



The Use of Spatial Data for the Preparation of Environmental Reports in Europe

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EXECUTIVE SUMMARY

This report presents the findings of an online survey on the use of spatial data to produce environmental reports conducted by the European Commission Joint Research Centre in 2009. The objectives of the survey were twofold: on the one hand, to understand how easy it is for practitioners to obtain the spatial data they need to carry out Environmental Impact Assessments (EIAs) and/or Strategic Environmental Assessments (SEAs) and on the other hand, to provide information to the European Commission (EC) on the developments made in the use of spatial data to undertake EIAs and SEAs. The 2009 survey represents, in fact, an update of a similar survey conducted in 2002 by DG Environment and provides where relevant a comparison of results. A significant increase in the number of respondents was registered since the original survey, however it should be noted that the sample does not represent all practitioners that carry out EIA/SEA reports in Europe. Nevertheless, the results give an indication of the trends and problems in the market of EIA and/or SEA. The main outcome of the survey is that practitioners still face problems in using spatial data for the preparation of environmental reports. Issues mainly relate to finding and accessing data of the quality needed for the purpose. As a consequence, there is an increase in cost and time to produce environmental reports. The estimate of such additional burden is quantified as well as potential savings that could be achieved if problems connected with the use of spatial data were removed.

SECTION I: INTRODUCTION AND CONTEXT

1 Introduction

1.1 Background to SEIS-BASIS

SEIS-BASIS aims to address our current limited understanding of both the comparability and quality of data about the environment. Such barriers present time-consuming and costly problems that limit the usability, efficient assessment and ready conversion of data into information that meets the needs of users. Data comparability is hampered by issues such as diverging definitions between thematic groups, varying data collection practices and methodologies, a lack of common standards, insufficient interoperability of the systems used between monitoring activities and a lack of coordination of monitoring programmes between different levels of government and across borders.

Launched by DG ENV and carried out by the JRC, in collaboration with the EEA and the Member States, SEIS-BASIS documents the current state-of-play of environmental monitoring across Europe to address such challenges through three main objectives:

1. To provide a baseline assessment of the operational capacity of the 27 EU Member States (plus Norway and Switzerland) when collecting data required for:
 - a) The implementation of the environmental *Acquis*, including reporting obligations
 - b) The integration of environmental concerns in other policies
2. To undertake a comparative analysis and fitness-for-purpose assessment of environmental data and related information.
3. Identify and assess policy options that address the gaps and barriers identified in the studies above.

This report presents the findings of a survey of EIAs and SEAs practitioners that contributes to the second objective.

1.2 Findings of the 2002 survey

The key findings of the 2002 survey revealed that the vast majority of the organisations carry out less than 25 EIAs and SEAs per year and most of them employ less than five full time equivalent staff for the preparation of such environmental reports, indicating the small size of the industry. The mean turnover per study was found to be € 73,135 and it took on average six months to produce a report. The most frequent problem that practitioners faced when using spatial data related to access (70%), followed by difficulties with finding out which data is available (56%) and unavailability of the data needed (51%). These problems were felt to increase both the time needed to prepare environmental reports by 7-8% and their cost by 5-6%. Vanderhaegen and Muro (2005) estimated that 20,000-38,000 EIAs and 6,000-10,000 SEAs were carried out every year in the EU-25. Based on this assumption and on the above mentioned results in terms of turnover and time per study, it was estimated that annual savings of 100-230 million Euro per annum would be achieved if additional costs and time due to problems with the use of spatial data were removed.

1.3 Overview of the 2009 survey and its objectives

This survey was undertaken by the Joint Research Centre of the European Commission, in the context of the SEIS-BASIS project, to find out how easy it is for European Environmental Impact Assessment (EIA) and/or Strategic Environmental Assessment (SEA) practitioners to obtain the spatial data they need.

The objective of this survey was also to provide information to the European Commission (EC) on the developments made in the use of spatial data to undertake EIAs and SEAs, to understand how 'fit-for-purpose' and readily available such environmental information is across countries and to allow for comparisons to be made to a similar survey conducted in 2002 by DG Environment.

Repeating the original survey of 2002 not only helps to identify the issues that are relevant to the SEIS-BASIS project but also contributes to the development of user requirements for Annex II and III of the INSPIRE Directive¹.

The important link to this Directive is confirmed by one of the outcomes of the 2009 survey, according to which between 11 and 20 different INSPIRE spatial data themes are used by a large proportion of respondents (30%) to produce EIA or SEA reports. This result shows on the one hand how important the implementation of INSPIRE is to environmental applications such as EIAs and SEAs, and on the other hand, the value of these applications, which are legally required across Europe, to identify user needs and thus contribute to the specification development for INSPIRE.

The questionnaire was devised by DG JRC in Ispra, adapted on the original 2002 survey, and distributed to EIA/SEA practitioners who analyse the impacts of plans and projects and prepare impact assessment reports.

The total number of respondents (as of November 2009) was 128, representing a substantial increase from the 50 respondents of 2002. The remainder of this report provides an outline of the methodology to recruit respondents. This is followed by a description of the sample in terms of the type of organisations and the activities they do in relation to EIA and SEA. Section 3 then considers the use of spatial data and the problems practitioners face in acquiring and applying the data to assessments before providing a summary of results and the conclusions.

1.4 Methodology

The survey was carried out online using LimeSurvey with a questionnaire divided into four sections:

- Part A - Information relating to the participating organisation
- Part B - Type of EIA/SEA activities
- Part C - Use of spatial data for preparing EIA/SEA reports; and
- Part D - Problems associated with spatial data when preparing EIA/SEA reports.

¹<http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2007:108:SOM:EN:HTML>

Respondents were recruited to the survey using the membership of the International Association for Impact Assessment (IAIA, via two newsletters) and mailing lists provided by EU Member States (plus Norway and Switzerland), either directly or by indicating contact details on relevant websites.

In addition, the European Commission Expert Group on EIA and SEA and a European-wide town planning project (Plan4All) were asked to disseminate the link to relevant practitioners, and the link to the survey was also made available on the INSPIRE homepage. Appropriate responses were secured by asking a filter question at the start of the survey about a respondent's role in EIA and/or SEA activity and the countries where they are based.

The analysis also includes some of the results from another survey undertaken by DG JRC and dedicated to practitioners involved in EIA and SEA reports within Regione Lombardia in Italy. This accounts for a total of 22 records. Moreover, some copies of the survey were distributed during a workshop in Rome on EIA/SEA organised by the Italian Ministry of the Environment in July 2009 and the results have also been included in the sample. Overall, the approach aims to gather evidence from a wider group of organisations than the original 2002 sample.

When comparing the two surveys (2002 and 2009), the 2002 figures mainly come from the Atkins report on their questionnaire (Spence *et al.*, 2003), supplemented by Vanderhaegen and Muro (2005).

SECTION II: ANALYSIS OF THE 2009 SURVEY

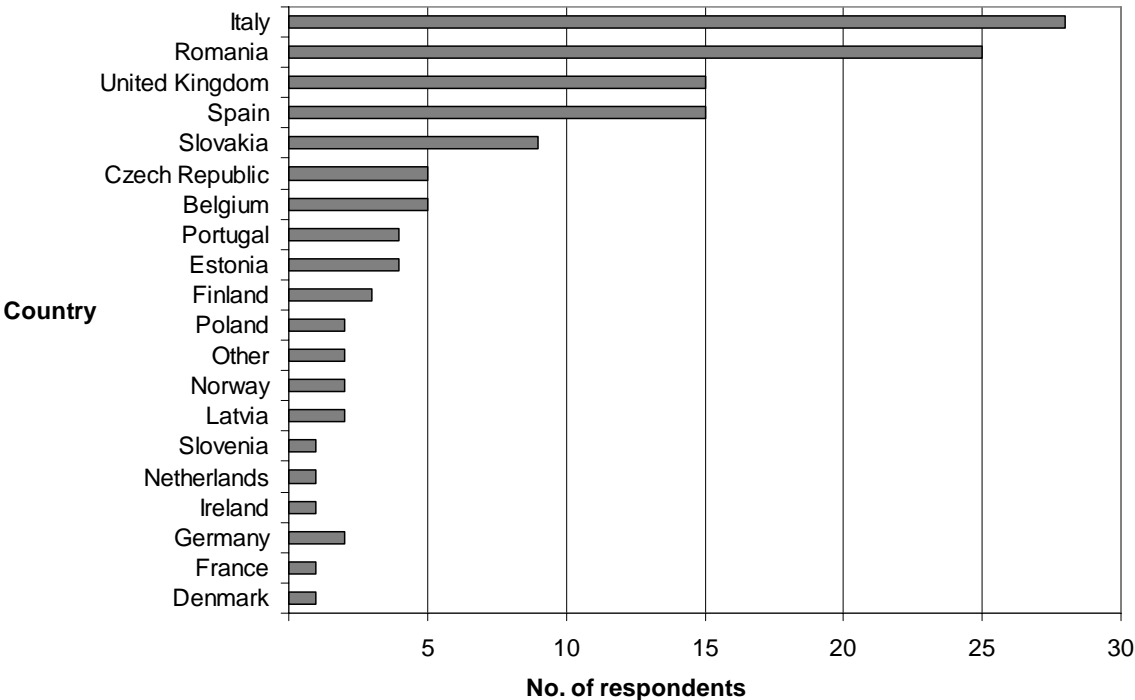
2 INFORMATION ABOUT THE ORGANISATION AND EIA/SEA ACTIVITIES

2.1 Geographical coverage

Geographical coverage includes both where the respondents' organisation is based and where they undertake EIA/SEA activities.

All respondents gave information about the country where their organisation is based. The survey covered 21 European countries, involving 18 of the 27 Member States of the EU. Compared to the original survey of 2002, the current sample of respondents is quite different, as the 2002 survey had responses from 9 countries and the EU has 12 new Member States since 2002. The two most representative countries are Italy and Romania, accounting for 22% and 20% of the total responses respectively. The high figure for Italy is justified by the decision to integrate the responses of the Regione Lombardia survey, as noted above. Figure 1 below shows the division of the 128 participants by country.

