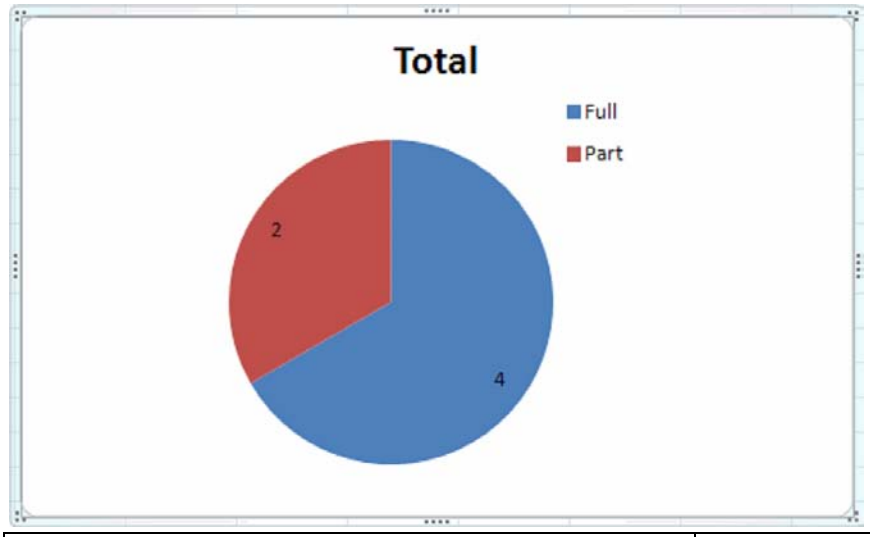
Scale



Scale	Count of Scale	%
1.1.000.000	1	16.7
1:50.000	2	33.3

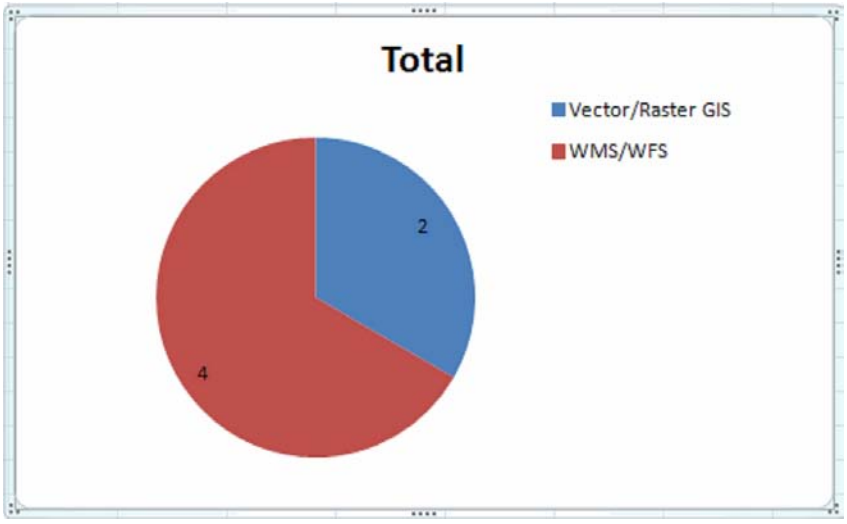
1:50.000 - 1:1.000.000	3	50.0
Grand Total	6	100.0

Coverage



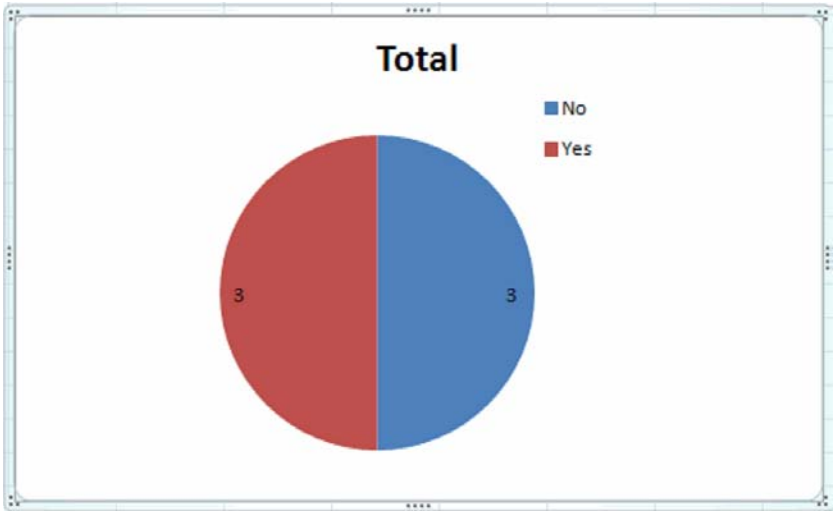
Coverage	Count of Coverage	%
Full	4	66.7
Part	2	33.3
Grand Total	6	100.0

