UN-GGIM NIA
Working Group on Trends in National Institutional Arrangements

UN-GGIM
UNITED NATIONS
COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

United Nations Committee of Experts on Global Geospatial Information Management

Background Document on Trends in National Institutional Arrangements in Geospatial Information Management

E/C.20/2015/5
Item 5 of the provisional agenda

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Prepared by UN-GGIM Working Group on National Institutional Arrangements
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United Nations Committee of Experts on Global Geospatial Information Management

Working Group on Trends in National Institutional Arrangements in Geospatial Information Management

1. Background

At its third Session in Cambridge, United Kingdom, in July 2013, the Committee of Experts mandated the creation of a Working Group to identify best practices and sets of institutional models and legal frameworks for national geospatial information management.

The Working Group (WG) consists of representatives from 11 Member States: Columbia, Jamaica, Japan, Korea, Mexico, Mongolia, Nigeria, Pakistan, Singapore, Spain and Tuvalu. Spain was elected to chair this Working Group in the person of Mr. Antonio Arozarena[1].

In order to accomplish the overall objective of the Working Group Terms of Reference, the Group carried out a detailed analysis focused on 3 main issues:
- geospatial information business models
- structure of geospatial information management organizations
- role of people as active stakeholders in geospatial information systems

The report presents the results from the analysis undertaken of the data received from four global questionnaires covering the three areas of work:
- Production systems analysis, coordinated by Spain
- Funding structures, dissemination systems and data policy models, coordinated by Mexico
- Structure of geospatial information management organizations and the role of volunteered geographic information, coordinated by Singapore. This report was done in two parts, one for the analysis of the structure of geospatial information management organizations and other for the role of volunteered geographic information.

The WG has also had access to the information contained in the survey report *"The Status of Topographic Mapping in the World"* (Konecny, UN-GGIM-ISPRS). Given that this report collected information about topographic mapping and the National Institutional Arrangement (NIA) WG's survey collected information theme by theme; the content of this report has been used to validate some questions in the NIA's survey and will be used in the next phase of the work as complementary information to the one collected in the WG survey.

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[1] He is the Deputy Director of the National Geographic Institute of Spain and represents Spain at the general meetings of the UN-GGIM and also on UN-GGIM Europe.

The work plan of the Working Group on NIA is as follows:

1. Geospatial Information (GI) business model analysis

1.1 GI production systems analysis
- Real user needs in GI and Geospatial Reference Information (GRI).
- Review and description of existing data capture and creation systems.
- Review and description of current geographic data management systems: maintenance, analysis, transformation, storage.
- Analysis of geographic data life cycle. How production systems deal with information update.
- Identification of inefficient gaps in current production systems.
- Ways of changing to best practices on GI and GRI production.
- Impacts of change in production systems.
- Definition of GRI and Core Geospatial Reference Information (C-GRI).

1.2 Funding structures in Geospatial Information
- Analysis of current funding models.
- Identification of main threats on sustainability of current funding structures.
- Successful models of sustainable funding for GRI and GI.

1.3 Dissemination systems in Geospatial Information
- Current trends in GI, GRI dissemination.
- Identification of main obstacles preventing wide spread of GI.
- Analysis of the impact of ever changing technologies on GI dissemination.
- Best practices in GI, GRI dissemination.

1.4 Data policy models
- Analysis of current situation on GI and GRI data policies.
- Identification of gaps in current data policy structures.
- Successful examples on GI data policy in public and private sector.

2. Structure of Geospatial Information Management Organizations
- Types of entities: government (federal, provincial and local), private, NGOs.
- Formal and informal GI organizational structures.
- Leadership.
- Governance policies and legislation.
- Linkages and network among entities and their communication mechanisms.

3. The role of people as users and producers of GI (Volunteered Geographic Information, VGI)
- Citizens as active stakeholders in GI production, dissemination and consumption.
- Impact of volunteer geographic information and crowd sourced data on GI systems.
- Best practices on involving people on GI systems.

3. Task Groups

In order to carry out this Work Program three Task Groups have been established. Each of these task groups has a coordinator in charge of organizing tasks, fostering participation and engaging representative new members coming from the regional geospatial information community if needed.

TG1: GI production systems analysis (work plan 1.1).
Coordinator: Spain
Components: France, Italy, Republic of Korea, Singapore

TG2: GI funding structures, dissemination systems and data policy models (work plan 1.2, 1.3, 1.4).
Coordinator: Mexico
Components: Austria, France, Italy, Jamaica, Singapore, Spain, UNGGIM-ISPRS, CSIRO

TG3: Structure of GI management organizations and the role of VGI (work plan 2, 3).
Coordinator: Singapore
Components: Austria, Bangladesh, Belgium, France, Guyana, Japan, Republic of Korea, Carleton University, GSDI, CSIRO

4. Questionnaires and Selected Themes

All the TGs conducted the analysis phase of their work by preparing and executing questionnaires which were circulated globally to the UN-GGIM Committee of Experts.

The first questionnaire was prepared by TG3 that aimed to identify and describe the types of entities, organizational structures, types of leadership and policies in Geospatial Information Management (GIM) organizations. The results will be used to propose an indicator or index of effectiveness of GIM organizations structure. It was circulated between January and February 2015.

A second questionnaire was jointly prepared by the three TGs in order to simplify the information received by Member States. This combined questionnaire aimed to identify and describe:
- GI production systems analysis
- GI funding structures, dissemination systems and data policy models
- The role of people as users and producers of GI

The Geospatial Information considered in general terms is very wide, so the first step was to select the themes of GI which will be object of this analysis.

On this first study, to select the themes on which the work will focus, only land data themes were considered. For future studies other land data themes not included or themes in oceans and or atmosphere could be considered.

The reasons of selecting land topics and no other topics including oceans and or atmosphere were the following:

- Land information is more stable than information on oceans and atmosphere
- Land information is more suitable to be analysed by national agencies, while information in oceans and or atmosphere are more suitable to be analysed by global organizations.
- Land information has a big influence in geo-statistical or geolocation aspects.

To determine the land topics to study we have started to analyse the relationship between them and the 17 United Nations Millennium Sustainable Development goals.

For this task we examined the 17 United Nations Millennium Sustainable Development goals with the INSPIRE land themes included in the Annexes 1, 2 and 3. This table was sent to the NIA WG members to indicate, under their point of view, which themes they considered more related with each United Nations goal.

In the next image there is an example of one of these tables completed by one member of the group.

Studying the results of the tables received from the NIA WG members it was concluded that there are nine transcendental land themes to achieve the 17 United Nations goals which will be the selected themes for the study. They are:

1. Geographical names
3. Cadastral parcels
5. Hydrography
7. Imagery
9. Elevation

2. Administrative Units
4. Transport networks
6. Settlements
8. Land cover

5. Conclusions From the Analysis Phase

Given the low response rate, the Working Group proposes that the questionnaires be re-circulated to allow more Member States to participate and thus generate more conclusive results from the analysis. The proposed new deadline is 30 September 2015.

With the results of the surveys, completed with the new answers received until 30 September 2015, and the information collected in the report The Status of Topographic Mapping in the World (Konecny, UN-GGIM-ISPRS) some indicators will be selected by consensus of the NIA Working Group in order to have an objective assessment of the GIM systems in the different countries. This assessment combined with a segmentation of countries done with United Nations indexes, as it could be the Human Development Index (HDI) could take us to identify the best practices on GIM on each segment of countries.

Consolidation of user requirements and of core data scoping will have to be carried out in 2016 in order to extend the nine land topics studied in this first analysis phase, during 2014/2015, to other land themes. In addition, marine and atmosphere are to be considered as topics for future work.

The Working Group aims to complete the diagnosis phase and identification of best practices, to identify the main trends related to production systems, funding structures, data dissemination systems, data policy models, organizational structures and role of the volunteered geographic information as stated in the work plan. This work will use the UN-GGIM paper on "Future trends in geospatial information management: the five to ten years vision" as reference. The final report with the complete conclusions should be delivered by the end of January 2016.

The Committee of Experts is asked to encourage Member States to actively participate in the work agenda of UN-GGIM, particularly in activities relating to the Sub-Tasks of the Working Group on National Institutional Arrangements.

The Working Group intends to define a strategy and identify a forum to elaborate on the discussion of the major findings related to funding structures, data dissemination systems and data policy models and show the scenario that prevails in different regions as a reference for the analysis and perspective of the situation of each Member State.

Survey Report on Analysis of Geospatial Reference Information Production Systems

Prepared by UN-GGIM National Institutional Arrangements Task Group 1

Coordinated by Antonio Arozarena Villar (aarozarena@fomento.es)

Contents

Survey Report on analysis of GRI Production systems

1. Answers to the TG1 questionnaire

The questionnaire was circulated to 193 countries and 59 of them responded (30% of the countries).

The diagrams below show the countries that answered the questionnaire and also the answers by UN-GGIM Regions.
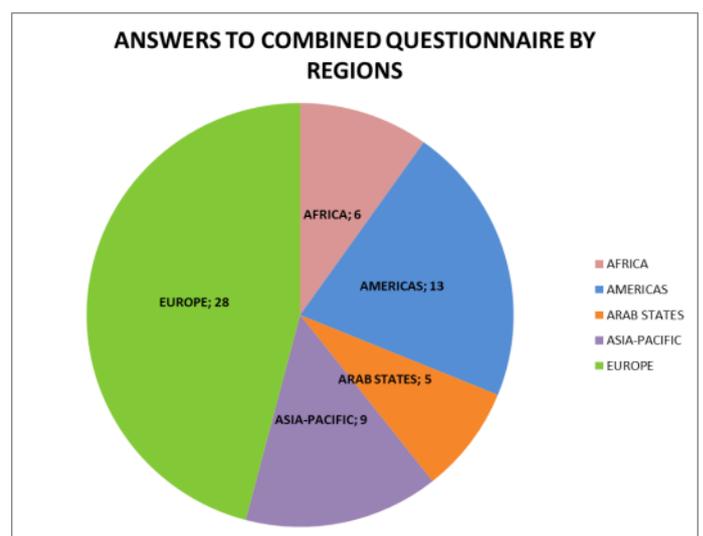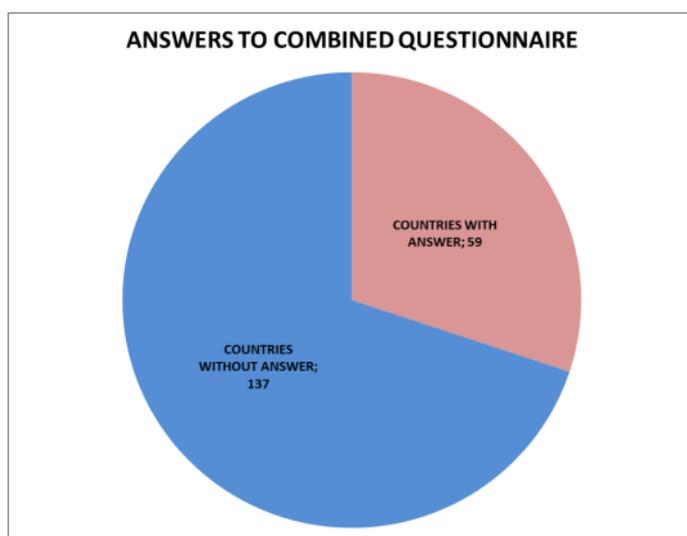
The results of the answers analyzed by UN Regions are as follows:

Africa

From 54 countries of Africa, 6 of them answered (16% area of the Region).
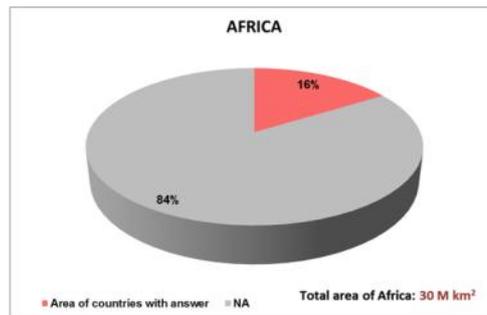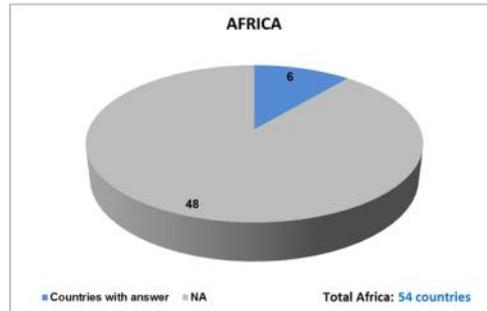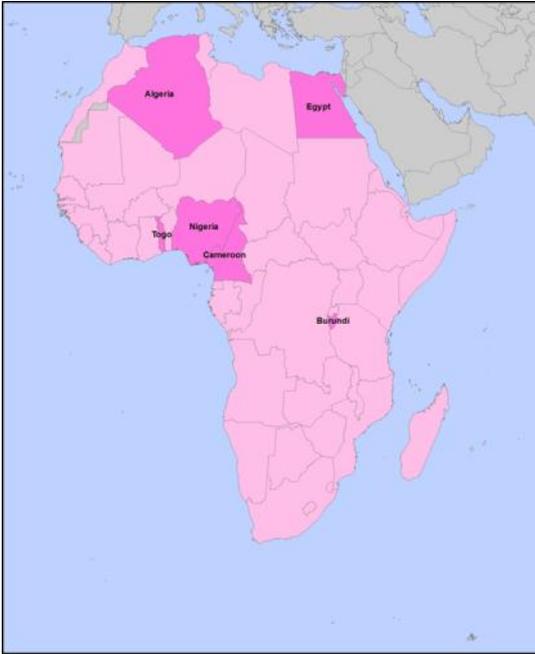
Americas