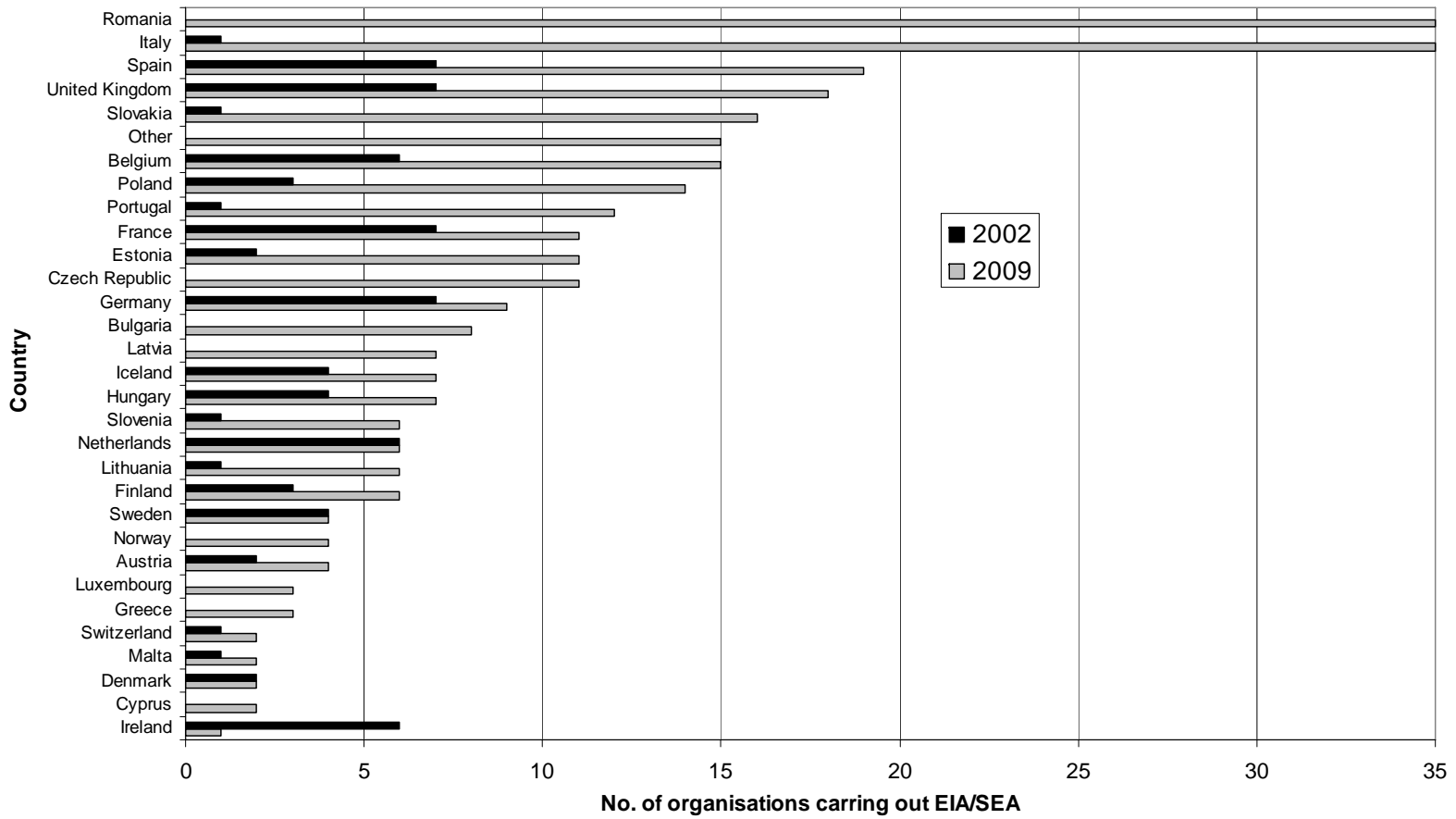
Figure 1: Country where the organisation is based



Moreover, all participants noted in which countries they carried out EIA/SEA. The results are displayed in Figure 2, where results from the original survey are also included for comparison purposes.

Despite the fact that not all 27 EU Member States are represented in the 2009 survey, respondents indicated that their activities took place across all of them, as well as countries such as Norway, Switzerland and Turkey.

Figure 2: Country where the organisation carries out EIA/SEA



The majority (73%) of participants only carries out EIA/SEA in 1 country, which was assumed to be the country where their organisation is based, while only 5% of respondents indicated that they carry out EIA/SEA in 10 or more countries. The most active countries were Romania, Italy, Spain, the UK and Slovakia. Compared to the original survey, it is evident that more countries are now represented, like Cyprus, Greece and Romania and for countries already included in the original survey, there is an overall increase in the organisations involved, with Ireland being the only exception.

2.2 Size of the organisation

For the study the size of the organisation was considered to include the number of full time equivalent (FTE) personnel involved in preparing EIA and SEA reports.

All participants gave information relating to the number of FTE personnel and the results are shown in Table 1.

Table 1: Number of staff involved in preparing EIA and SEA Reports

Number of staff	Number of Participants
1-5	76
6-10	16
11-20	19
21-50	8
>50	9

The majority (60%) of participants employed less than 5 full time staff for the preparation of EIA and SEA reports. 33% of organisations employ between 6 and 50 people for their EIA/SEA activity. Only 7% of the sample employs more than 50 FTE personnel. This confirms the small and medium size of the activity. The findings are in line with the original results, where 55% of participants employed less than 5 FTE personnel.

2.3 Annual turnover

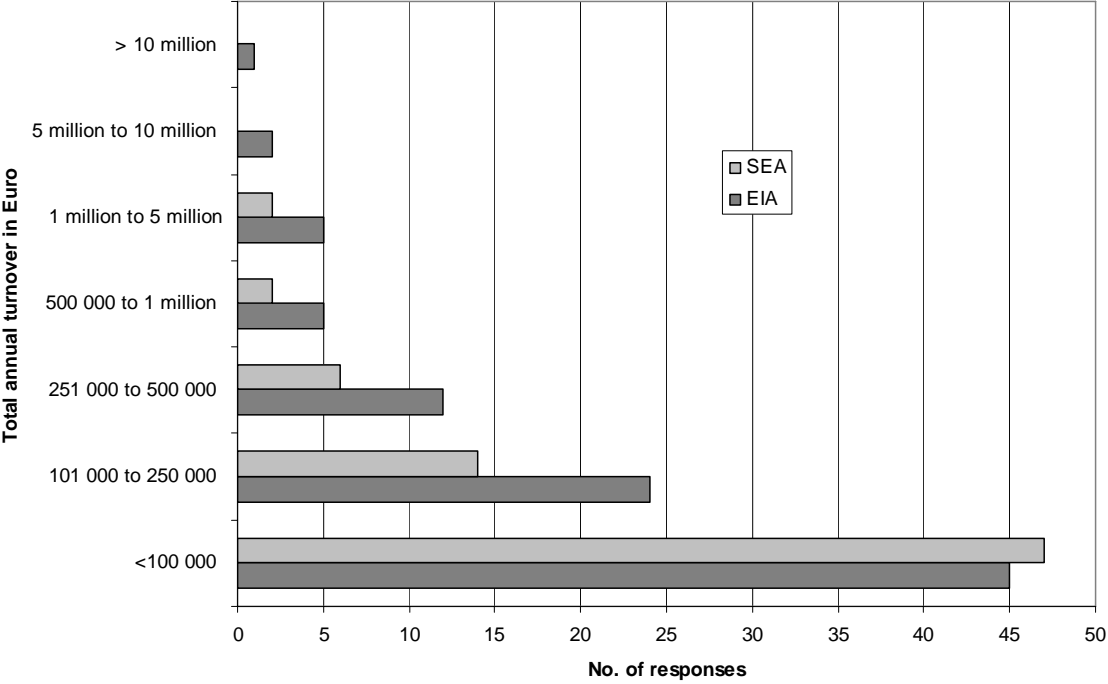
In the questionnaire we considered annual turnover to relate to the participating organisations' annual turnover for undertaking EIA and SEA activities. The two versions of the questionnaire (2002 and 2009) use slightly different ranges for response options. Given the relatively small size of the sector, the ranges of turnovers have been split into smaller classes, in order to better understand possible variations.

The questionnaire for Regione Lombardia was based on a slightly different scale, where the categories 1-5 million and 5-10 million Euros were merged into a single class. Moreover, participants were asked about total annual turnover both for EIA and SEA combined. Given these considerations, we decided to analyse those results (19 records) separately from the other survey respondents.

The annual turnover for carrying out EIA is less than €100,000 for 48% of respondents, between €101,000 and 250,000 for 26% and from 251,000 to 500,000 for an additional 13%. The remaining 14% of respondents reported an annual turnover over € 500,000, half of which were based in the UK.

The same trend can be seen for SEA, where 94% of respondents declared having a total turnover up to €500,000, of which 66% fell into the less than €100,000 category. Only 6% of respondents declared to have an annual turnover above € 500,000 and where half of these were again located in the UK. Comparative results are reported in Figure 3 (where results for Regione Lombardia have not been included).

Figure 3: Total annual turnover (in €) for EIA and SEA



In terms of the respondents from Regione Lombardia, 47% indicated that the total annual turnover for EIA and SEA activity together is less than €100,000 while for another 26% the total annual turnover is between €101,000 and 250,000. Another 16% of the participating organisations declared their annual turnover for EIA and SEA activity together to be over € 500,000.

It is clear that the majority of organisations involved in EIA/SEA reports across Europe are medium-sized companies, whose turnover is normally below €100,000. In the sample of total respondents, some outliers were found where the turnover is over €1 million, especially in the EIA sector. This may be explained by the more mature nature of this type of assessment compared to SEA.