Format



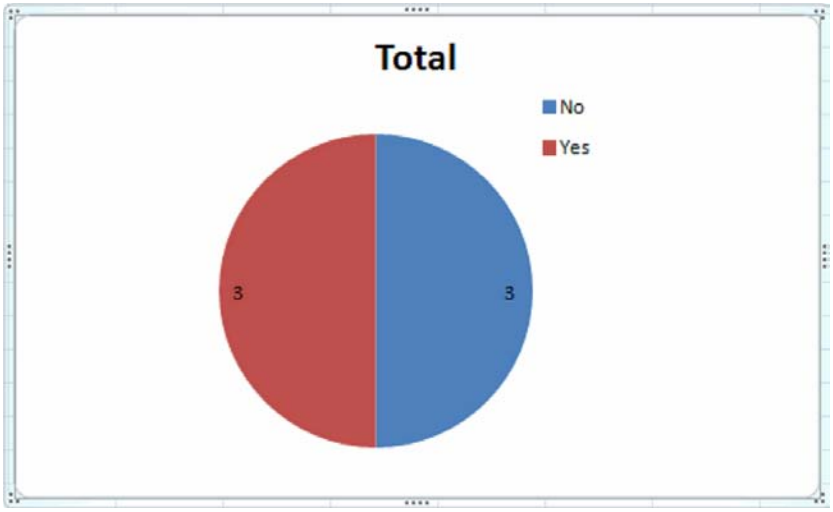
Format	Count of Format	%
Vector/Raster GIS	2	33.3
WMS/WFS	4	66.7
Grand Total	6	100.0