From 35 countries of Americas, we received 13 answers (89% area of the Region).
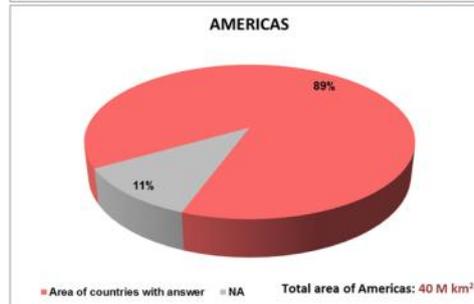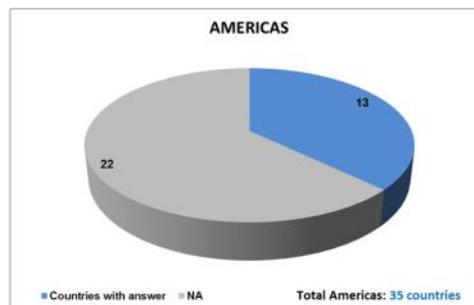
Arab States

22 countries the Arab States and 5 of them answered to the questionnaire (29% of the Region).
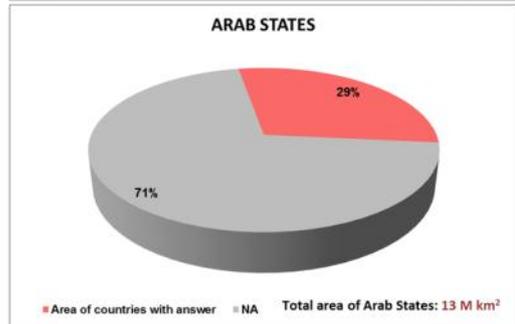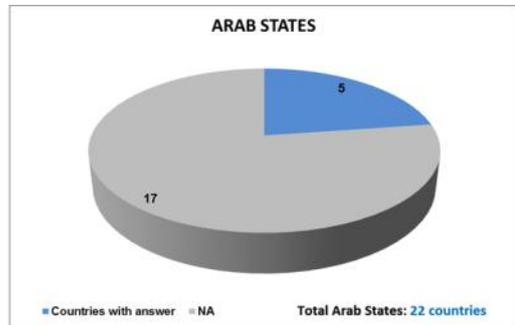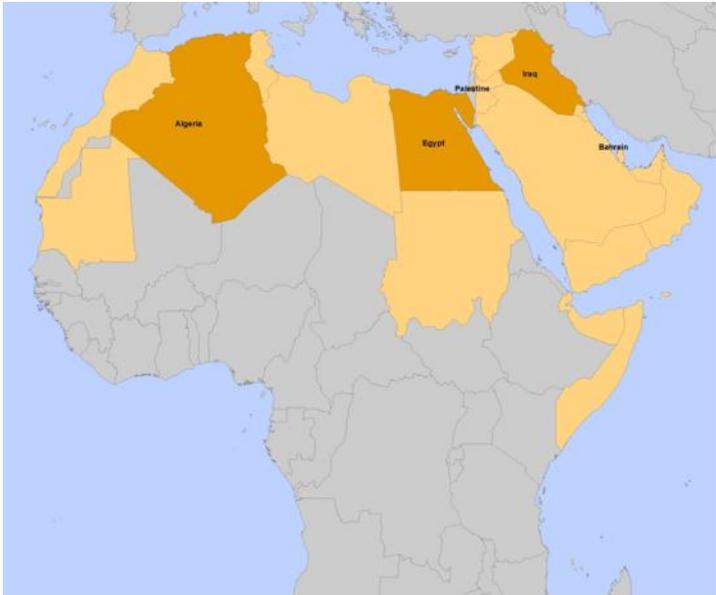
Asia-Pacific

This Region has 49 countries and 9 answered to the questionnaire, including Macao as a country (20% of the area of the Region).
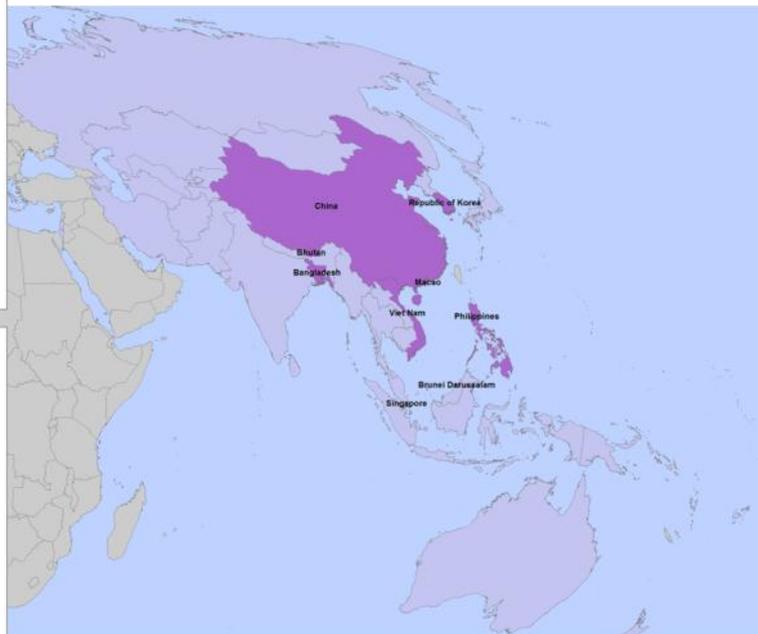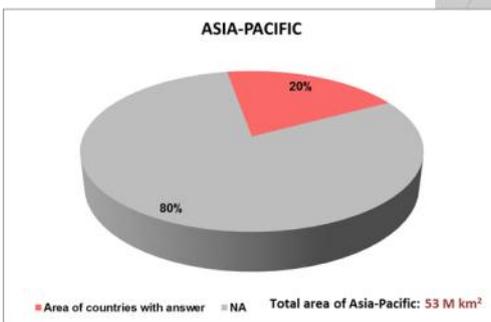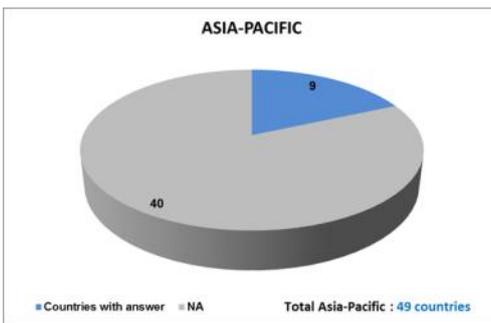
Europe

This Region has also 49 countries and we received answers from 29, including Northern Ireland as a separate area as they sent the questionnaire separately from Great Britain. (18% of the area of the Region).
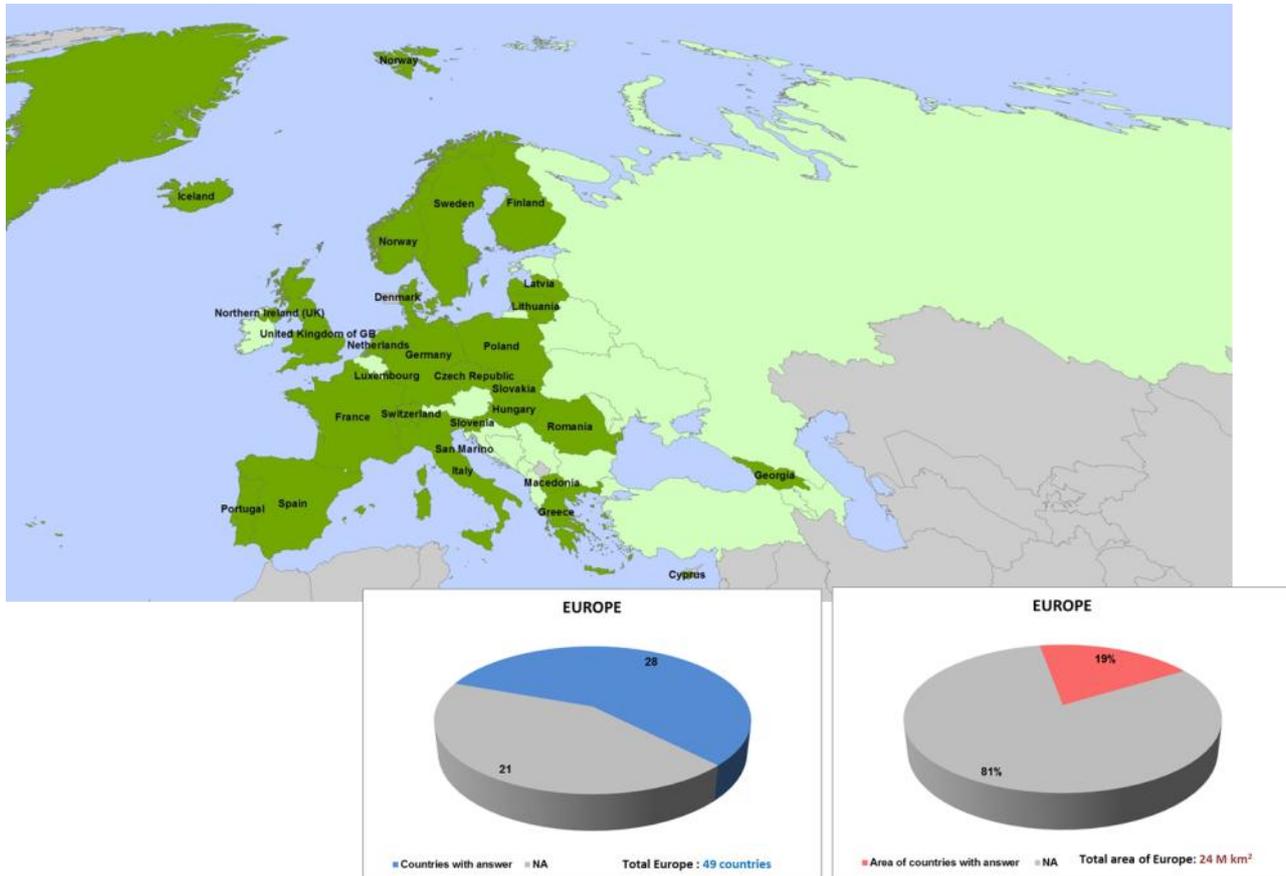
2. TG1 questionnaire

The questionnaire prepared by TG1 was thought to cover the two first work plan phases: analysis activities of the state of the art in each area and diagnosis of the current situation.

Is consists of 8 questions formulated as it follows:

Q1.- Which are the methods applied for GRI data creation/update?
   a) Automatic
   b) Semi-automatic
   c) Manual

Q2.- The creation/update of GRI is done by:

a) Own resources
b) Third parties
c) Collaborative (public and/or private)
d) VGI (Volunteered Geographic Information)

Q3.- Which is the approach used in creation/update of GRI?
a) Bottom-up (production with the maximum scale/resolution serves to lower scales/resolutions)
b) Top-down (production with lower scales/resolutions serves to higher scales/resolutions)
c) Independent production for each scale/resolution needed

Q4.- Which is the production scale
a) 1:1.000
b) 1:1.000-1:5.000
c) 1:5.000-1:25.000
d) 1:25.000-1:50.000
e) < 1:50.000

Q5.- The GRI data update is done continuously or periodically?
a) Periodically
b) Continuously

Q5b.- In case it is periodical, which is the update period?
a) 1 - 2 years
b) 3 - 5 years
c) 5 - 10 years
d) >10 years

Q6.- The data update done complete or partially?
a) Complete (all territory)
b) Partial (part of territory)

Q7.- The update is done for the complete theme or for some features/attributes
a) for the complete theme
b) only for some features/attributes of the theme ([2])

Q8.- Who are the users of GRI
a) Government
b) Private sector
c) Academia
d) NGO's
e) Citizens

These questions must be answered for each of the 9 themes selected in the previous phase and more than one answer is allowed.

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[2] (*) Examples of features/attributes:
Transport Networks   Axis, width of the lane, etc
Hydrography   Axis, width of the river, flow, etc

3. Results of TG1 questionnaire

The results are done in percentage of production effort

The questionnaire was circulated to be filled with crosses to answer the questions and more than one answer was allowed in for each question. To be able to quantify these results we have assumed that the effort dedicated to the production of each theme is equally distributed between the options marked. This means that we have transformed the crosses in values as it is shown in the image in yellow.

In addition we have considered the area of each country weighing the answers on the basis of this area. The formulas applied are shown below.

Spain		Geographical names	Administrative units	Cadastral parcels	Transport networks	Hydrography	Elevation
1.- The methods applied for data creation/update are	Automatic						X 0,33
	Semi-automatic	X 0,5	X 0,5	X 1,0	X 0,5	X 0,5	X 0,33
	Manual	X 0,5	X 0,5		X 0,5	X 0,5	X 0,33

Brazil		Geographical names	Administrative units	Cadastral parcels	Transport networks	Hydrography	Elevation
1.- The methods applied for data creation/update are	Automatic	x 0,5	x 1,0		x 0,5	x 0,5	x 0,5
	Semi-automatic				x 0,5	x 0,5	x 0,5
	Manual	x 0,5					

Administrative units

$$\% \text{ Automatic} = \frac{0*area\,Spain + 1*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

$$\% \text{ Semi-automatic} = \frac{0,5*area\,Spain + 0*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

$$\% \text{Manual} = \frac{0,5*area\,Spain + 0*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

Elevation

$$\% \text{ Automatic} = \frac{0,33*area\,Spain + 0,5*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

$$\% \text{ Semi-automatic} = \frac{0,33*area\,Spain + 0,5*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

$$\% \text{Manual} = \frac{0,33*area\,Spain + 0*area\,Brazil + \dots}{\sum area\,countries\,with\,answer}$$

These percentages of production effort are obtained for each of the questions and for each of the 9 selected themes having the results explained below.