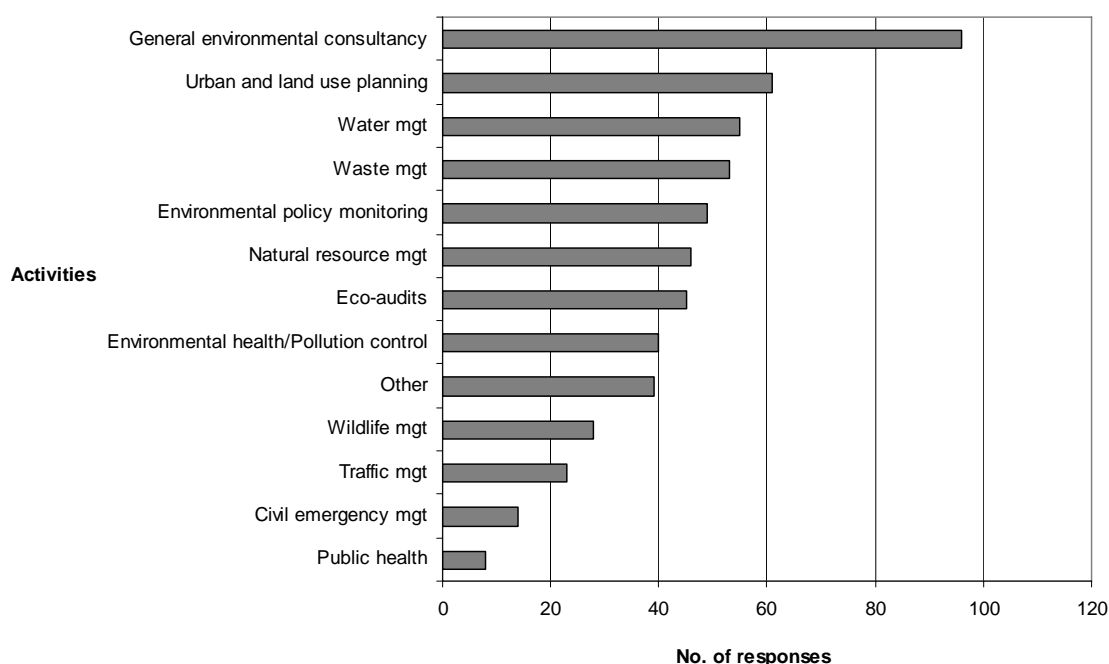
In the original survey 81% of participants indicated that the annual turnover for carrying out EIA and SEA reports was less than € 1 million and none reported a turnover greater than € 10 million. It would appear that the scaling used in the 2009 survey showed that the annual turnover for many practitioners is much lower than the 2002 lowest class (€ 500,000) would indicate.

2.4 Activities carried out by the organisation

This section aims to understand the range of activities that practitioners are involved in. 126 respondents provided information on this issue (see Figure 4).

The majority of participants were involved in both EIA and SEA (63%), while fewer indicated carrying out only EIA (29%) or SEA only (8%). The results are similar to the 2002 survey when 70% of respondents were involved in both EIA and SEA activities, while 26% only in EIA and only 4% in SEA.

Figure 4: Activities carried out by the organisations



Other main activities that participants were involved in include general environmental consultancy (76%), urban and land use planning (48%) and water management (44%); the same top three activities for 2002 respondents. Two participants declared that EIA/SEA was their only activity, while 19% of respondents noted involvement in only 1 additional activity (apart from the main activity of EIA/SEA). Nearly 50% of respondents took part in 2 to 5 activities, while only 1 respondent was involved in all 13 activities.

2.5 Number of environmental assessments (EIA/SEA) carried out per year

Participating organisations were asked how many EIAs and SEAs they carry out per year. The results are shown in Figure 5 and Figure 6.

The majority of organisations carried out 1 to 5 EIAs and SEAs per year, as in 2002. However, some respondents have reported producing many more studies than in the previous survey. In 2002 the maximum number of EIAs was 51-100 studies per annum, where the 2009 figures indicate one organisation is producing over 500 studies per annum

and four are producing 101-500 studies per annum. Similarly, in 2002, the maximum number of SEAs was 11-25 studies per annum, where the 2009 figures indicate three organisations are producing 101-500 studies per annum, as well as some examples in the 26-50 and 51-100 ranges. In general, more EIAs studies are carried out than SEAs.

Figure 5: Number of EIAs⁽¹⁾ carried out per year

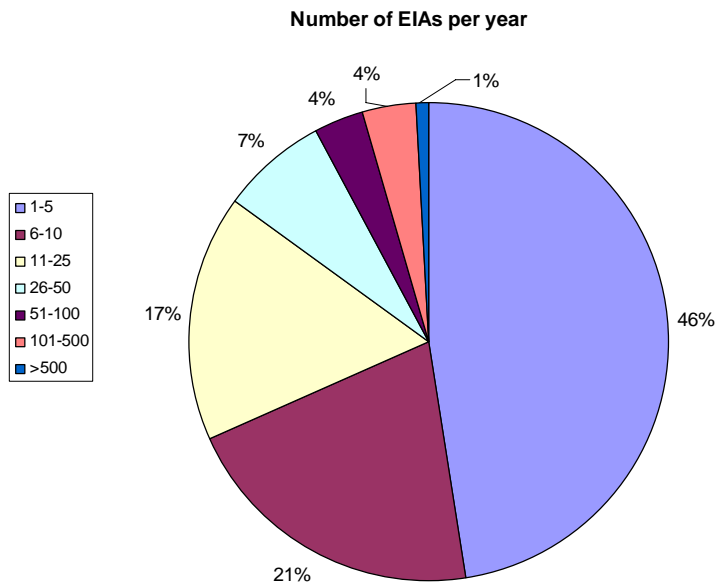
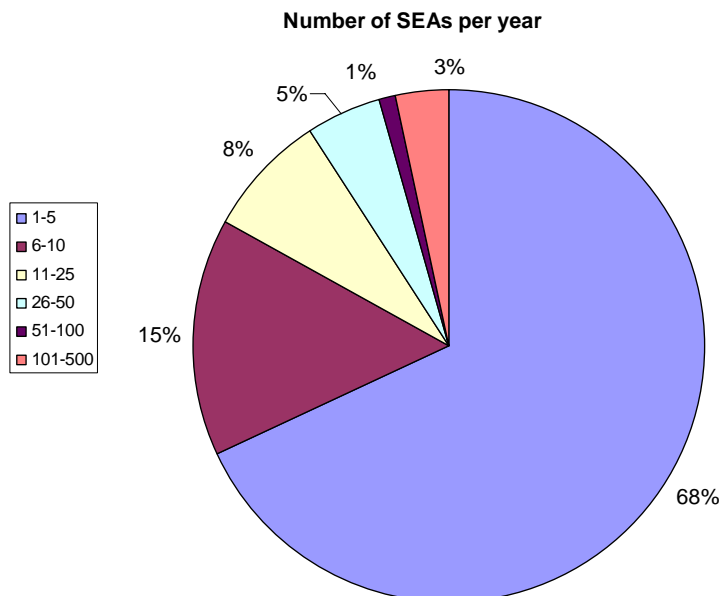


Figure 6: Number of SEAs⁽²⁾ carried out per year



Notes:

(1) 114 organisations that carry out EIA responded.

(2) 88 organisations that carry out SEA responded

2.6 Turnover per study

Knowing the total annual turnover and the number of EIA/SEA studies per year carried out by each organisation, we have also calculated the average turnover per single EIA/SEA report. In the survey for Regione Lombardia, participants were specifically asked about the turnover per single EIA/SEA study, therefore these results are presented separately.

For EIA, the average turnover per study was just over € 41,000 while for SEA, the average turnover per study is lower at € 29,000. Figures for Regione Lombardia confirm that the average turnover for EIA is higher than for SEA but with higher values (€ 79,000 for EIA and € 60,500 for SEA). Therefore, it could be argued that EIA and SEA activities are more complex and may take longer in some regions than in others.

It should be noted that the above mentioned figures represent just an approximation, given the methodology followed to calculate them.

We decided not to include the direct question in the survey for various reasons, and in particular:

- the original survey did not foresee this question, therefore for comparison purposes it was not included;
- the turnover per study is used as a proxy for the cost to produce such reports, which companies find often difficult to estimate or are unwilling to provide.

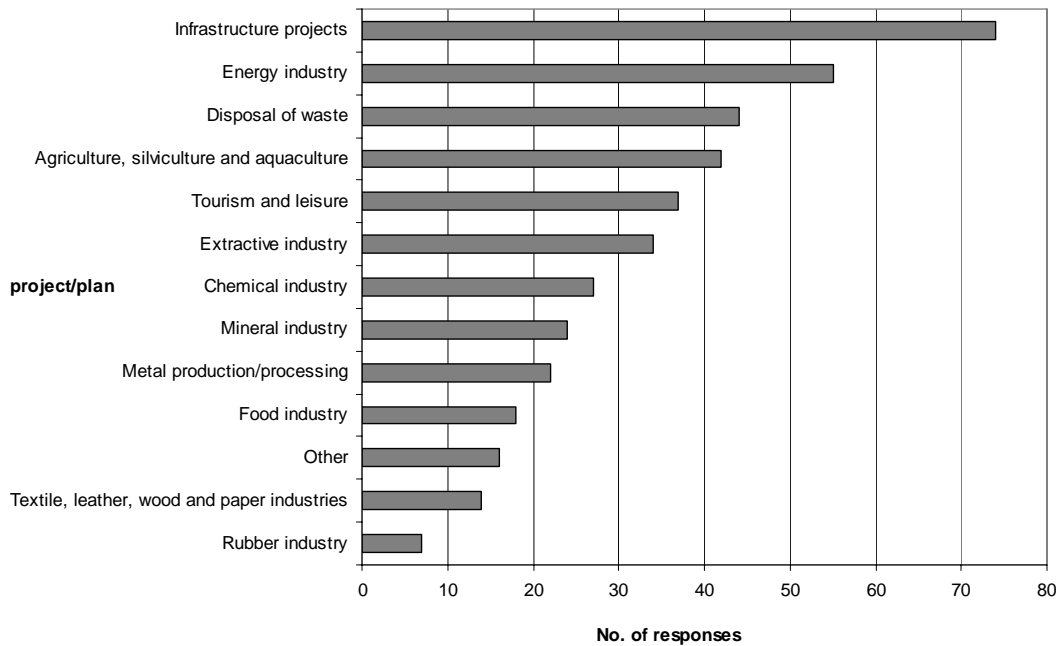
According to the original survey, the average turnover appeared to be higher at € 73,135 per study. The reduction in the turnover per single study compared to the 2002 survey, if confirmed, could be explained by the greater use of preliminary environmental assessments in some countries. Screening assessments are carried out as a routine, without the need to complete full environmental assessment, therefore reducing the time and the cost of these assessments.