Metadata



Metadata	Count of Metadata	%
No	3	50
Yes	3	50
Grand Total	6	100

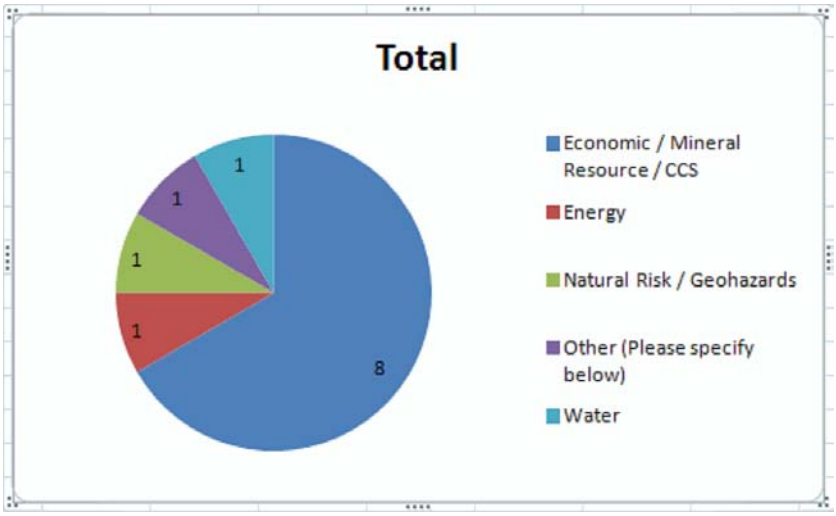
Cost



Cost	Count of Cost	%
No	3	50
Yes	3	50
Grand Total	6	100

Ukraine

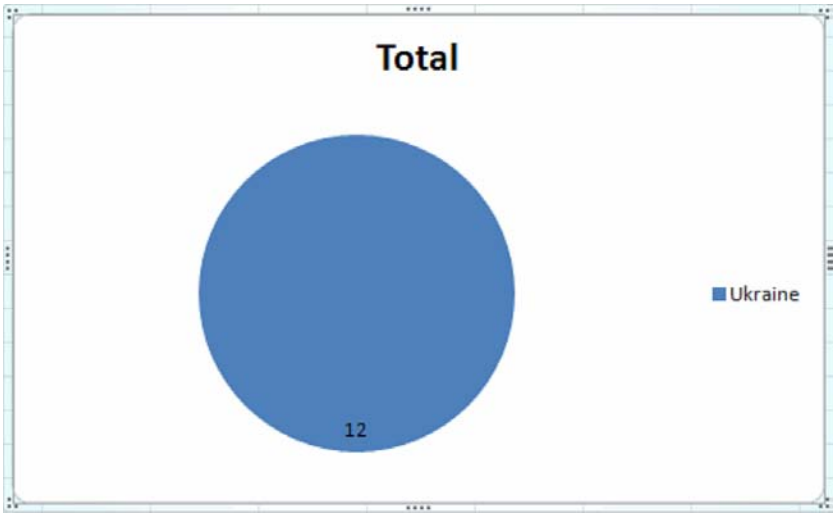
Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	**8**	66.7
Energy	**1**	8.3
Natural Risk / Geohazards	**1**	8.3
Other (Please specify below)	**1**	8.3
Water	**1**	8.3
Grand Total	**12**	100.0

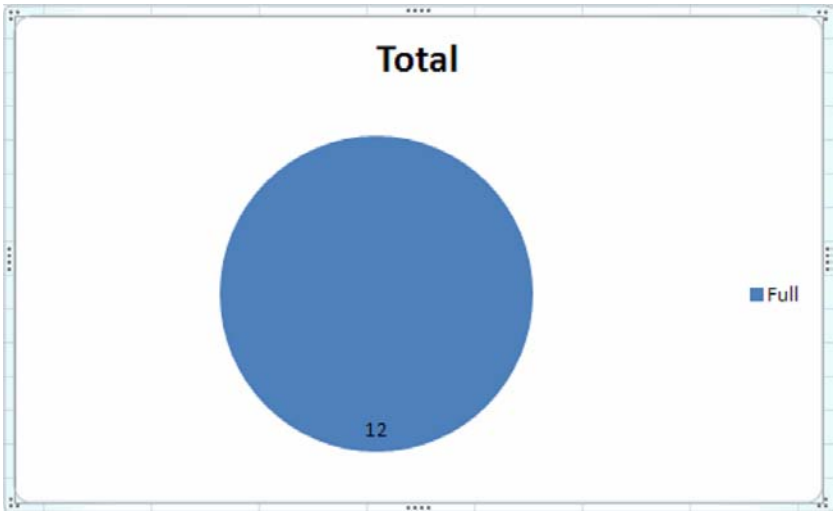
Other theme: 'Economy'

Scale



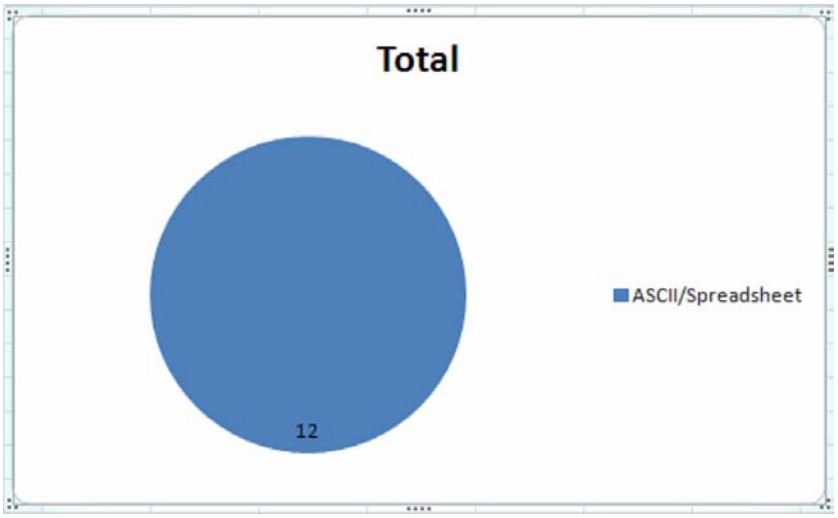
Scale	Count of Scale	%
Ukraine	**12**	100.0
Grand Total	**12**	100.0