1. Methods applied for data creation/update

In regards to the methods used for geospatial data creation and update, it was found that the most used method was semi-automatic (52,12%), the exception being for imagery, where automatic methods were most important.
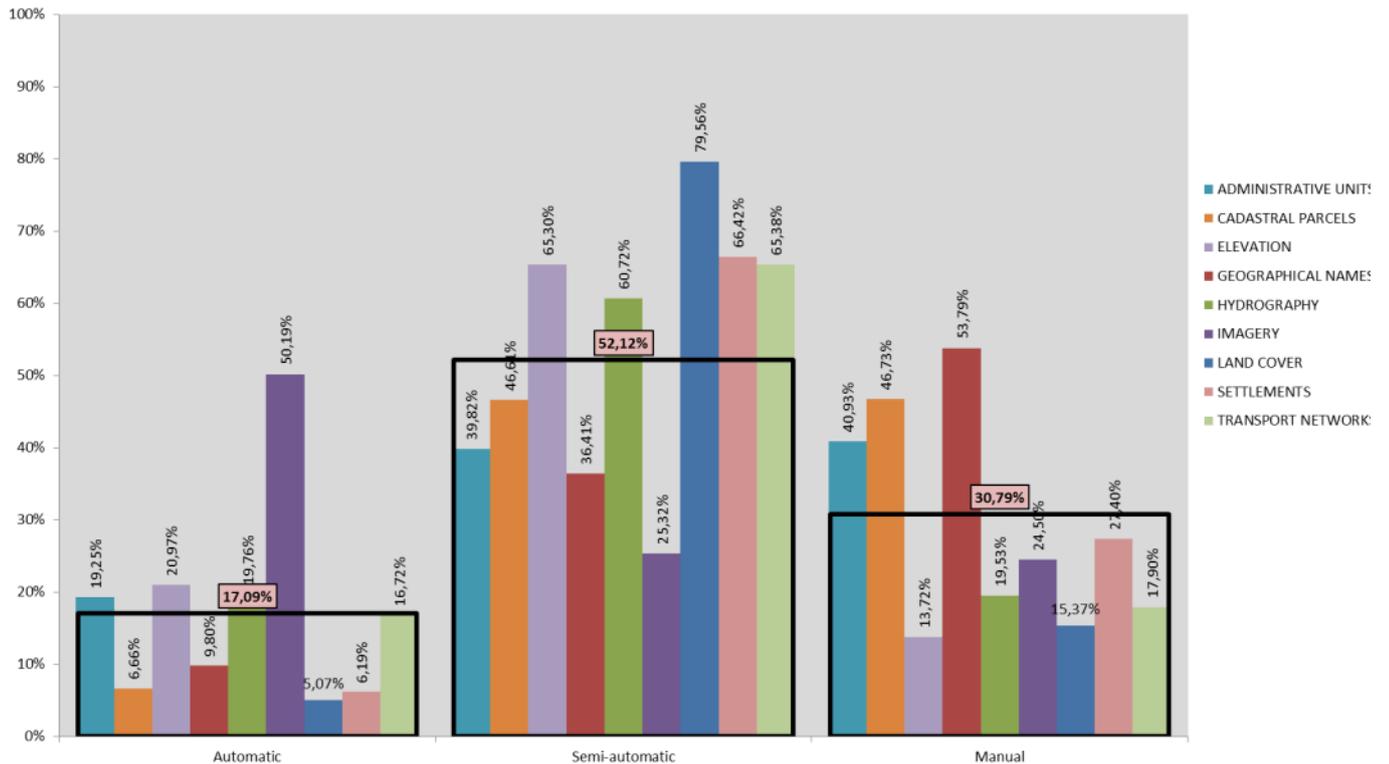
- ✓ For the creation/update of GI data semi-automatic methods are the most used
- ✓ Imagery is the exception where the automatic methods are the most important
- ✓ For administrative units, cadastral parcels and geographical names the manual methods are more important.
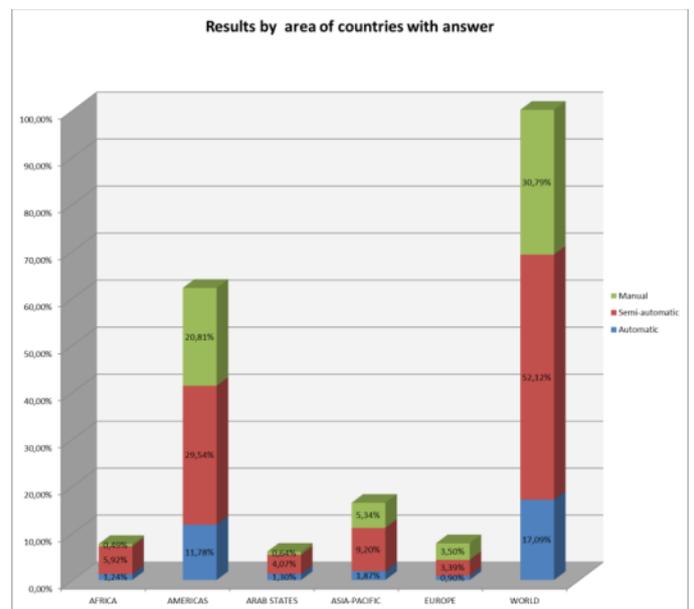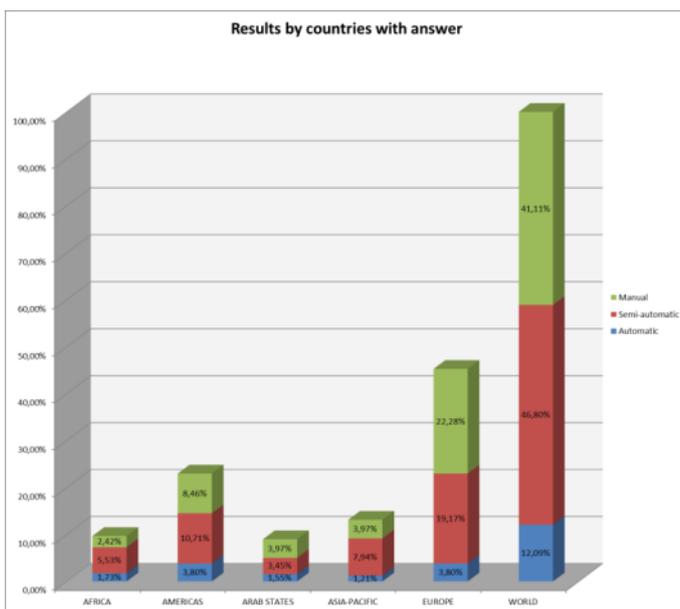
2. The creation/update of GRI is done by:

In addition, responding organizations indicated that geospatial data creation and update were being done almost exclusively internally, using own production resources (62,04%) with little or no support from the crowd, through volunteered geographic data

- ✓ For the creation/update of GI Imagery is being done almost exclusively by own-production
- ✓ The participation of VGI in the creation/update of GI data is practically inexistent.
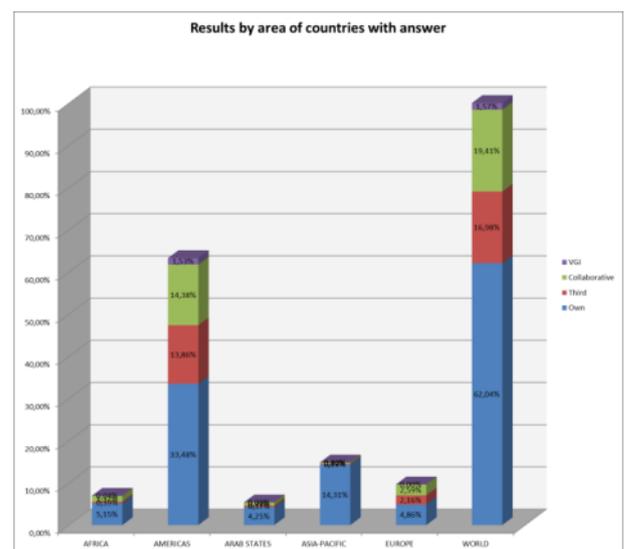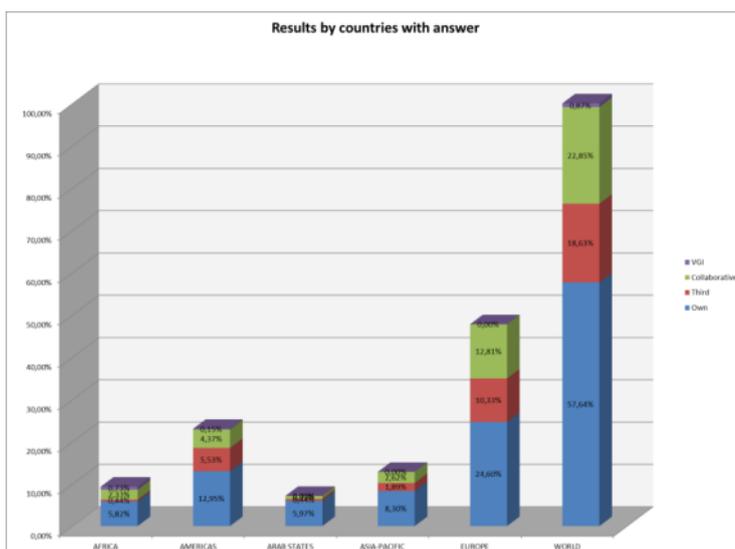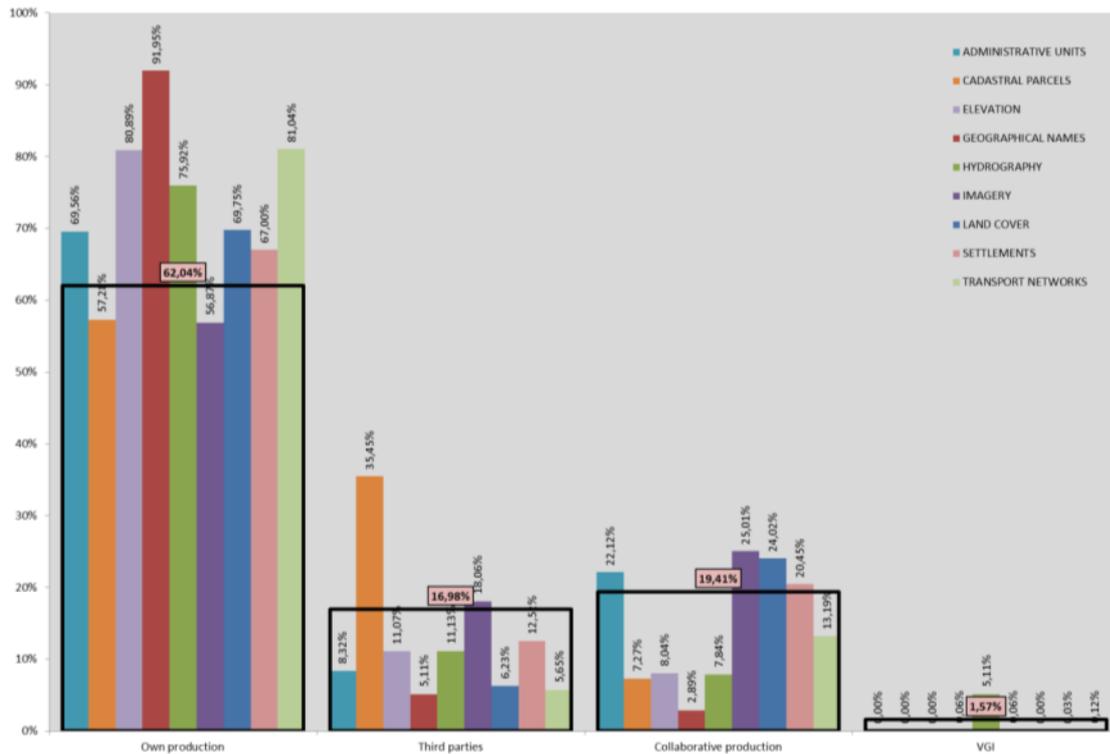
3. Approach used in creation/update of GRI

Responses to the approach used for the creation and update of geographic data indicated that the approach varied between the bottom-up approach, which means production at the maximum scale or resolution, and that of an independent production for each scale or resolution