Oosterhuis (2007) also commented on the costs of performing an EIA. The findings revealed that such costs are mostly less than 1% of the overall cost of the project although results vary considerably. In general, the percentage of the EIA component decreases with the project size and absolute amounts ranged between a few thousand to more than 100,000 Euros.

2.7 Projects/plans for which the organisations carry out EIAs/SEAs

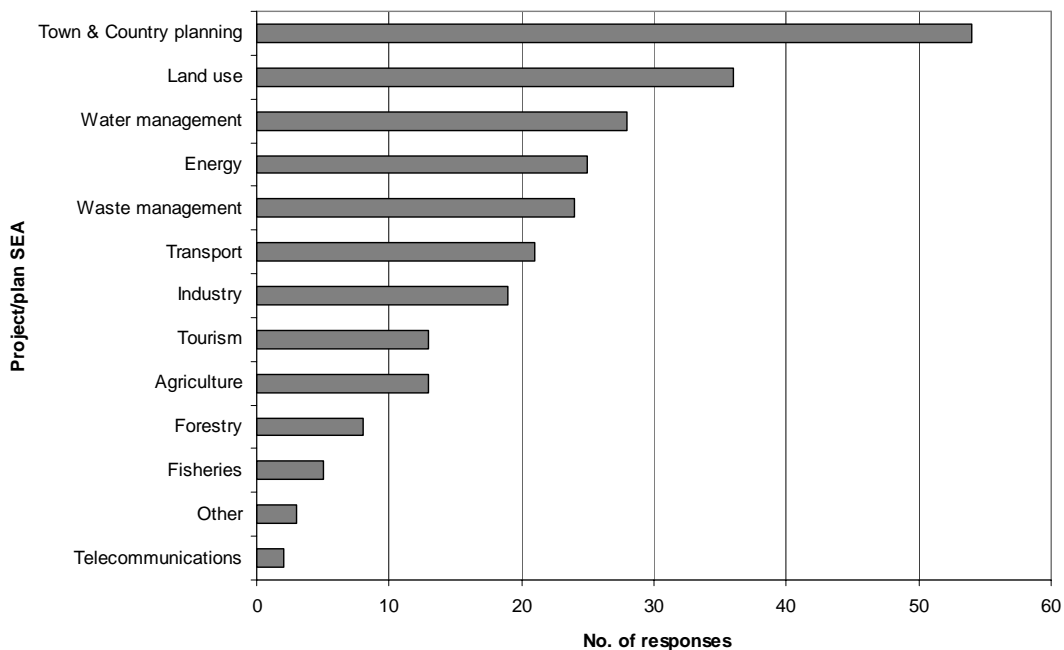
Participants were asked for which type of projects/plans their organisations carried out EIAs and SEAs. Most participants responded to this section of the questionnaire, where the most common projects were in the infrastructure (69%), energy (51%) and waste disposal (41%) sectors, as shown in Figure 7 “Other” types of EIA project specified by the respondents included: residential and mixed use developments, wind farms, golf courses and shopping centres. These three main project areas are the same as found in 2002.

Figure 7: Number of organisations involved in each type of EIA project



As shown in Figure 8, projects and plans were the most frequently occurring activities in SEA, where town and country planning (68%), land use (45%) and water management (35%) were the most prominent. “Other” types of SEA project involved a national electric grid and operational programmes of EU funding.

Figure 8: Number of organisations involved in each type of SEA project

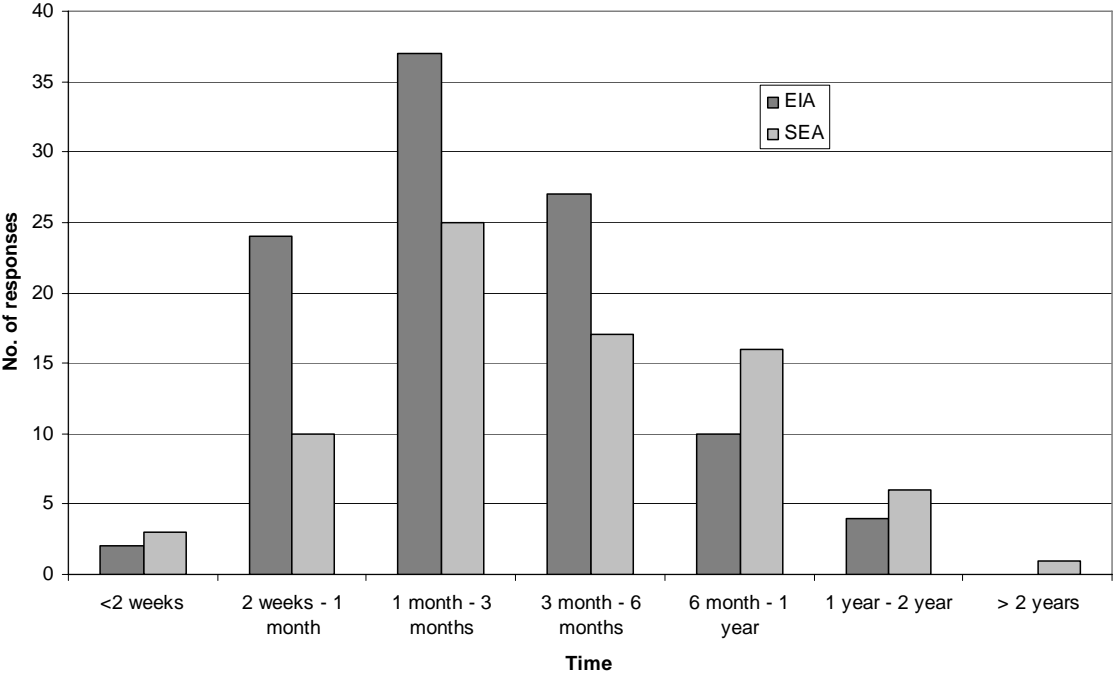


In 2002, the three main project areas were 'town and country planning', 'transport' and 'land use'.

2.8 Average time needed to complete a EIA/SEA report

Most of the respondents gave information about the average time taken to complete either an EIA or SEA report. As shown in Figure 9, the majority of respondents indicated that it takes on average between 1 and 3 months to complete reports for EIAs (36% of respondents) and SEAs (32% of respondents) where SEA reports take longer.

Figure 9: Average time to complete an EIA and SEA report



In the original survey, the majority of respondents indicated that the average time needed to complete an EIA report was between 6 months and 1 year. This timeframe to complete a SEA report was also indicated by the majority of respondents. The observed reduction in the time taken to complete environmental reports could be explained by the fact that screening reports are included, too. As already mentioned in the section 5.6, these preliminary assessments require less time than full environmental assessments.

2.9 Experience with cross-border EIAs or SEAs

For the study, cross-border EIA/SEA was considered as any experience participants had in EIA/SEA activities in collaboration with other countries. Only 42% of respondents noted having experience with cross-border EIAs and SEAs. This has not changed compared to 2002, where 43% of participating organisations were involved in cross-border EIA/SEA. Such activity may present additional issues to do with access to data, including language barriers. These can be considered alongside other problems relating to access to geographical information that are addressed next.

SECTION III: PROBLEMS WITH SPATIAL DATA

3 USE OF SPATIA DATA AND RELATED PROBLEMS

3.1 Spatial data frequently used by the organisation for preparing either EIA or SEA reports

To explore the use of datasets in EIAs and SEAs, participants were asked to consider the themes in the Annexes of the INSPIRE Directive (see Figures 10, 11, and 12). Spatial data relating to protected sites, land use and habitats and biotopes were the most frequently selected themes in the preparation of EIA/SEA reports, all being used in over 70% of cases. The least frequently used data were those for sea regions and oceans. Only 7% of respondents declared that they used “other” types of spatial data. This included data relating to airports and polluted sites as well as specific datasets for climate change grids.