Coverage



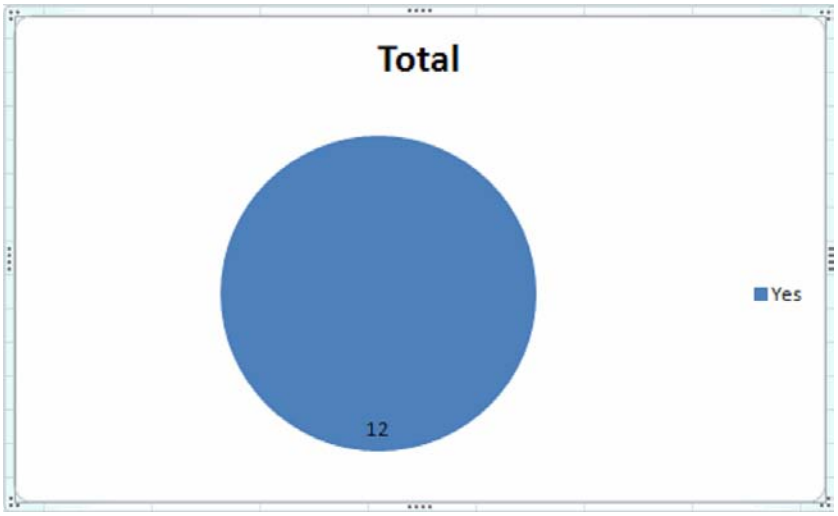
Coverage	Count of Coverage	%
Full	**12**	100.0
Grand Total	**12**	100.0

Format



Format	Count of Format	%
ASCII/Spreadsheet	**12**	100.0
Grand Total	**12**	100.0

Metadata



Metadata	Count of Metadata	%
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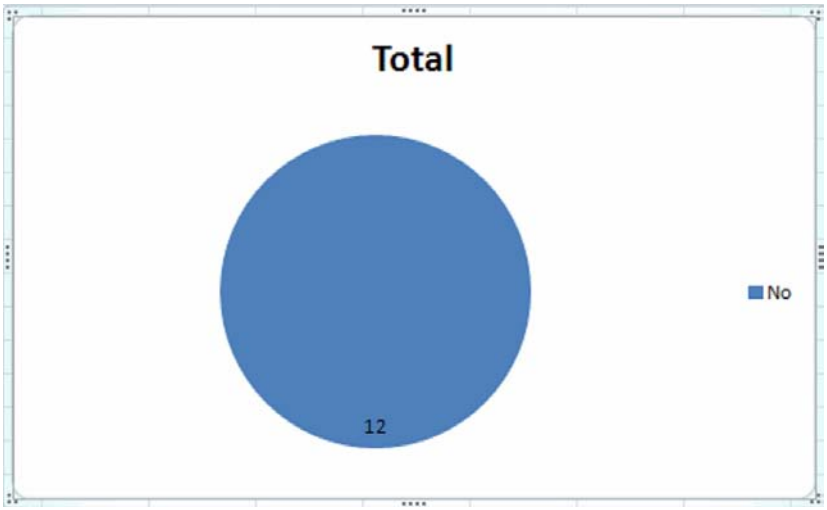
Grand Total	**12**	100.0