- ✓ Half of the GRI data are created/updated using the bottom-up approach (production with the maximum scale/resolution serves to lower scales/resolutions)
- ✓ The independent production for each scale/resolution is also important. This is particularly true in the case of Imagery –
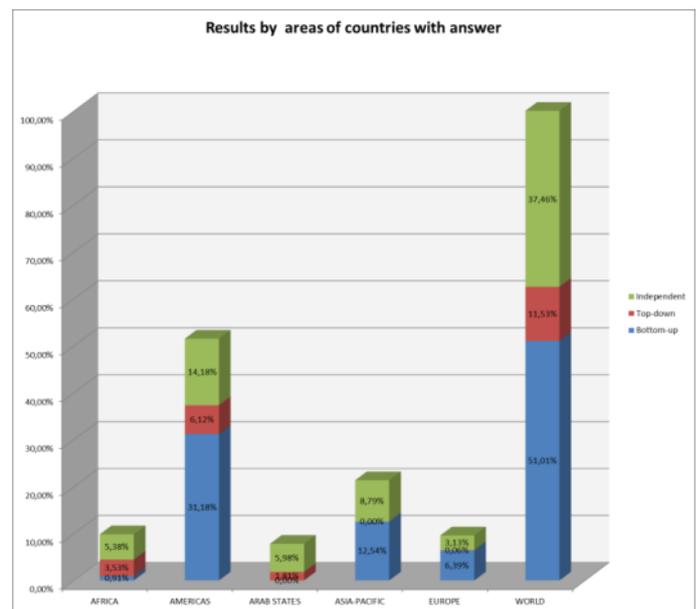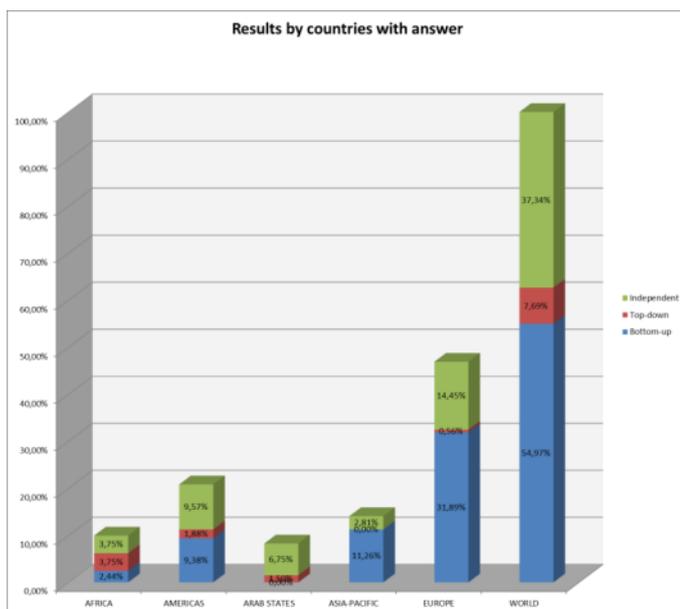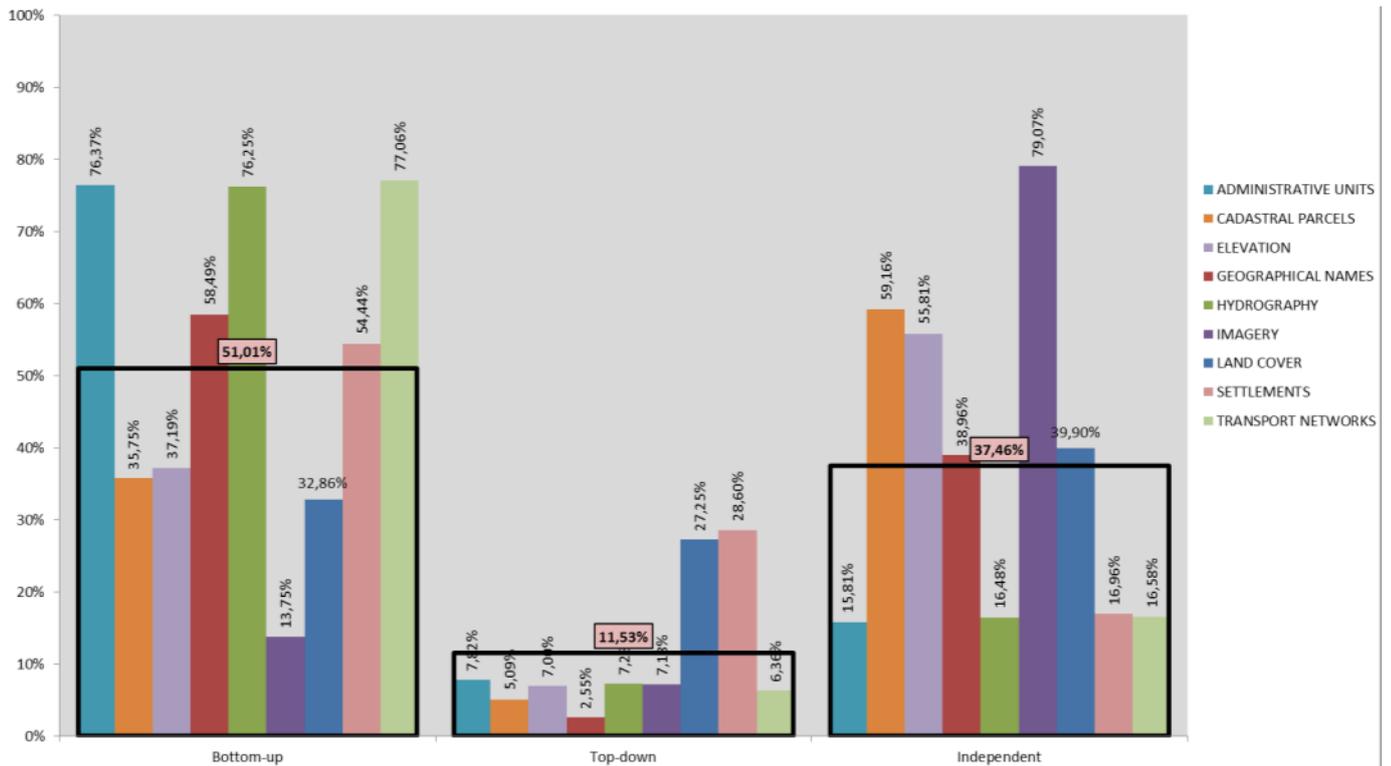
4. Production scale

The analysis also revealed that medium scales between 1:25.000 and 1:50.000 are the most common production scales used, with the exception of cadastral parcels which are prepared at larger scales.
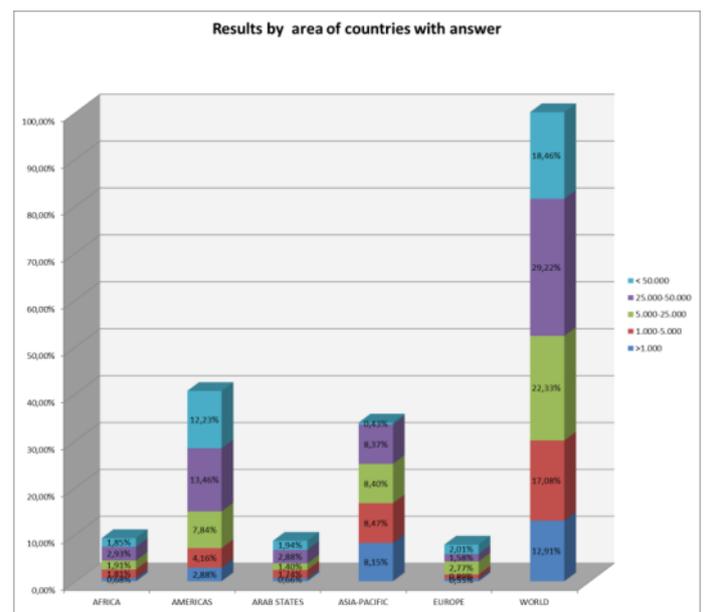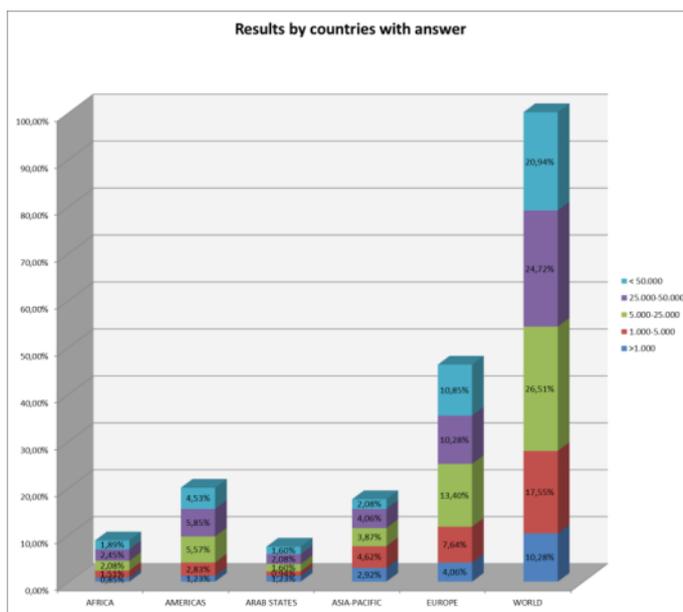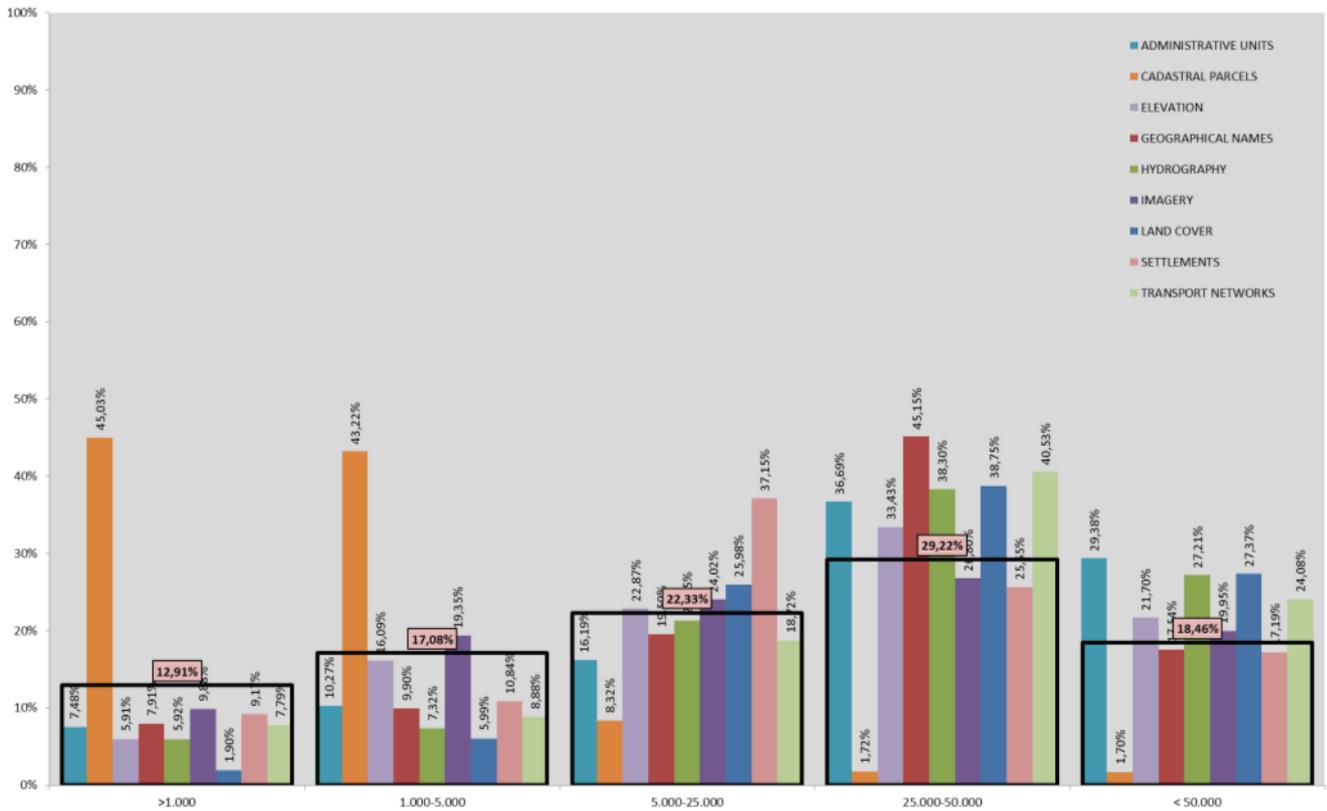
5. Type of GRI update

✓ The update is quite distributed between continuous and periodical, being the continuously update somewhat higher.