Figure 10: Spatial Data used to produce EIA/SEA reports for Annex I

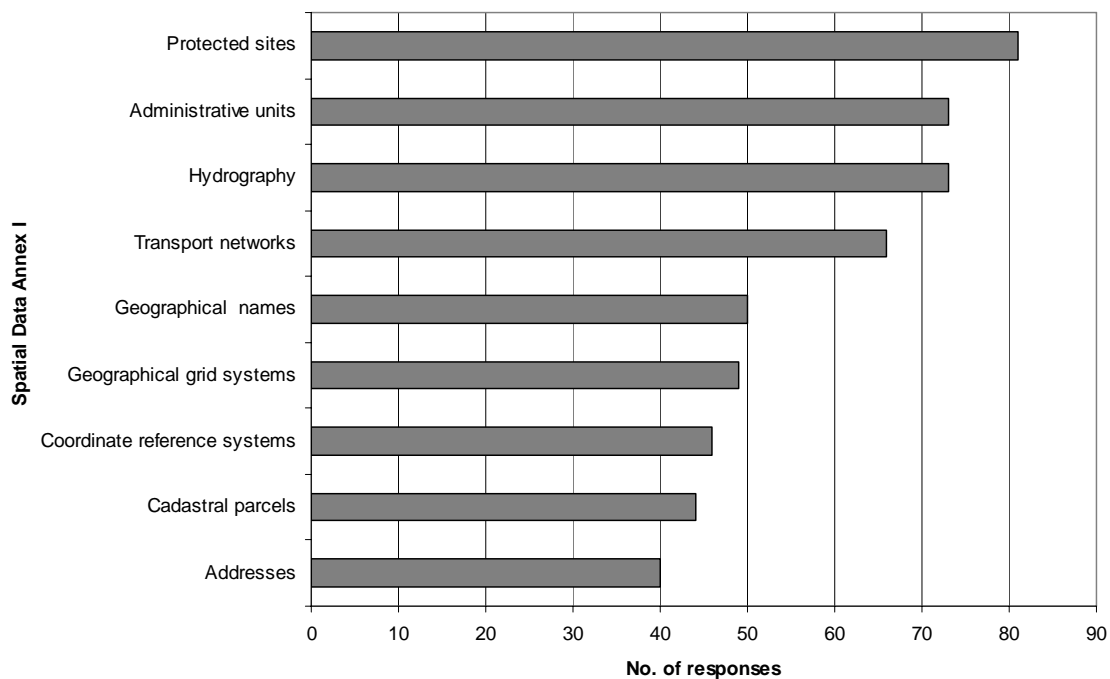
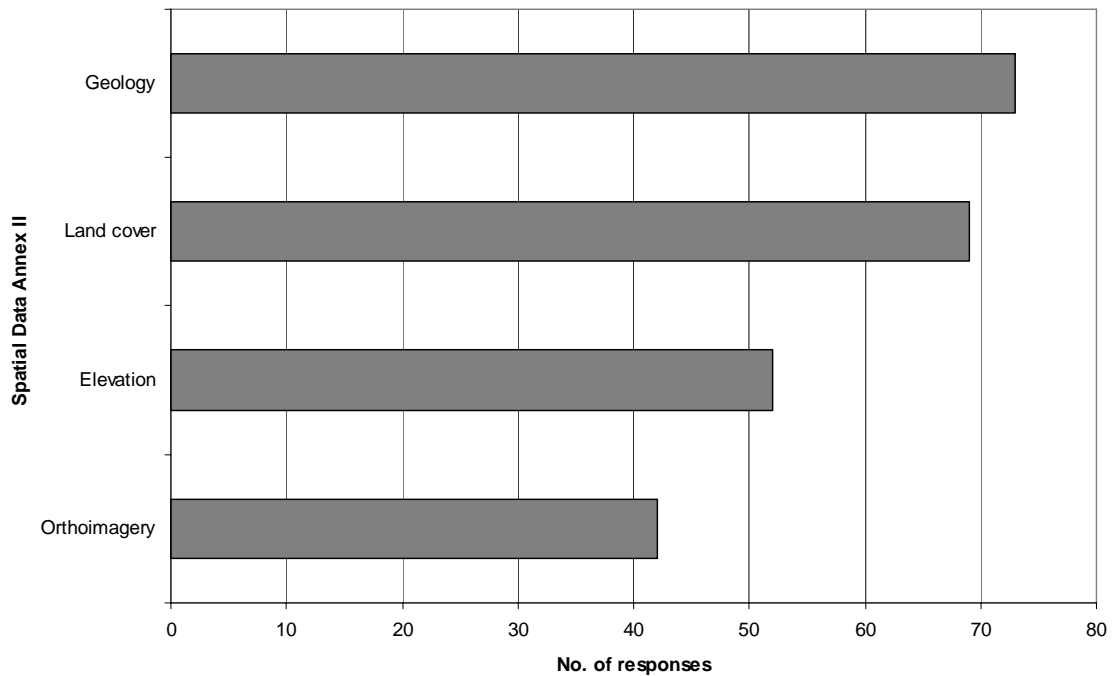
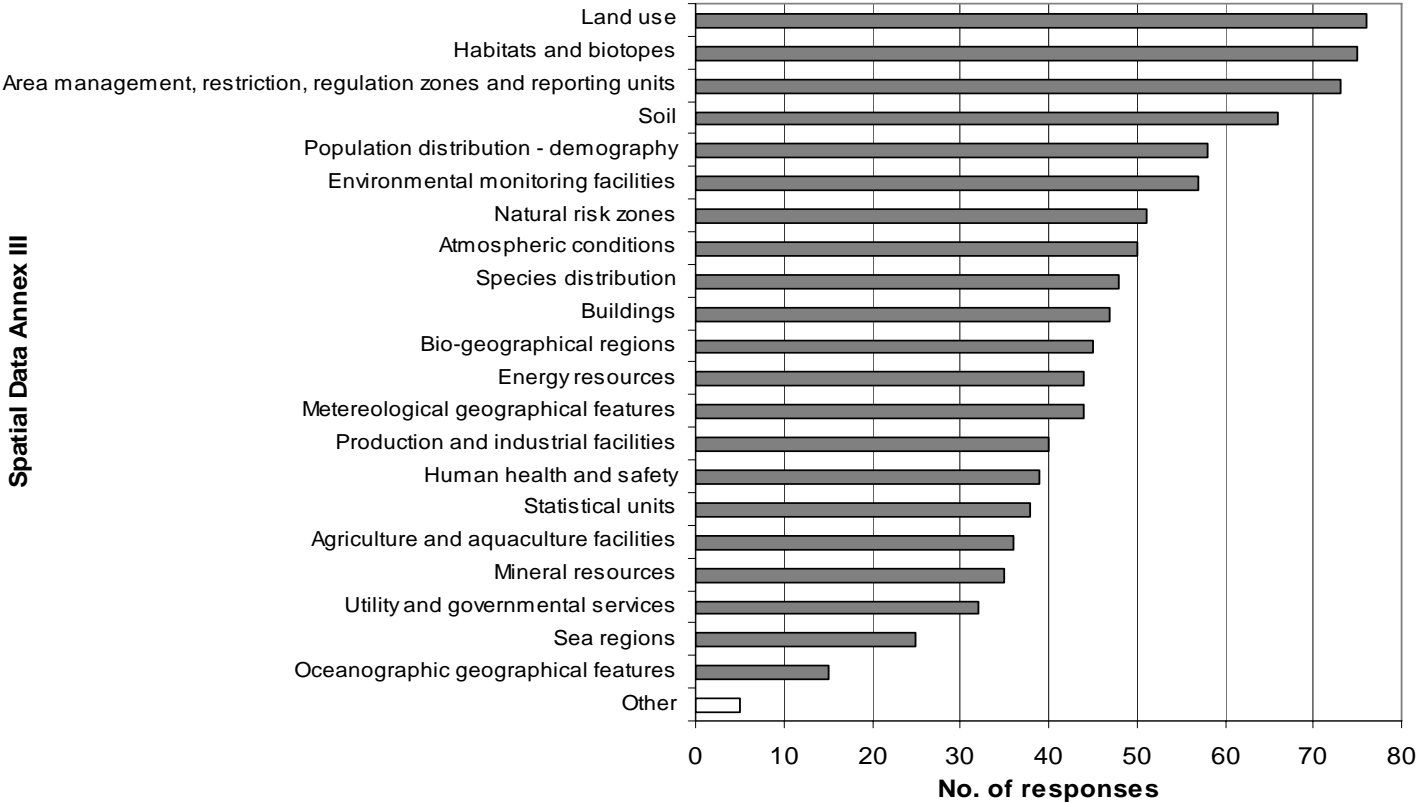


Figure 11: Spatial Data used to produce EIA/SEA reports for Annex II



Further analysis gathered information on how many different spatial data are used by the various organisations in the production of their environmental reports. Despite the fact that 22 respondents (17% of total respondents) did not answer this question, the results are quite evenly distributed among the total number of spatial data used (ranging from 1 to 34 types of data), following the INSPIRE themes. However, a large proportion of respondents (30%) use 11 to 20 different types of spatial data to produce various EIA/SEA reports.

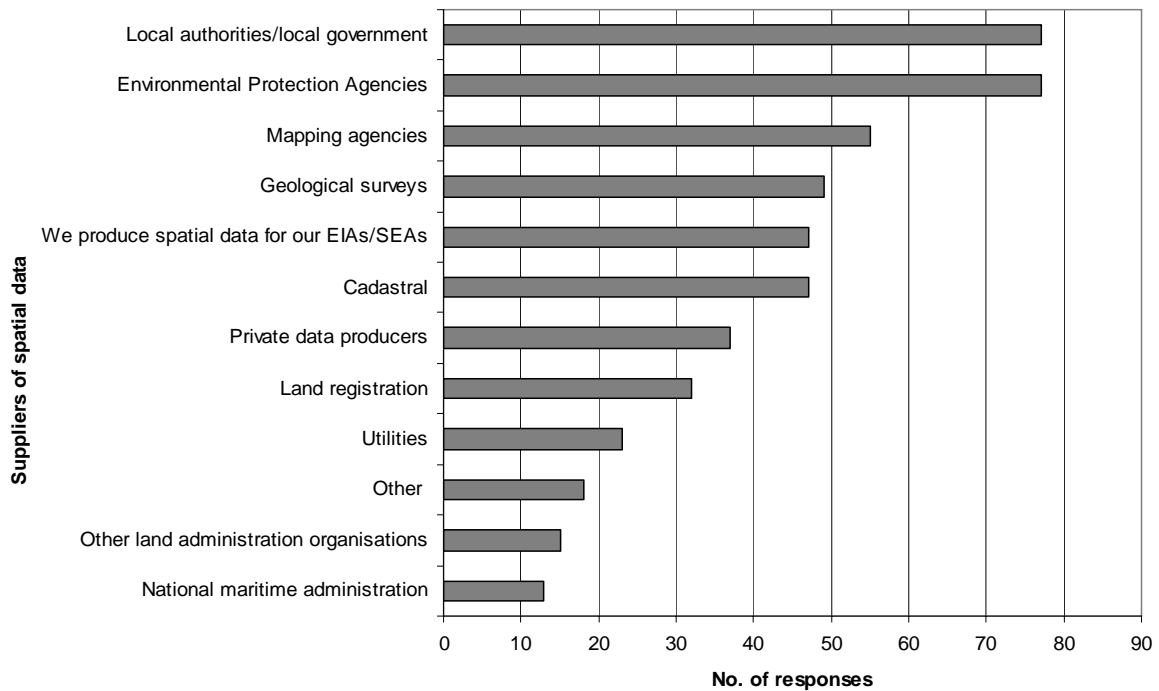
Figure 12: Spatial Data used to produce EIA/SEA reports for Annex III



3.2 Main suppliers of spatial data

Respondents indicated that the main suppliers of spatial data are Local authorities/local governments and Environmental protection agencies (73%) followed by Mapping agencies (52%). It is interesting to note that 44% of respondents produce their own data for EIA/SEA reports. Other sources of data include national and regional bodies as well as private companies who offer access to data products, including Google Earth.