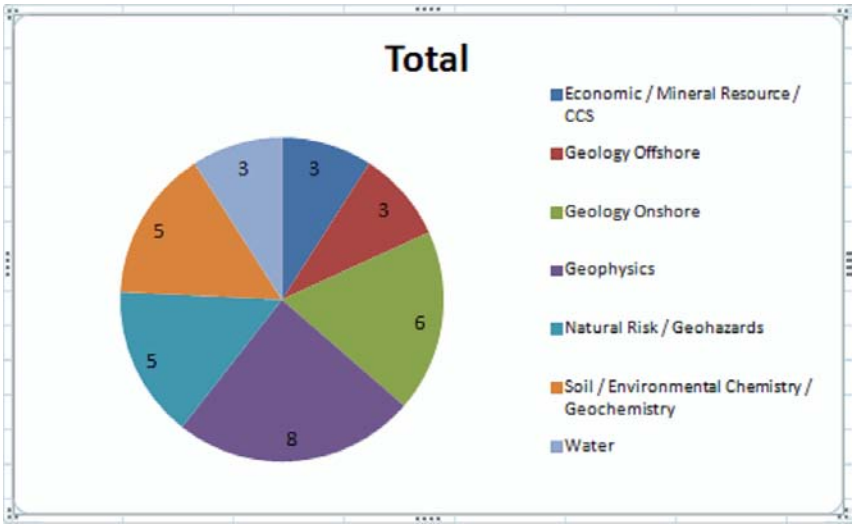
Cost



Cost	Count of Cost	%
No	**12**	100.0
Grand Total	**12**	100.0

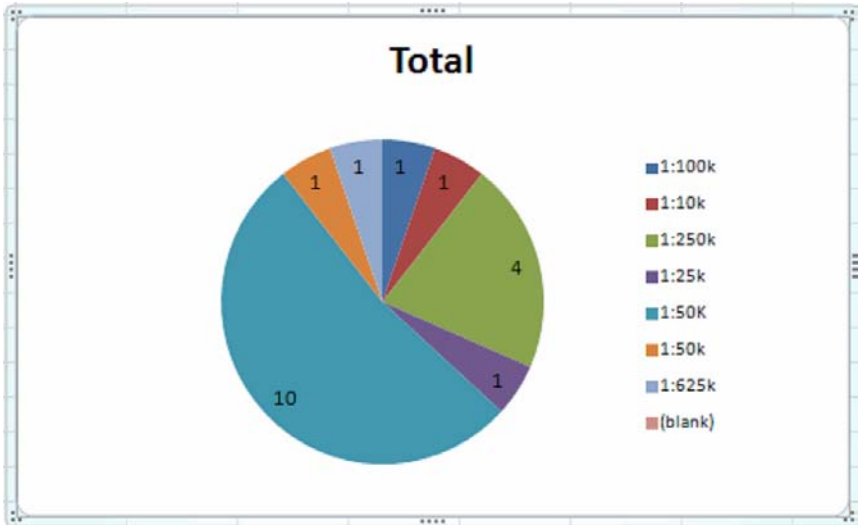
United Kingdom

Theme



Theme	Count of Theme	%
Economic / Mineral Resource / CCS	3	9.1
Geology Offshore	3	9.1
Geology Onshore	6	18.2
Geophysics	8	24.2
Natural Risk / Geohazards	5	15.2
Soil / Environmental Chemistry / Geochemistry	5	15.2
Water	3	9.1
Grand Total	33	100.0

Scale



Scale	Count of Scale	%
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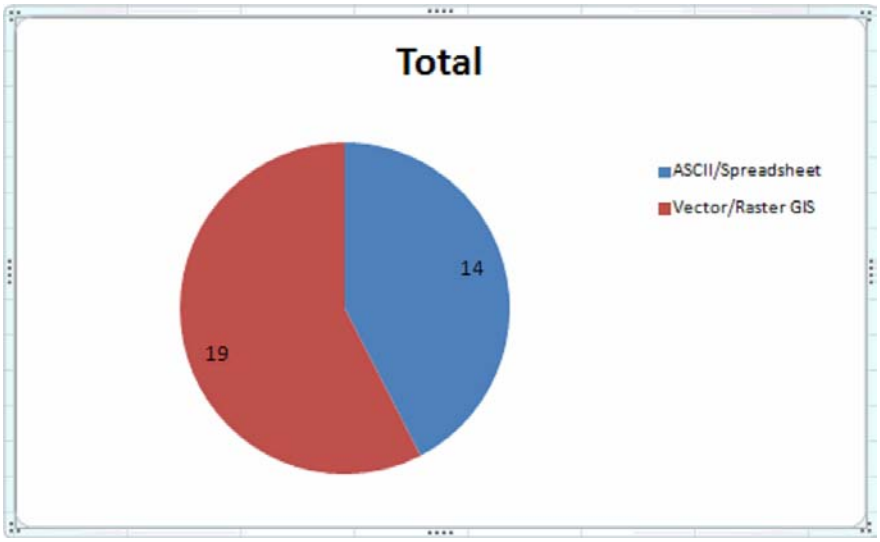
1:10k	1	3.0
1:250k	4	12.1