Results by countries with answer

Results by countries with answer
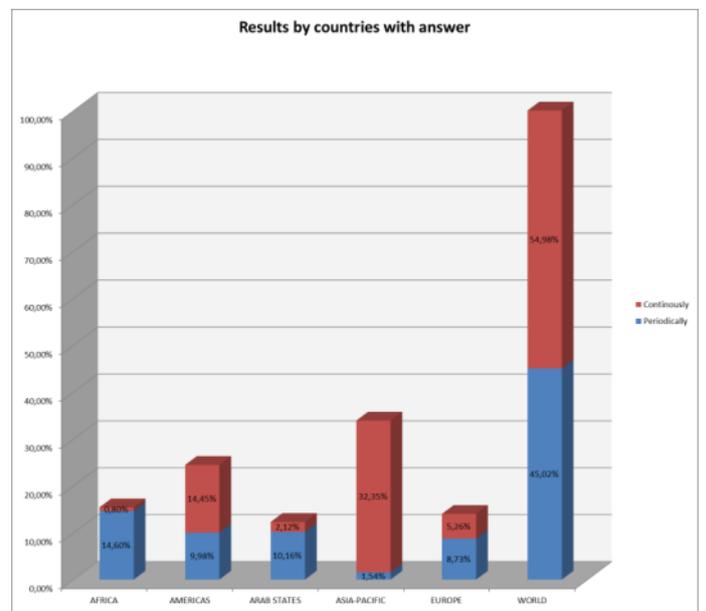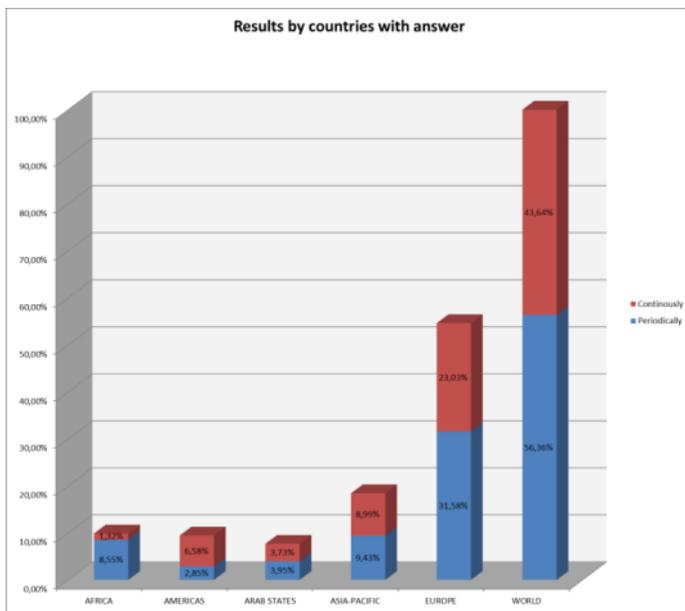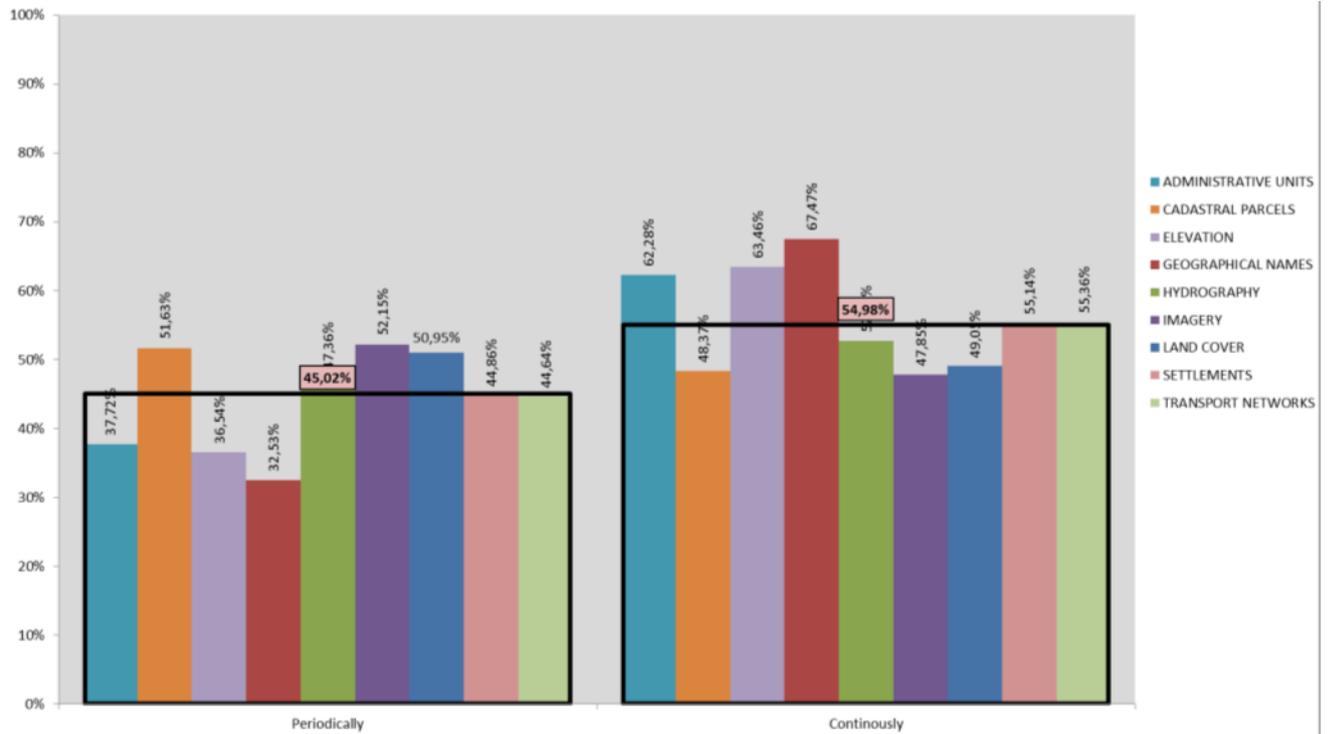
5b. Periodicity of update, in case of periodical update.

The update period most used for most of the referenced themes is 5 to 10 years For Cadastral parcels the predominant update period is 1-2 years

- ✓ For Imagery the predominant update period is 3-5 years
- ✓ For Administrative units and Geographical names the predominant update period is bigger than 10 years.
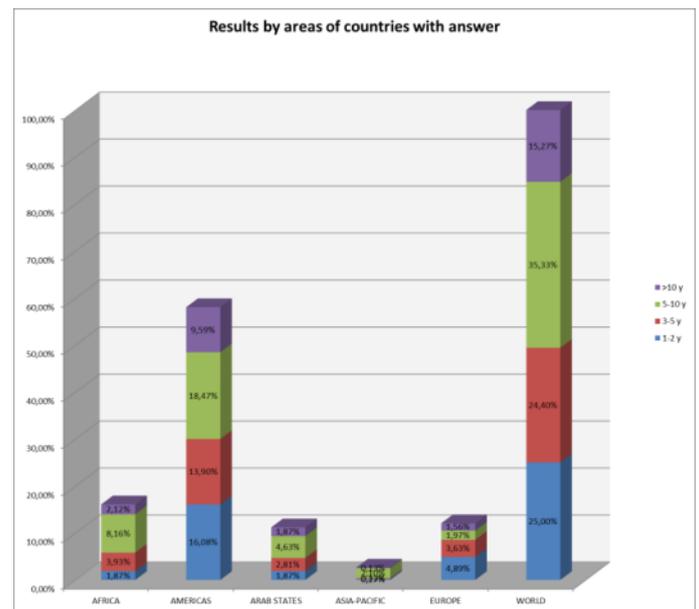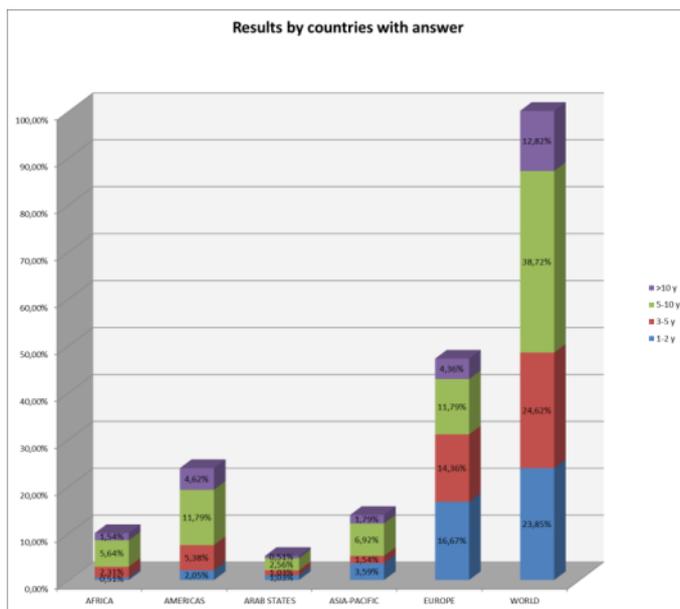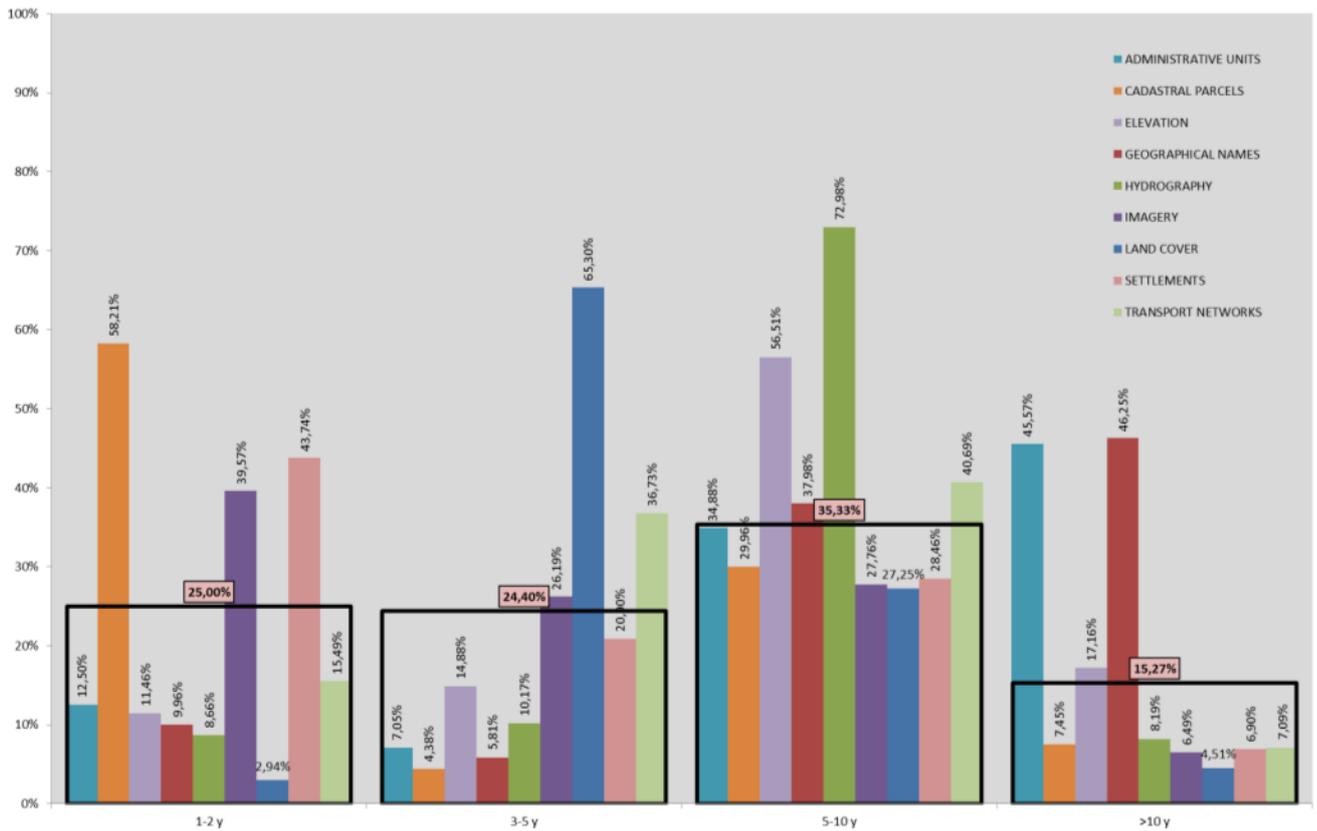
6. Complete or partial update

The update is majority done for part of the territory faced with the update of the complete territory