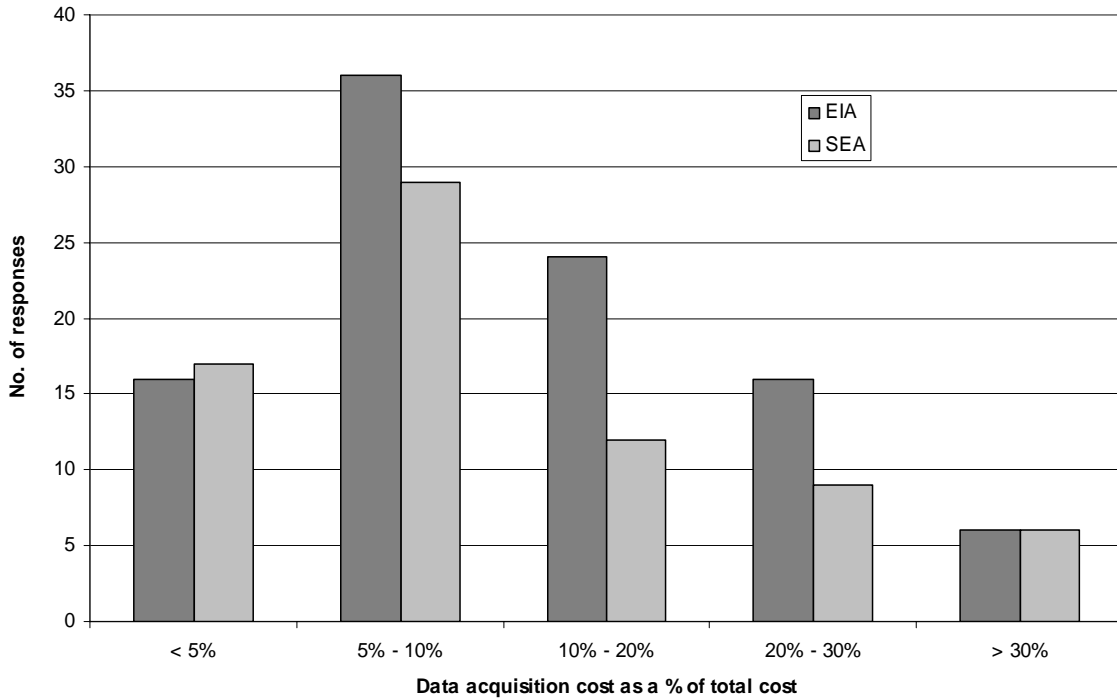
Figure 13: Participants using data from each type of suppliers



3.3 Data acquisition cost

For the study, data acquisition cost was considered as a percentage of the total cost to prepare EIA/SEA reports. Not all the respondents provided information on data acquisition costs. Results are summarised in Figure 14. The majority of EIA (37%) and SEA (40%) practitioners, declared that data acquisition costs represent between 5% and 10% of the total cost to produce an EIA or SEA report. Only a small percentage of practitioners (6% for EIA and 8% for SEA) indicated that the acquisition cost has an influence on total cost greater than 30%.

Figure 14: Data acquisition cost as a proportion of the total cost to produce reports



3.4 Reuse of data

For the study, ‘reuse of data’ meant that data acquired for one EIA/SEA report were subsequently reused to produce other reports. 83 respondents (65% of the sample) indicated that they reuse the data that they acquire for one report to produce other reports.

3.5 Types of operation spatial data are used for

Participants were asked to select all the types of operation they use spatial data for:

- 1) visualisation/presentation of impacts,
- 2) identification of impacts,
- 3) simple analysis, and
- 4) complex analysis/forecasting of impacts using modelling and scenario analysis.

From the analysis of the 103 responses to this question, it can be concluded that spatial data are mainly used to identify impacts (89% of cases), visualising and presenting impacts (82%) and for simple analysis and forecasting (75%). Almost 50% of respondents use spatial data for more complex analysis involving the use of models and scenarios. These findings are comparable to the ones revealed by the original survey.

The majority of respondents use data for three to four different types of operation, counting for 37% and 34% of the total respondents respectively, while only one or two activities concern respectively 12% and 17% of respondents.

3.6 Problems with the use of spatial data

Participants were asked to identify problems with spatial data in terms of:

- finding the data,
- accessing it,
- integrating it,
- low quality and
- high cost.

98 participants responded to this question. The most frequent problems practitioners face with the use of spatial data relate to finding the data (59%) and low quality (58%). These problems are followed by accessing the data (53%), integrating it (53%) and its high cost (48%). Only 4% indicated having none of the above mentioned problems, while 18% stated to have 'other' problems.

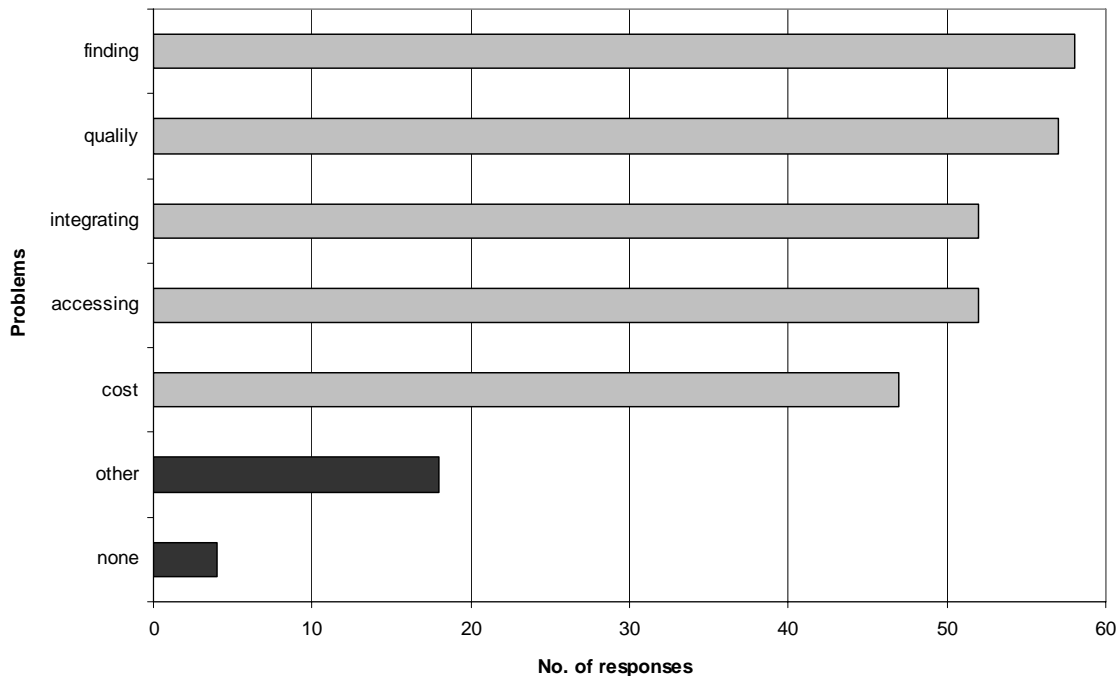
The high rate of 'other' responses is due to the fact that in the Italian survey more problems were listed than in the English version. These included:

- difficulties in obtaining information on the quality and technical characteristics of existing data;
- lack of staff to use existing datasets (i.e. in GIS applications); and
- the data needed are not available.

The original 2002 survey revealed that 90% of organisations experienced problems with the use of spatial data. In particular, accessing (70%) and finding (56%) the data were the most common problems, followed by integrating it and low quality (each 47%) and high cost (44%).

The current survey reveals that finding the data, assessing its quality and integrating it with other data remain just as problematic as in 2002; on the contrary access has become easier once the data is found. This can be explained by the higher number of data now available on-line.

Figure 15: Types of problems connected with spatial data's use



Almost 70% of respondents indicated that they face between 1 to 3 problems related to spatial data use, while 21% declared that they had 5 or more problems.

3.7 How problems with the use of spatial data affect EIA/SEA reports

Participants were asked how the problems described above affect the preparation of EIA/SEA reports in terms of:

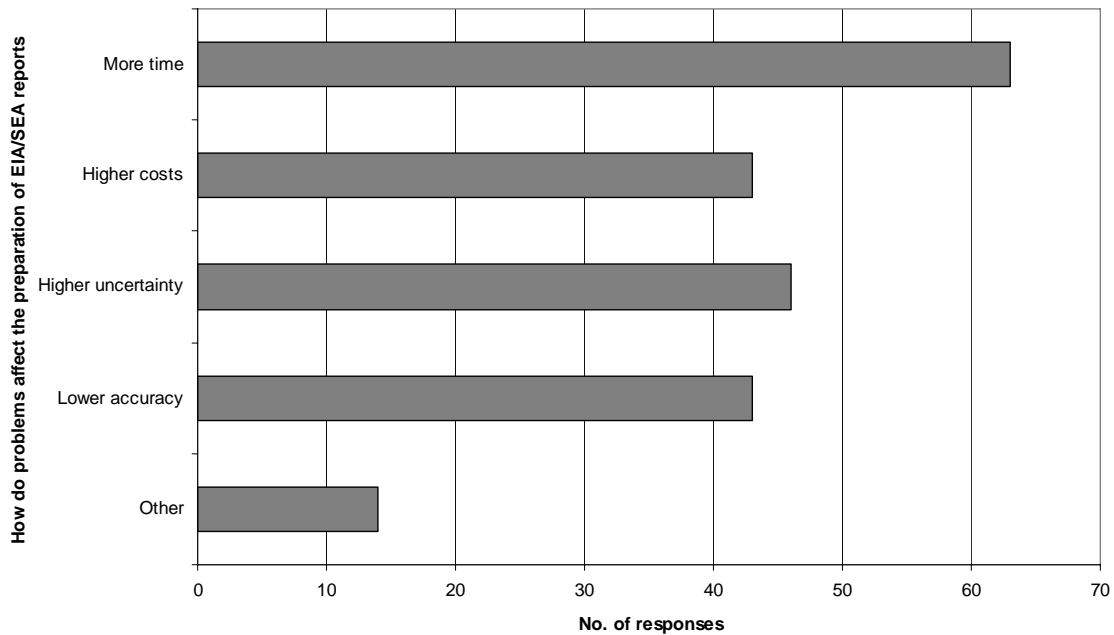
- lower level of accuracy when describing the impacts;
- higher uncertainty of impacts;
- higher cost of studies; and
- longer time.