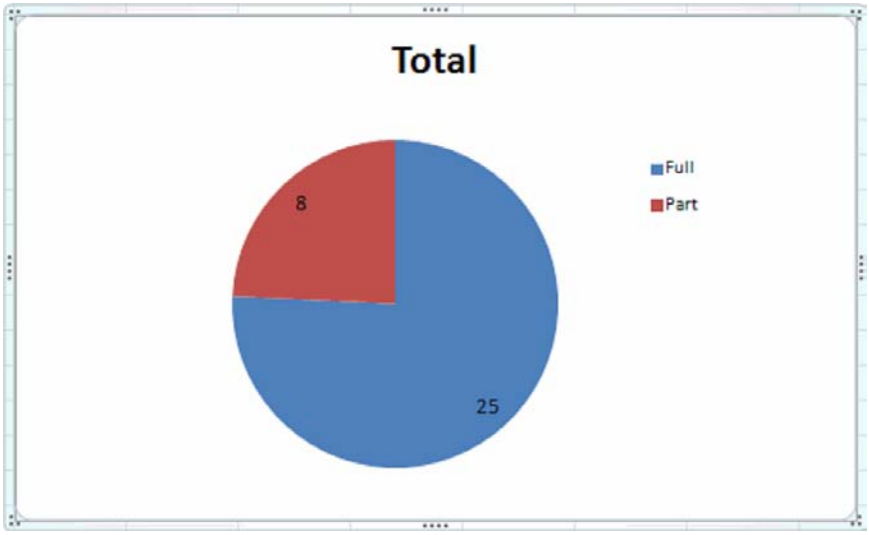
1:25k	1	3.0
1:50K	10	30.3
1:50k	1	3.0
1:625k	1	3.0
(blank)	14	42.4
Grand Total	33	100.0

Format



Format	Count of Format	%
ASCII/Spreadsheet	14	42.4
Vector/Raster GIS	19	57.6
Grand Total	33	100.0

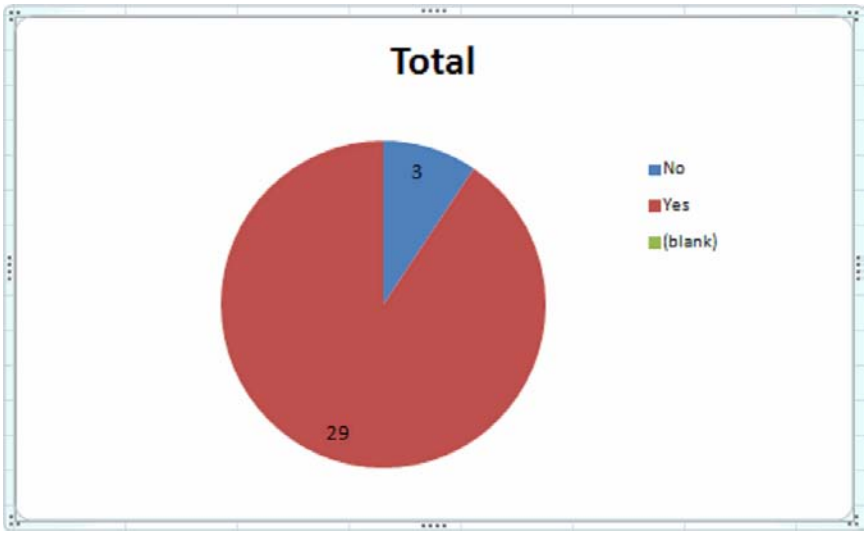
Coverage



Coverage	Count of Coverage	%
Full	25	75.8
Part	8	24.2

Grand Total	33	100.0

Metadata



Metadata	Count of Metadata	%
No	3	9.1
Yes	29	87.9
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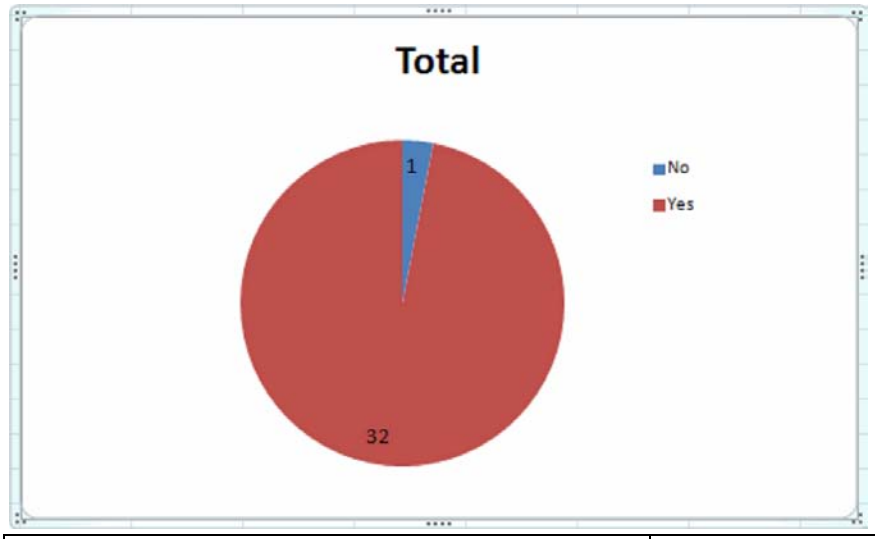
Grand Total	33	100.0