Results by countries with answer

Results by area of countries with answer
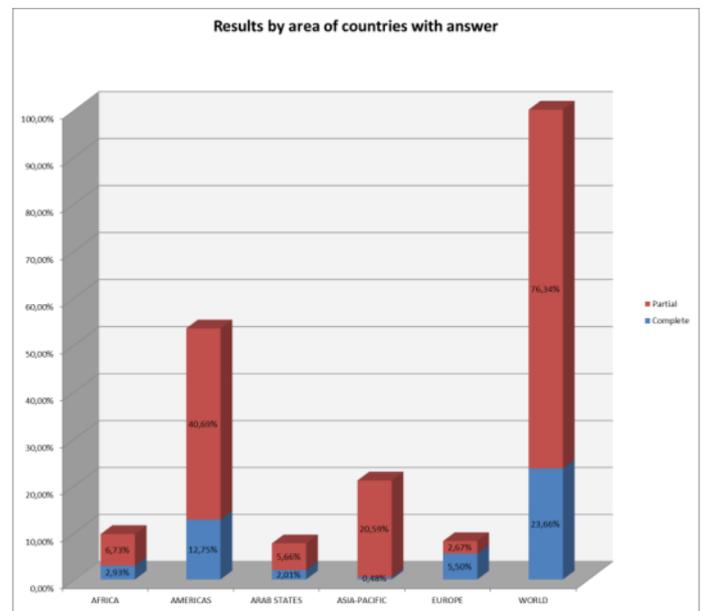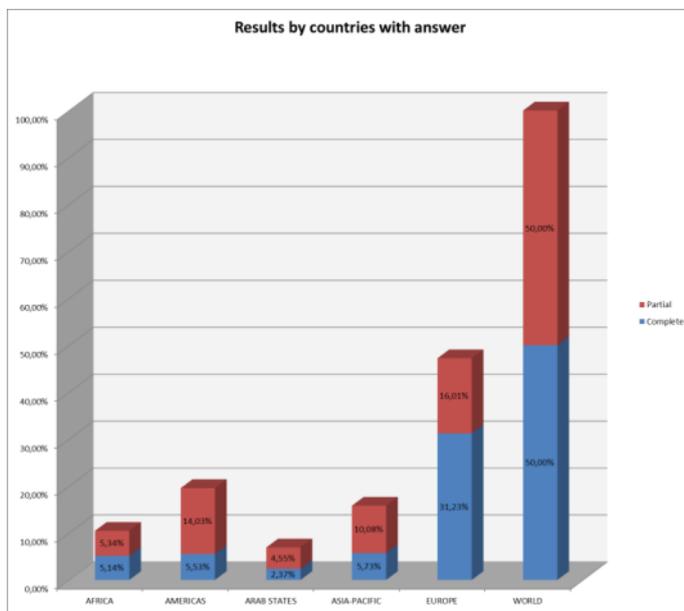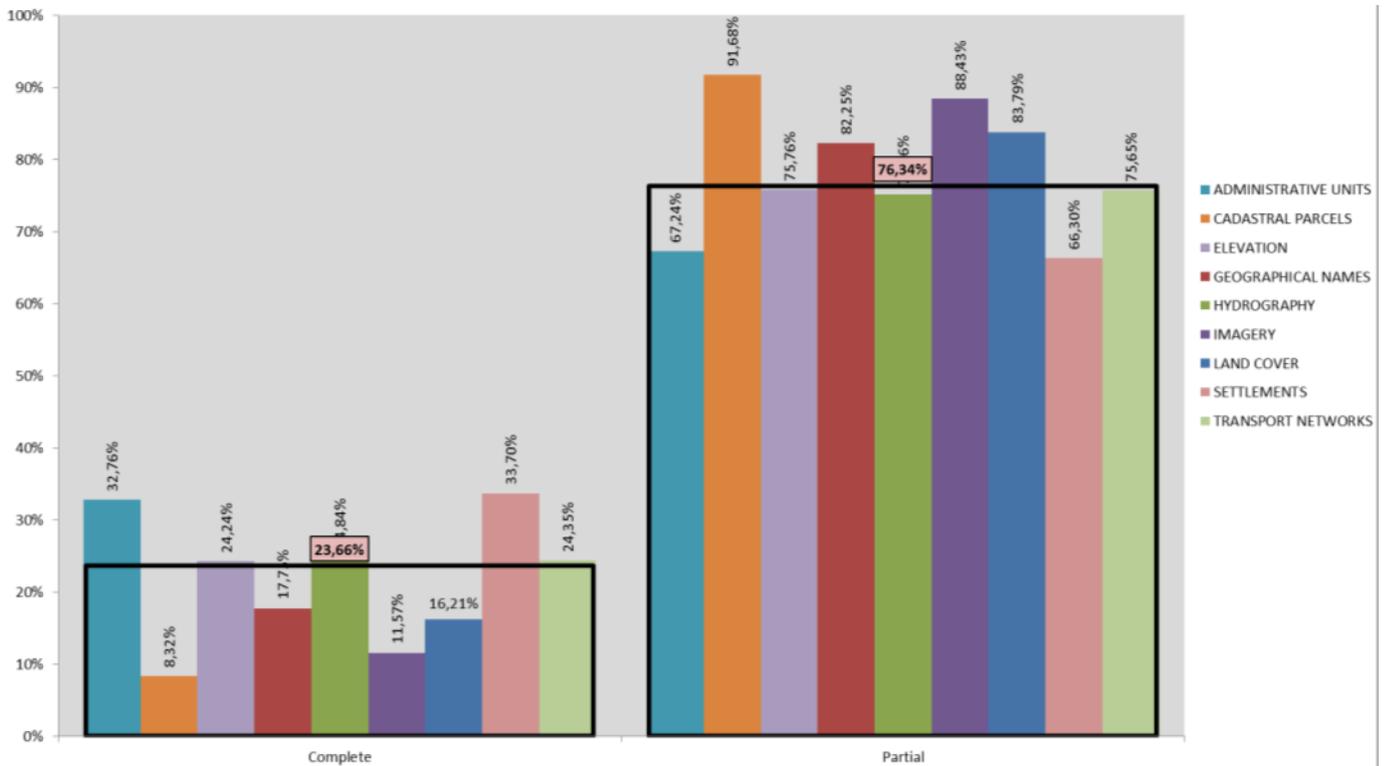
7. Update done for the complete theme or for some features /attributes of the theme

The way to do this update is shared between the update of the complete theme or only some features of the theme.
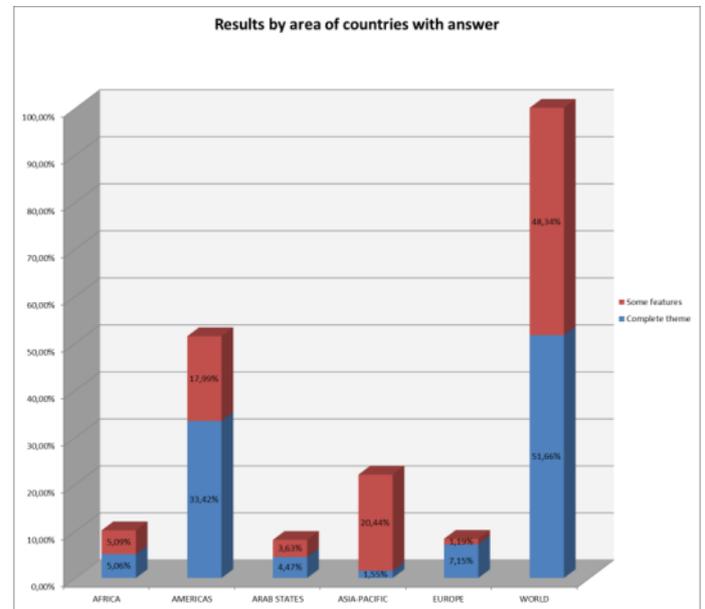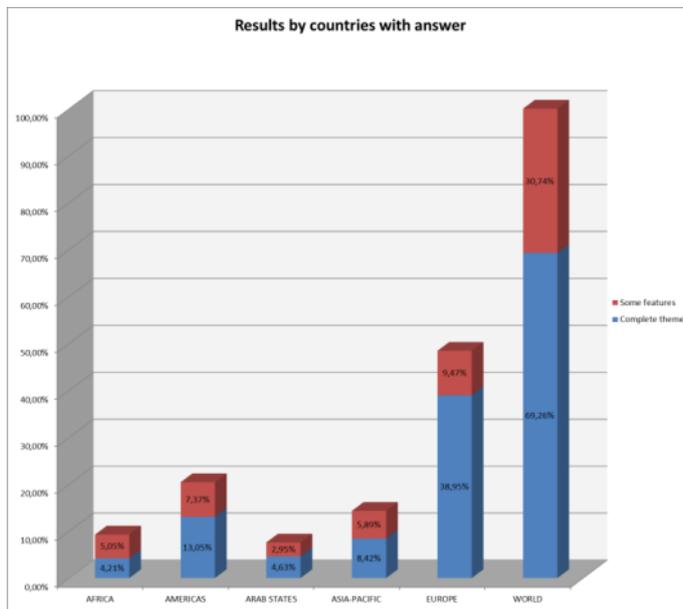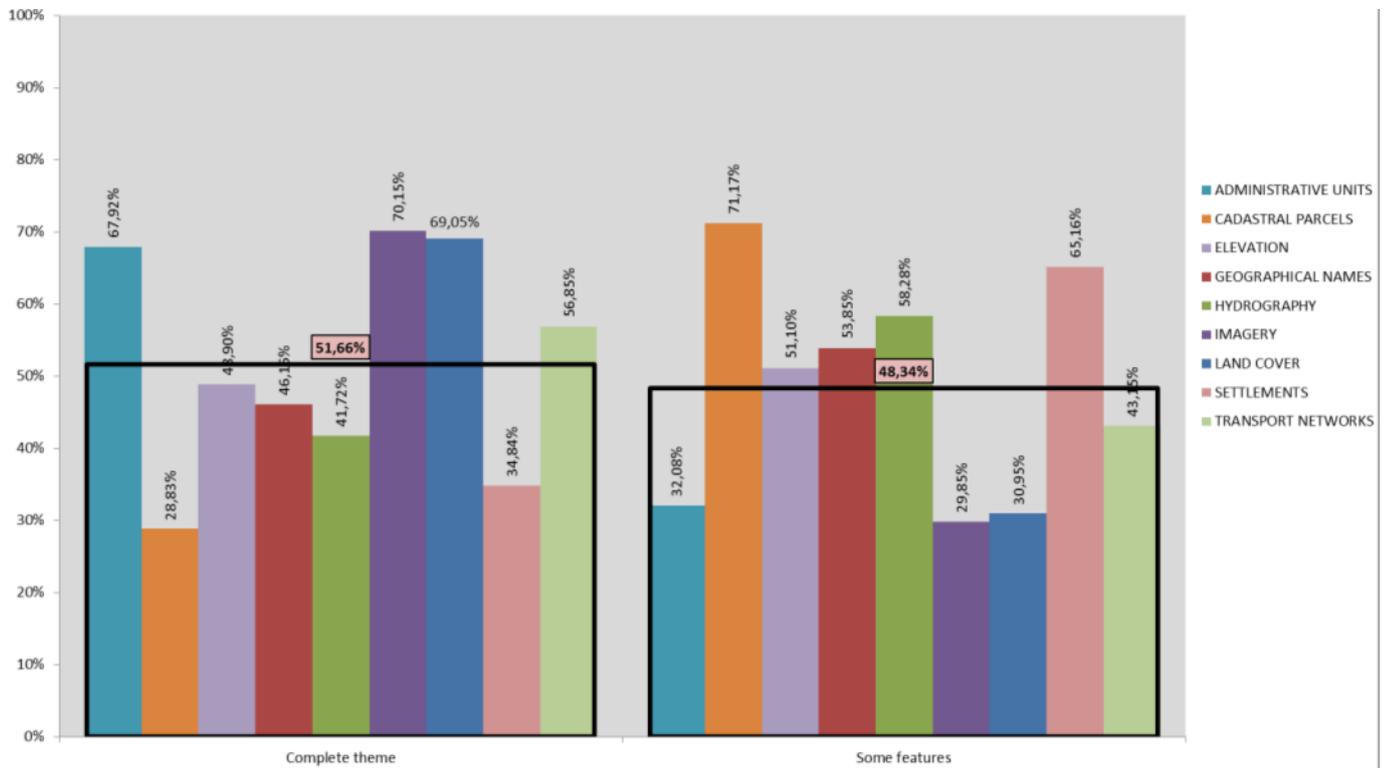
8. Users of GRI

About the users we can say that all the collectives are users of the GRI data.
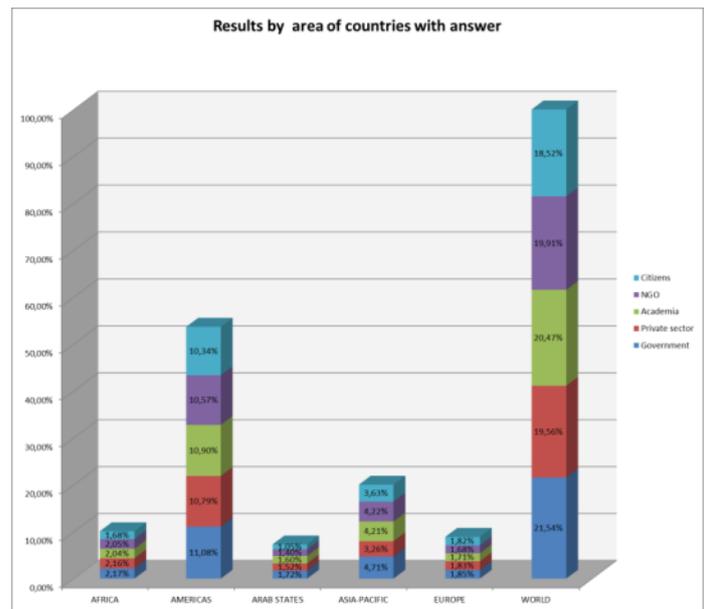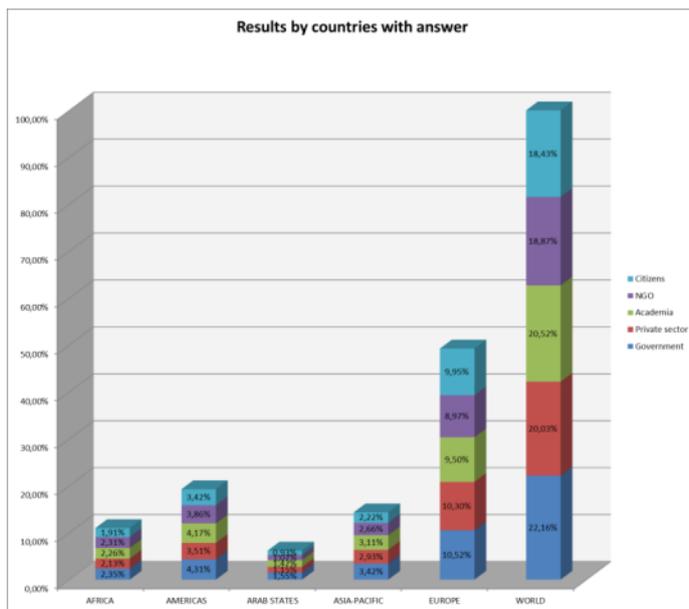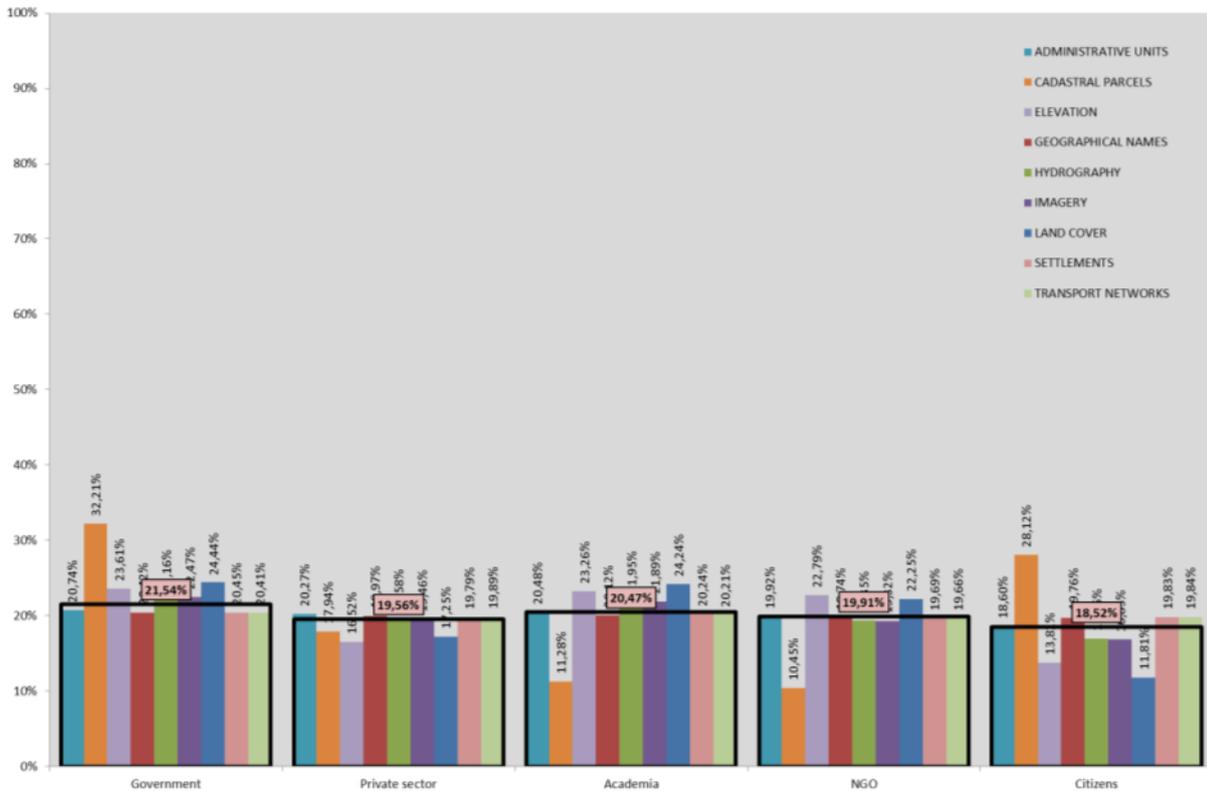
4. Findings from TG1