The most common concern faced by respondents was that more time was needed to prepare EIA/SEA reports (68%), followed by higher uncertainty of impacts (50%), lower accuracy and higher cost (both at 47%).

The main problems indicated in the 2002 survey, were increase in time (58% of respondents) and in cost (53%).

Compared to the original results, time seems to have increased, however this should be read as a proportion of the total time needed to complete such reports, which is now shorter (see Section 2.8)

Figure 16: How problems affect the preparation of EIA and SEA reports



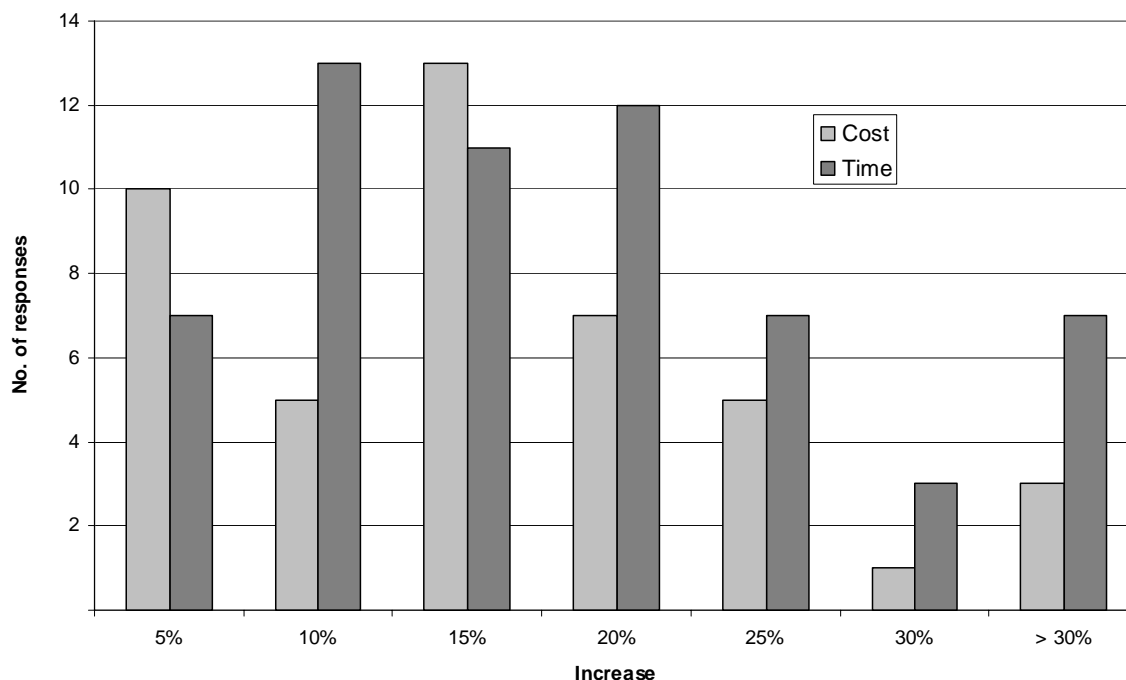
The Italian version of the questionnaire included more problems than the ones listed above, which have been aggregated into the category 'other'. 14 respondents indicated that problems connected with spatial data's use cause also 'other' problems, such as:

- difficulty in presenting the results of EIA/SEA reports in a comprehensible way to the public; and
- difficulty in comparing alternative projects.

3.8 Estimates of the increase in cost and time to produce EIA/SEA

Participants were asked to quantify the increase in cost and time caused by problems connected with the use of spatial data. On average, the incremental time was between 10% and 20%, while the incremental cost about 15%. Therefore they both have similar values, although it should be noted (Figure 17) that in fact time increases can have greater effects as indicated by the number of respondents showing impacts equal or greater than 30%.

Figure 17: Estimated incremental cost and time to produce EIA/SEA reports



In the 2002 survey the average cost increase was estimated at 5-6% and the average increase in time at 7-8%. It would therefore appear that this incremental ‘burden’ has widened. However, we need also to consider that at least on average, the overall length of time to undertake an EIA/SEA study, and costs have more than halved compared to 2002.

3.9 Amount of EIA and SEA activity

Recent studies commissioned by DG Environment to consultant COWI (2009) concerning the report on the application and effectiveness of the EIA and SEA Directive were also taken into account. We focused in particular on the number of EIA and SEA procedures carried out in the 27 Member States as reported by national experts. The data have been collected and summarised in Table 2 below. It should be noted that a conservative approach has been followed; in particular, where a range was given, the lower value was selected, the mean value was calculated when the number of studies was given for a cumulative period of time and additional details were found in the text. For some countries, like France and Germany, the number of EIA studies carried out per year was also confirmed by a recent GHK, Technopolis study (2008) commissioned by DG Enterprise.

According to the table below, nearly 24,000 studies, including screening, were carried out in 2006 in the EU-27. It should be noticed that this figure is an underestimate, not only in light of the conservative approach followed but also because some of the figures refer only to the national level, and therefore do not include all the environmental assessments carried out at regional/local level. These can be very substantial, as indicated by a study conducted in Regione Lombardia, Italy (Craglia M. and Campagna M., 2009). In this region, 69 national

EIAs were carried out in Regione Lombardia during 2000-2008, but during the same period there were also 700 regional EIAs and 1,300 screenings. This means that for each national EIA there were 10 regional EIAs and 20 screening procedures. Although in different countries and regions of Europe these ratios will differ depending on institutional practice and level of development (see for example Oosterhuis, 2007), they give nevertheless an indication of the potential very large number of studies that may be affected by the issues raised in this report, i.e. the 24,000 per year figure could be underestimated by a factor of 10.

Table 2: Number of EIAs and SEAs carried out in Europe in 2006

Country	Number of SEAs per year 2006 data or best estimate	Number of EIAs per year 2006 data or best estimate
AT	200*	131
BE	21	511
BG	109	2545
CY	2	75
CZ	12	197
DE	n.a.	1000
DK	n.a.	228
EE	165	77
ES	10	320
FI	1510	37
FR	440*	5000
GR	28	3100
HU	160	440
IRL	n.a.	597
IT	n.a.	n.a.
LT	75	669
LU	3	0
LV	88	850
MT	1	10
NL	64	102
PL	23	n.a.
PT	2	152
SL	338	n.a.
SK	19*	498
SV	220	1600
RO	105*	822
UK	400	597
TOT	3995	19558

* 2007 data

Knowing the number of environmental studies that are carried out yearly in the EU Member States, makes it possible to calculate the total cost of the EIA and SEA system and, as a consequence, the amount of savings that could be achieved when problems connected with spatial data are removed.

4 SUMMARY OF RESULTS AND CONCLUSIONS

The recent survey undertaken by JRC in 2009 revealed that the majority of responding organisations employs less than 5 full time equivalent (FTE) staff involved in the preparation of EIAs/SEAs.

The majority of organisations, involved both in EIA and SEA, have an annual turnover lower than 100,000 Euros. A small number of responding organisations declared to have an annual turnover, for EIA and SEA related activities, above 500,000 Euros. This percentage is higher for those organisations involved in EIA activities than for SEA and it can be explained by the relatively more consolidated industry of EIAs.

The majority of organisations carry out up to 5 EIAs or SEAs per year and the average time needed to complete these assessments is between 1 and 3 months; however, unlike in 2002, there is a general growth in the number of environmental assessments carried out yearly and a reduction in the time needed to complete them.

The most common projects, for which EIAs are carried out, relate to infrastructure, energy and waste disposal, confirming the outcome of the original survey. As to SEAs, projects mainly related to town & country planning, land use and water management.

Results from this recent survey indicate that the average annual turnover per study (taking into account all respondents together) is about € 46,000 for EIA and € 34,000 for SEA, down from an average of € 73,135 of the original survey. This reduction in turnover per study, if correct, could be explained by the greater use in some countries of preliminary assessments instead of full studies.

The survey also indicated that between 11 and 20 different spatial data are used by 30% of respondents in order to complete a EIA/SEA report. This indicate what a good perspective these studies offer, given the large number of the 34 INSPIRE data themes they cover.

The main outcome of the 2009 survey is that practitioners undertaking EIAs and SEAs in Europe still face problems connected with the use of spatial data. In particular, problems relate to finding and accessing data of the quality needed for the purpose. These problems cause an increase in cost and time to produce environmental reports. The vast majority of respondents face on average an increase in cost and time to produce such reports of approximately 15%.

Compared to the 2002 survey, where the average cost increase was estimated at 5-6% and the average time increase was estimated at 7-8%, it would appear that this incremental 'burden' has widened. However, we need also to consider that at least on average, the overall length of time to undertake an EIA/SEA study, and costs have more than halved compared to 2002. As a result the data issues have probably remained about the same in absolute terms, although as a proportion of the overall time and cost of the study they have increased.

On the base of the reported figures for the number of EIAs and SEAs per year, nearly 24,000 reports were carried out in the Member States in 2006. In a highly conservative approach, it can be assumed that the total number of EIAs and SEAs carried out in EU-27 has remained at the 2006 level. On average, each study cost € 40,000, implying that the market of EIAs

and SEAs can easily make up for € 1 billion. These figures show immediately the magnitude of the problems related with the use of spatial data. Therefore, if such problems (15% increase in cost) were resolved, this would conservatively lead to savings in the order of € 150 million.

However, if sub-national figures were also included, the number of studies could increase by up to 10 times as indicated in Section 3.9 and with that the savings that could be generated with better access to data. Moreover, the recent accession of Bulgaria and Romania to the European Union (EU) is believed to increase the level of infrastructural projects and therefore the need for environmental assessments in those countries.