Cost

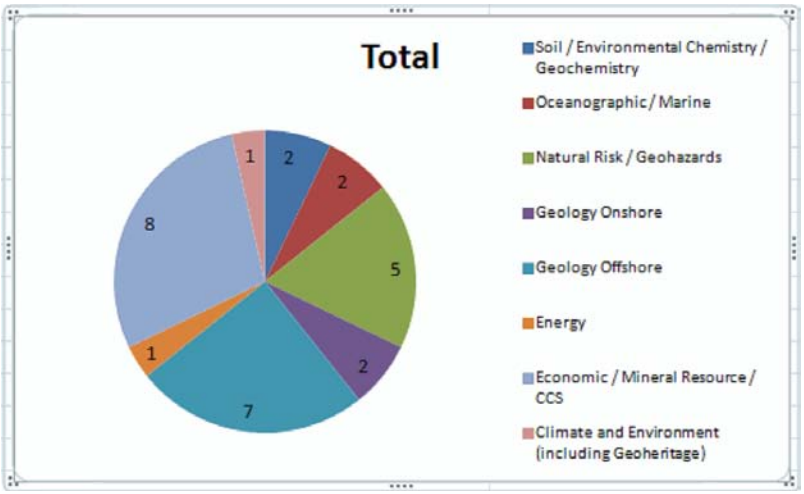


Cost	Count of Cost	%
No	1	3.0
Yes	32	97.0
Grand Total	33	100.0

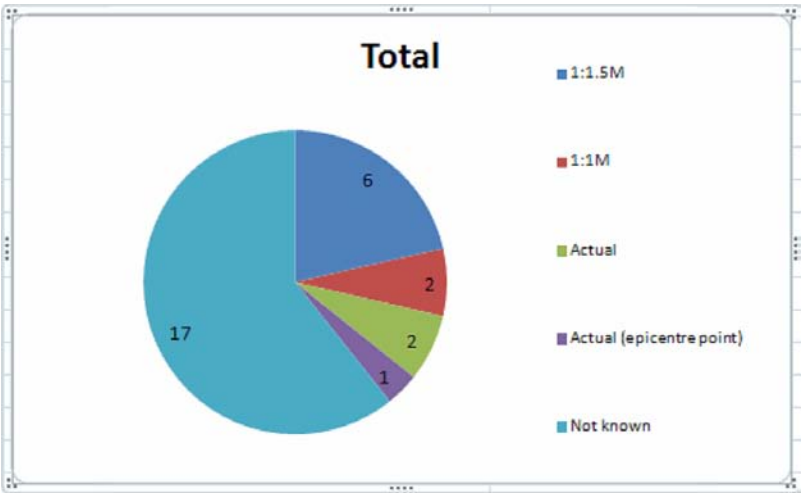
Appendix 4: Questionnaire results

Summary, compiled by EGDI-scope from EU projects collated at T3.1