In regards to the methods used for geospatial data creation and update, it was found that the most used method was semi-automatic, the exception being for imagery, where automatic methods were most important. In addition, responding organizations indicated that geospatial data creation and update were being done almost exclusively internally, using own production resources with little or no support from the crowd, through volunteered geographic data.

Responses to the approach used for the creation and update of geographic data indicated that the approach varied between the bottom-up approach, which means production at the maximum scale or resolution, and that of an independent production for each scale or resolution.

The analysis also revealed that medium scales between 1:25.000 and 1:50.000 are the most common production scales used, with the exception of cadastral parcels which are prepared at larger scales.

The update period most used for most of the referenced themes is 5 to 10 years. For the majority of Member States updates are done only for parts of their territory, instead of the complete territory. In addition, there are no differences between the number of Member States that update all the themes identified.

5. Participants

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Survey Report on Funding Structures, Dissemination Systems and Data Policy Models

Prepared by UN-GGIM National Institutional Arrangements Task Group 2
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Content:

Survey Report on Funding Structures, Dissemination Systems and Data Policy Models

TG2 as a member of NIA-WG aims: gather information on Funding Structures, Broadcasting Systems and Policy Models Data used in order to know the current situation, trends and best practices for the management of geospatial information in the member countries of the UN-GGIM. The TG2 was formed with representatives of the following countries: Mexico (coordinator), Austria, France, Italy, Jamaica, Singapore, Spain and a consultant of the International Society for Photogrammetry and Remote Sensing (ISPRS).

To achieve the stated objective, the coordinator of the NIA-WG in mutual agreement with the coordinators of the Task Groups 1, 2 and 3, they decided to implement an integrated questionnaire. For the preparation of this document, they were considered only the questionnaires received by the coordinator of TG2 geog. Carlos A. Guerrero Elemen from the Statistics Division of the United Nations, analyzing for the Task Group 2 (TG2) section. The integrated questionnaire was referred to the member countries of the UN-GGIM in late February 2015 with a one-month period for filling and shipping for integration by the Task Group.

In section for TG2 of the integrated questionnaire, settled for a total of 25 questions, divided into three sections (see *Figure 1 Questionnaire structure built in its section of TG2*):

I.	Funding Structures (6 questions)
II.	Dissemination Systems (11 questions)
III.	Data Policy Models (8 questions

In section for Best Practices, and in order to have a baseline to shape this section with respect to information received from the partner countries, was consulted the document "Future trends in geospatial information management: the five to ten year vision", published by Ordnance Survey at the request of the Secretariat for the United Nations Committee of Experts on Global Geospatial Information Management, in July 2013.
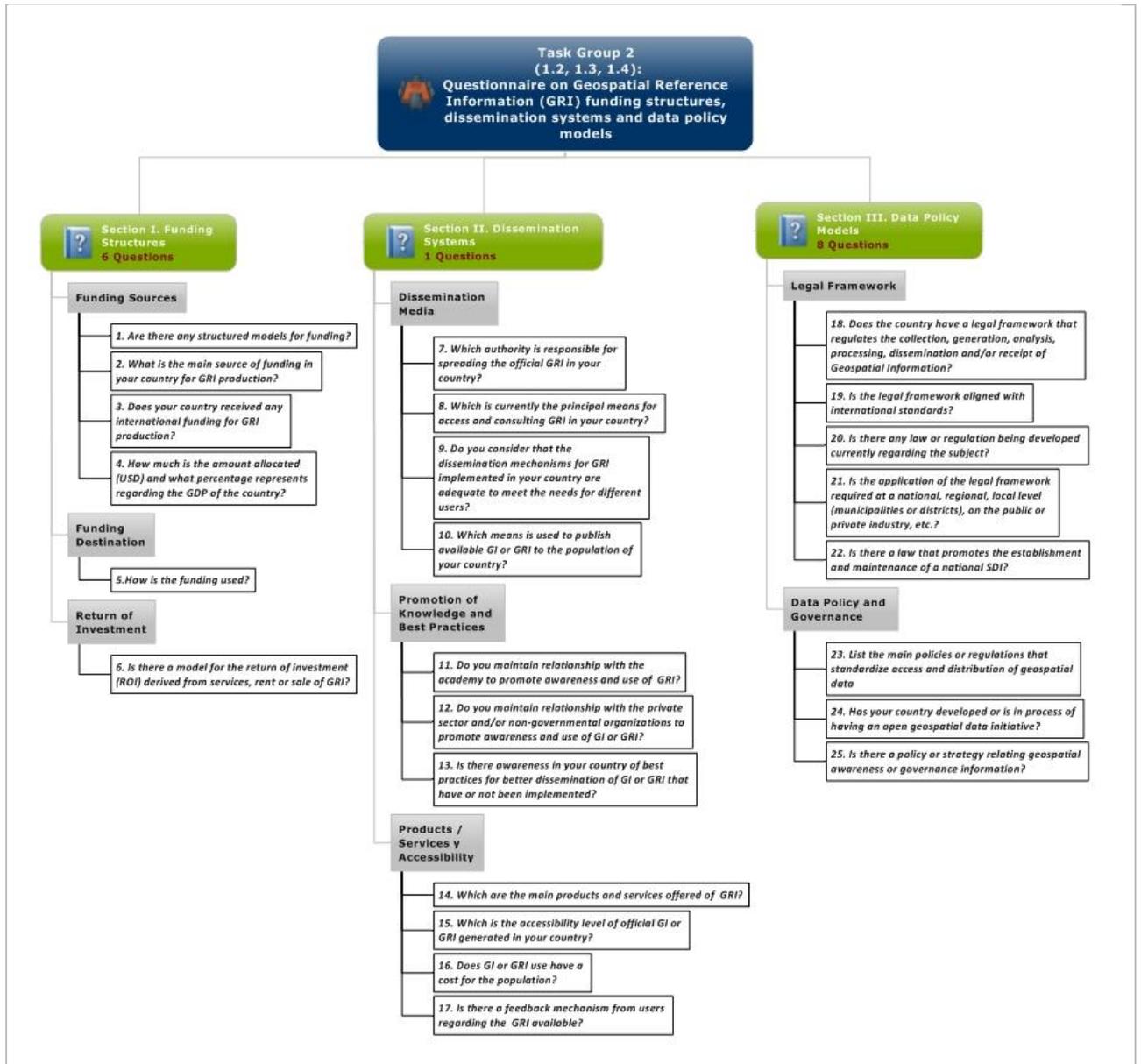
Figure-1 Questionnaire structure built in its section of TG2

I. Analysis Phase

I.1 Case studies (countries response to the questionnaire)

Level response

Of the 196 member countries UNGGIM whom the questionnaire was requested of the TG2 in the following table detailed by region, the total number of countries that responded or not to the questionnaire:

Region	Total of Countries	Respondidg	Nor Respondidg
Africa	54	2	52
América	35	7	28
United Arab	22	2	20
Asia – Pacific	49	4	45
Europe	49	12	37
Total	196	27	169

It is noted that the European region is where more countries responded, 12 in total and only two in the regions of Africa and Arab States. As it is shown in *Graphic-1 level response* and the representation of the *Map-1 Response by Region.*

Graphic-1 level response
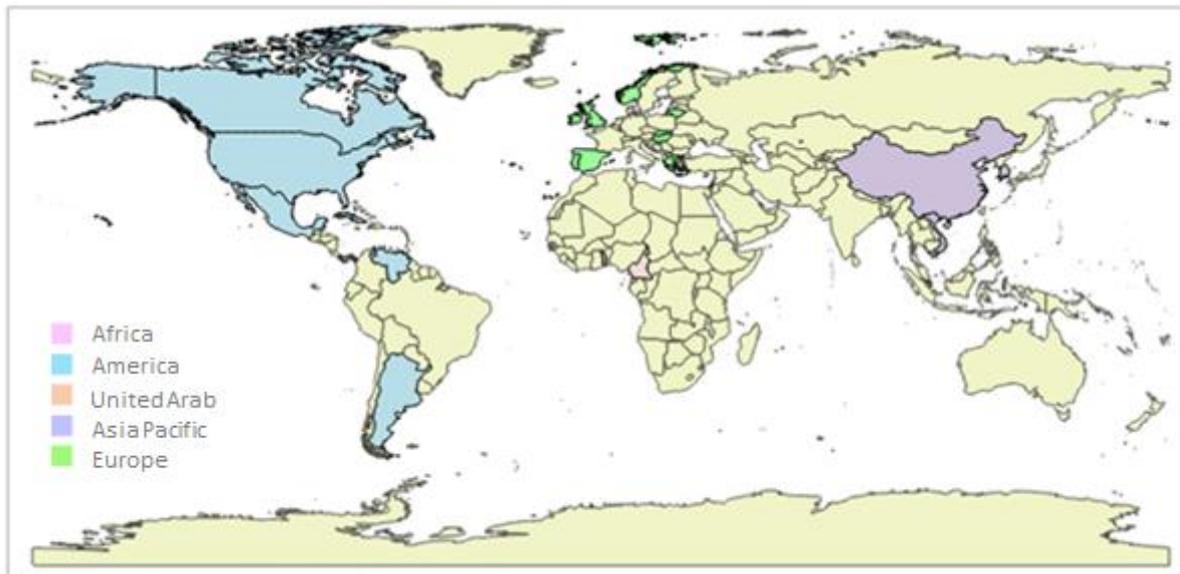
Map-1 Response by Region

Degree of completeness

Regarding *Funding Structures,* 23 countries responded this section, 4 there was no answer: Palestine, Slovakia, Portugal and Hungary. View *Map-2 Funding Structures Response.*
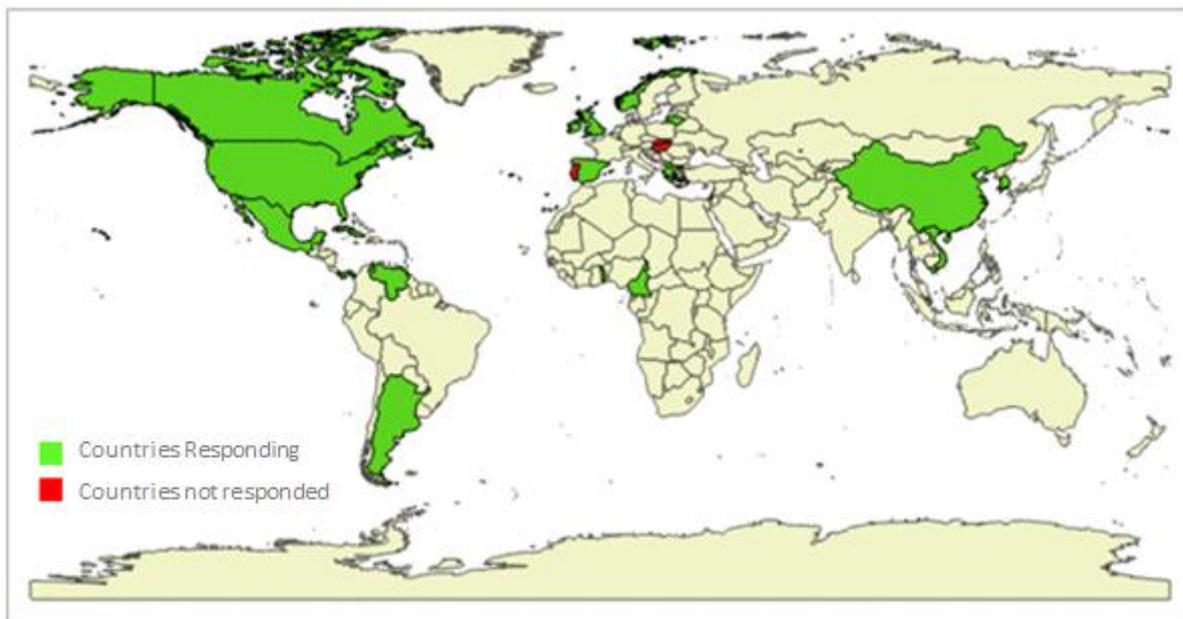
Map-2 Funding Structures Response

For *Dissemination Systems* section, it was obtained response from 27 countries.