On the base of these conclusions, we can therefore assume that the number of EIAs and SEAs per annum in the 27 Member States of the EU is greater than 24,000, implying also savings greater than € 150 million per year.

REFERENCES

COWI (2009). *Study concerning the report on the application and effectiveness of the EIA Directive*. COWI A/S, Kongens Lyngby, Denmark.

COWI (2009). *Study concerning the report on the application and effectiveness of the SEA Directive (2001/42/EC)*. COWI A/S, Kongens Lyngby, Denmark.

European Commission (2003). *How successful are the Member States in implementing the EIA Directive*. Report from the Commission to the European Parliament and the Council on the Application and Effectiveness of the EIA Directive (Directive 85/337/EEC as amended by Directive 97/11/EC).

GHK, Technopolis (2008). *Evaluation on EU Legislation – Directive 85/337/EEC (Environmental Impact Assessment, EIA) and Associated Amendments*. Final Report submitted within the framework of ENTR/04/093-FC-Lot 1. GHK, Birmingham, UK.

Oosterhuis F. (2007). *Cost and benefits of the EIA Directive*. Final report for DG Environment under specific agreement no. 07010401/2006/447175/FRA/G1. Institute for Environmental Studies, Amsterdam, The Netherlands.

Spence et al (2003). *INSPIRE Survey on Use of Spatial Data in the Preparation of EIA and SEA Reports*.

Vanderhaegen M. and Muro E. (2005). Contribution of a European spatial data infrastructure to the effectiveness of EIA and SEA studies. *Environmental Impact Assessment Review* 25 (2005) 123-142.

APPENDIX 1: SAMPLE OF THE QUESTIONNAIRE

Survey on the use of spatial data for the preparation of EIA & SEA reports

A. About your organisation

To help understand the variation in activity across Europe we would like to know some details about your organisation for classification purposes

* a1: In which country is your organisation based?

Please choose only one of the following:

Austria
Belgium
Bulgaria
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Norway
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden
Switzerland
United Kingdom
Other _____

*** a2: Does your organisation carry out:**

Please choose only one of the following:

Environmental Impact Assessment (EIA)

Strategic Environmental Assessment (SEA)

Both EIA and SEA

None of the above / Not applicable (End of the survey)

*** a3: Your organisation may work in more than one country. Please select all the countries where your organisation carries out EIA/SEA?**

Please choose all that apply:

Austria

Belgium

Bulgaria

Cyprus

Czech Republic

Denmark

Estonia

Finland

France

Germany

Greece

Hungary

Iceland

Ireland

Italy

Latvia

Lithuania

Luxembourg

Malta

Netherlands

Norway

Poland

Portugal

Romania

Slovakia

Slovenia

Spain

Sweden

Switzerland

United Kingdom

Other

*** a4: In which activities are you/is your organisation involved?**

Please choose all that apply:

General consultancy in environmental matters

Water management

Waste management

Urban and land use planning
Traffic management
Eco-audits
Environmental policy monitoring
Civil emergency management
Wildlife Management
Natural Resource Management
Public Health
Environmental Health / Pollution Control
Other
None of the above

B. Type of EIA/SEA activities

In this section we would like to know more about the characteristics of the EIA/SEA activities your organisation undertakes

*** b1: How many people in your organisation are involved in preparing EIA and SEA reports (numbers below are full-time person equivalents)?**

Please choose only one of the following:

1-5
6-10
11-20
21-50
> 50

*** b2: How many Environmental Impact Assessments (EIA) does your organisation carry out per year?**

Please choose only one of the following:

1-5
6-10
11-25
26-50
51-100
101-500
>500

*** b3: How many Strategic Environmental Assessments (SEA) does your organisation carry out per year?**

Please choose only one of the following:

1-5
6-10
11-25
26-50

51-100
101-500
>500

*** b4a: What is your annual turnover for carrying out Environmental Impact Assessments (EIAs)?**

Please choose only one of the following:

<100 000 Euros
101 000 to 250 000 Euros
251 000 to 500 000 Euros
500 000 to 1 million Euros
1 million to 5 million Euros
5 million to 10 million Euros
> 10 million Euros

*** b4b: What is your annual turnover for carrying out Strategic Environmental Assessments?**

Please choose only one of the following:

<100 000 Euros
101 000 to 250 000 Euros
251 000 to 500 000 Euros
500 000 to 1 million Euros
1 million to 5 million Euros
5 million to 10 million Euros
> 10 million Euros

*** b5: For which kind of project/plans does your organisation carry out Environmental Impact Assessments (EIA)?**

Please choose all that apply:

Agriculture, silviculture and aquaculture
Energy industry
Production and processing of metals
Extractive industry
Mineral industry
Chemical industry
Food industry
Textile; leather; wood and paper industries
Rubber industry
Infrastructure projects
Disposal of waste
Tourism and leisure
Other _____

*** b6: For which kind of project/plans does your organisation carry out Strategic Environmental Assessment (SEA)?**

Please choose all that apply:

- Agriculture
- Forestry
- Fisheries
- Energy
- Industry
- Transport
- Waste management
- Water management
- Telecommunications
- Tourism
- Town & Country planning
- Land use
- Other _____

*** b7: What is the average time needed to complete an Environmental Impact Assessment (EIA) report?**

Please choose only one of the following:

- <2 weeks
- 2 weeks - 1 month
- 1 month - 3 months
- 3 month - 6 months
- 6 month - 1 year
- 1 year - 2 year
- > 2 years

*** b8: What is the average time needed to complete a Strategic Environmental Assessment (SEA) report?**

Please choose only one of the following:

- <2 weeks
- 2 weeks - 1 month
- 1 month - 3 months
- 3 month - 6 months
- 6 month - 1 year
- 1 year - 2 year
- > 2 years

*** b9: Do you have experience with cross-border EIAs or SEAs?**

Please choose only one of the following:

- Yes
- No

C. Use of spatial data for preparing EIA/SEA reports

In this section we focus on your use of spatial data for EIA/SEA reports

*** c1: Please indicate which spatial data is frequently used by your organisation for preparing either EIA or SEA reports**

Please choose all that apply:

Addresses
Administrative units
Agricultural and aquaculture facilities
Area management, restriction, regulation zones and reporting units
Atmospheric conditions
Bio-geographical regions
Buildings
Cadastral parcels
Coordinate reference systems
Elevation
Energy resources
Environmental monitoring facilities
Geographical grid systems
Geographical names
Geology
Habitats and biotopes
Human health and safety
Hydrography
Land cover
Land use
Meteorological geographical features
Mineral resources
Natural risk zones
Oceanographic geographical features
Orthoimagery
Population distribution - demography
Production and industrial facilities
Protected sites
Sea regions
Soil
Species distribution
Statistical units
Transport networks
Utility and governmental services
Other _____

*** c2: Who are your main suppliers of spatial data?**

Please choose all that apply:

Environmental Protection Agencies
Mapping agencies

Geological surveys
National maritime administration
Cadastral
Land registration
Other land administration organisations
Local authorities/local government
Utilities
Private data producers
We produce spatial data for our EIAs/SEAs
Other _____

*** c3: Considering the preparation of Environmental Impact Assessment (EIA) reports, what proportion of the total cost comes from data acquisition?**

Please choose only one of the following:

<5%
5% - 10%
10% - 20%
20% - 30%
> 30%

*** c4: Considering the preparation of Strategic Environmental Assessment (SEA) reports, what proportion of the total cost comes from data acquisition?**

Please choose only one of the following:

<5%
5% - 10%
10% - 20%
20% - 30%
> 30%

*** c5: Does your organisation reuse data that was acquired for one EIA/SEA report to produce other EIA/SEA reports?**

Please choose only one of the following:

Yes
No

*** c6: For which types of operation does your organisation use the spatial data?**

Please choose *all* that apply:

Visualisation/presentation of impacts
Identification of impacts
Simple analysis/forecasting of impacts
Complex analysis/forecasting of impacts, using modelling and scenario analysis etc.
Other _____

D. Problems with spatial data when preparing EIA/SEA reports

In this section we would like to know about the problems you experience when preparing EIA/SEA reports in relation to spatial data

*** d1: Do you have any problems with spatial data in terms of:**

Please choose all that apply:

Finding it

Accessing it

Integrating it with other data

Its quality

Its cost

None of the above

Other _____

*** d2: How do these problems affect the preparation of EIA and SEA reports?**

Please choose all that apply:

Lower level of accuracy when describing impacts

Higher uncertainty of impacts

Higher costs of studies

Takes more time

Other _____

*** d3: Please estimate the increase in cost of EIAs/SEAs**

Please choose only one of the following:

5%

10%

15%

20%

25%

30%

>30%

*** d4: Please estimate the increase in time to produce EIA/SEA reports**

Please choose only one of the following:

5%

10%

15%

20%

25%

30%

>30%

d5: We would like to ask a sample of respondents some further questions to help clarify responses in the survey. If you would like to participate, please provide your name and an e-mail address where you can be contacted.

Please write your answer here: _____

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Abstract

This report presents the findings of an online survey on the use of spatial data to produce environmental reports conducted by the European Commission Joint Research Centre in 2009. The objectives of the survey were twofold: on the one hand, to understand how easy it is for practitioners to obtain the spatial data they need to carry out Environmental Impact Assessments (EIAs) and/or Strategic Environmental Assessments (SEAs) and on the other hand, to provide information to the European Commission (EC) on the developments made in the use of spatial data to undertake EIAs and SEAs. The 2009 survey represents, in fact, an update of a similar survey conducted in 2002 by DG Environment and provides where relevant a comparison of results. A significant increase in the number of respondents was registered since the original survey, however it should be noted that the sample do not represent all practitioners that carry out EIA/SEA reports in Europe. Nevertheless, the results give an indication of the trends and problems in the market of EIA and/or SEA. The main outcome of the survey is that practitioners still face problems in using spatial data for the preparation of environmental reports. Issues mainly relate to finding and accessing data of the quality needed for the purpose. As a consequence, there is an increase in cost and time to produce environmental reports. The estimate of such additional burden is quantified as well as potential savings that could be achieved if problems connected with the use of spatial data were removed.

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