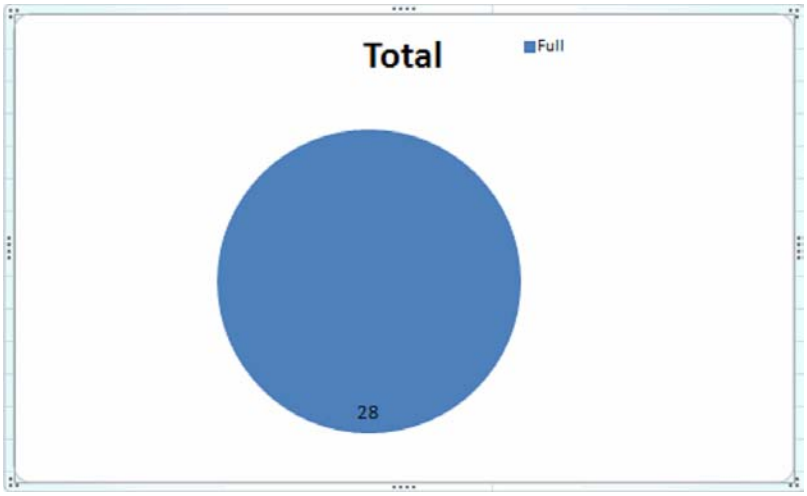
Theme



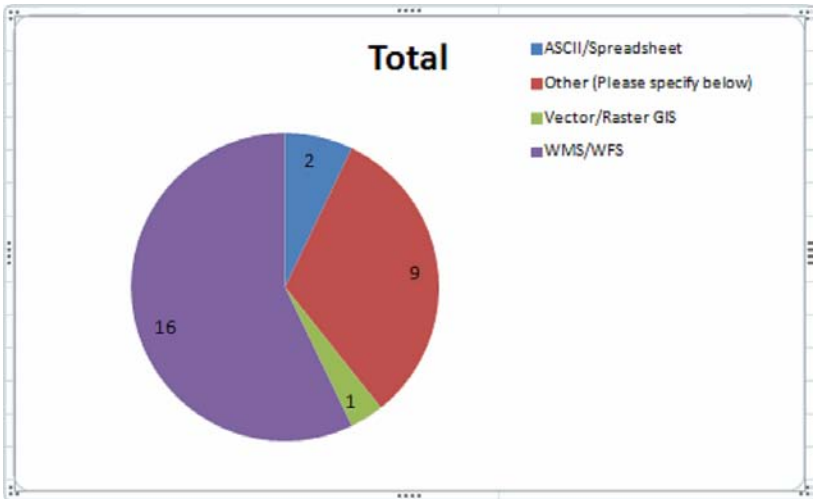
Scale



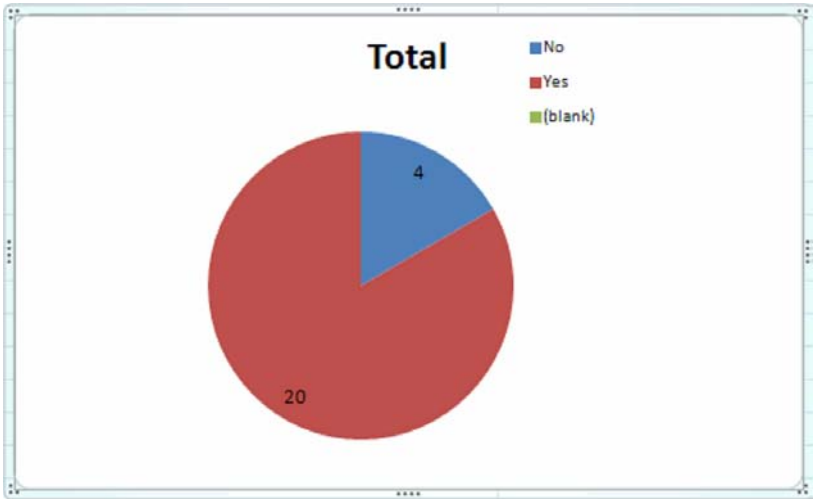
Coverage



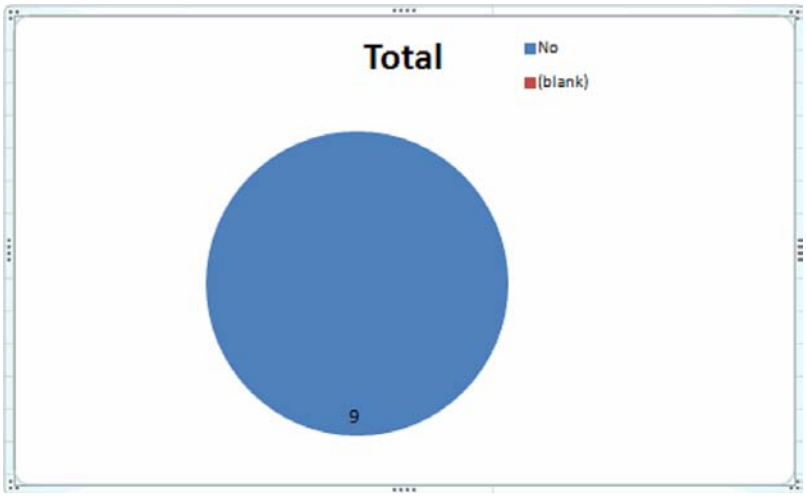
Format



Metadata



Cost


Total
No
(blank)
9