On the issue of *Data Policy Models*, 21 countries responded, 6 countries there was no answer: Palestine, Slovakia, Hungary, Togo, Cameroon and San Marino. View *Map-3 Response Data Policy.*
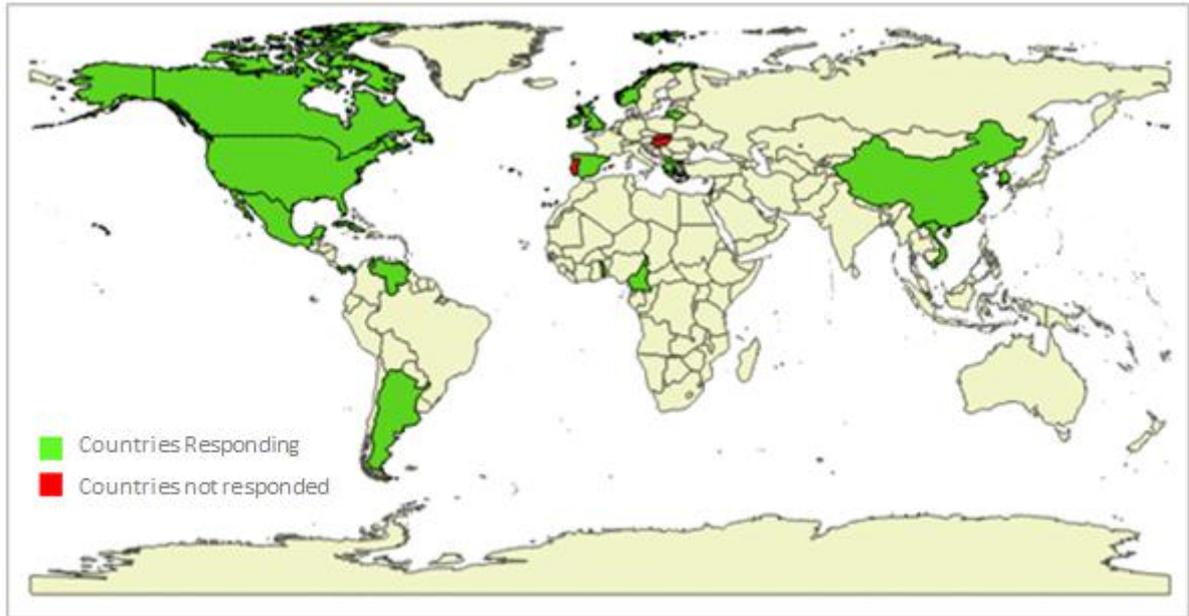
Map-3 Response Data Policy.

I.2 Analysis of funding structures

The collection instrument included six questions to determine funding sources, rate and the return of investment models applied to the Geospatial Information (GI) and Geospatial Reference Information (GRI), finding that:

1. Are there any structured models for funding?

For **GI acquisition**, emphasizes that funding is primarily public from one source, only in the areas of cadastral parcels and administrative units it has more public support from various sources. It stresses that private funding is minimal or nonexistent in most subjects. See *Graphic-2 Funding for the acquisition of GI.*
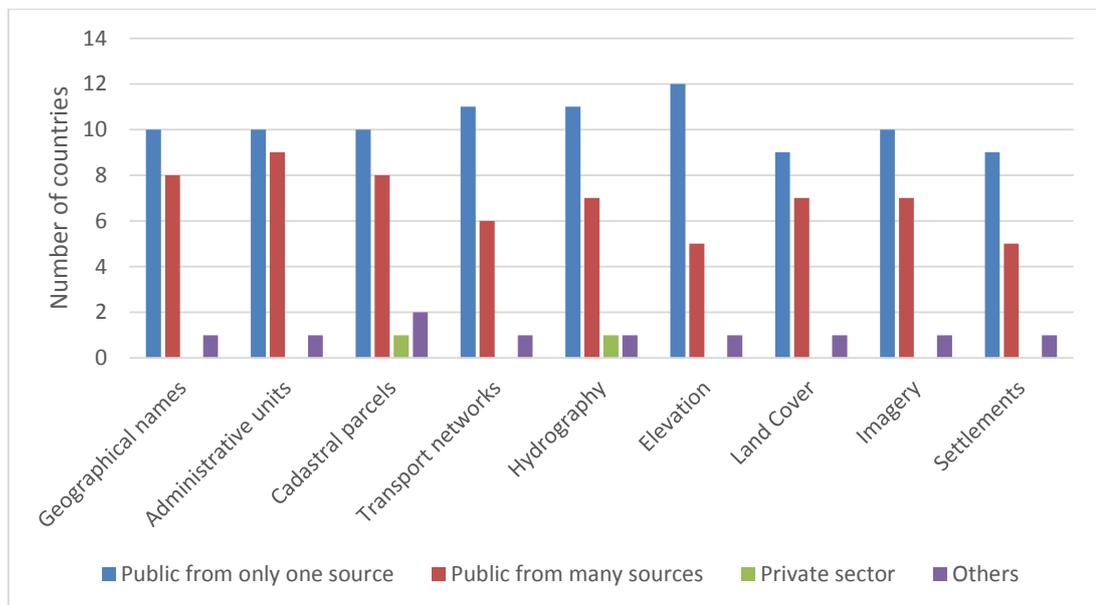
Graphic-2 Funding for GI acquisition.

In funding for **IG processing** only for the subjects of administrative units and cadastral parcels the highest percentage is public from various sources, in other subjects the highest percentage is public from a source, highlighting the theme of elevation. See *Graphic-3 Funding for GI processing*.
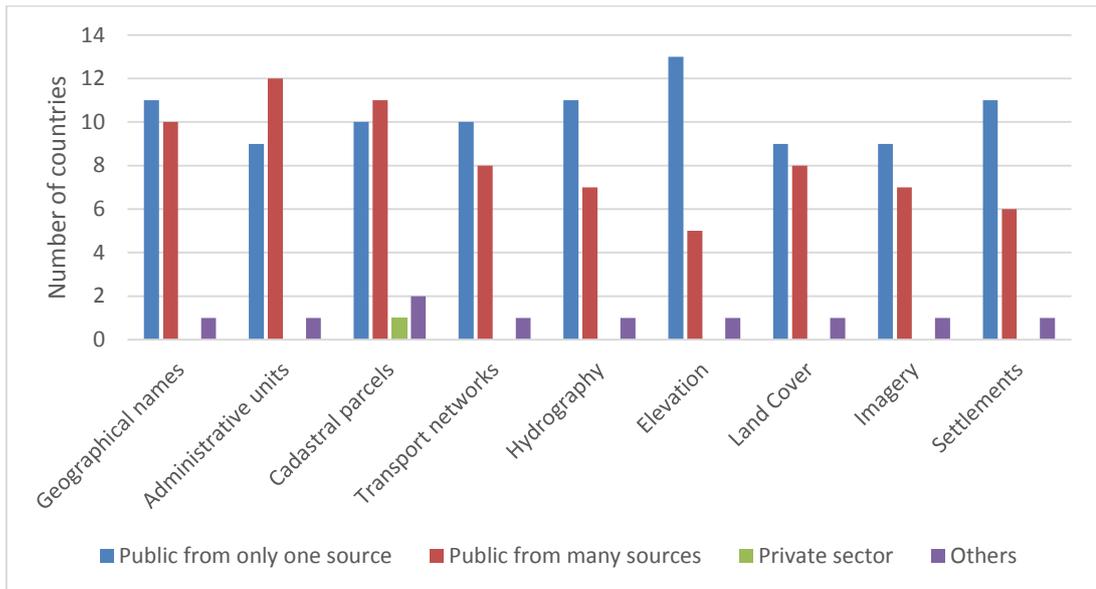
Graphic-3 Funding for GI processing

In funding for **dissemination of GI**, the greatest contribution is public from a single source, in all categories underfunded or no private sector is appreciated. See *Graphic -4 Funding for dissemination of GI*.
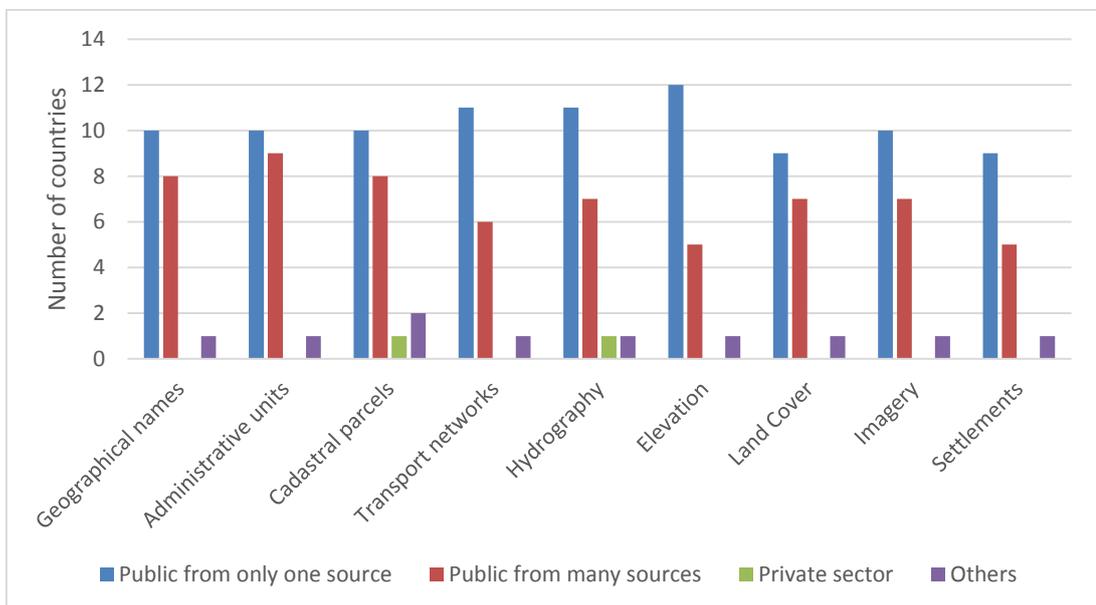
Graphic -4 Funding for dissemination of GI

For the three funding schemes (acquisition, processing and dissemination) in all subjects support from other sources is received; however, any country specified which ones.

2. What is the main source of funding in your country for the GRI production?

In all countries that answered the questionnaire stands out as the main source of funding for GRI production, the public, with only a minor percentage of private origin, as shown in *Graphic -5 Main source for the GRI production.*
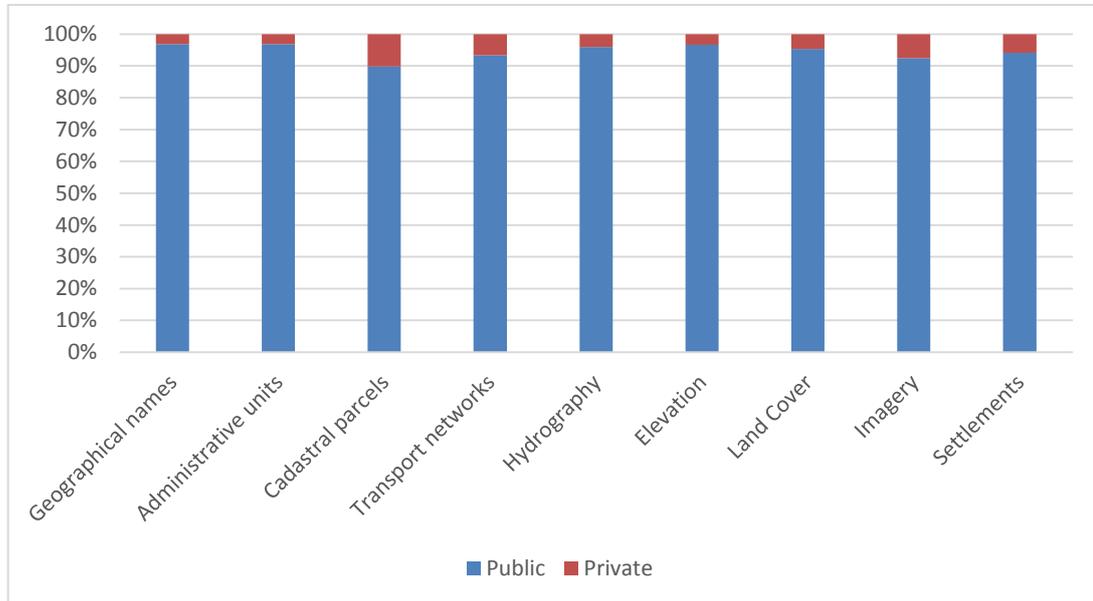
Graphic -5 Main source for the GRI production

3. Does your country received any international funding for GRI production?

- Spain states that 1% is international finance.
- Macedonia receives support from the International Cooperation Agency (JICA 2004-2006).
- Greece receives international funding in the issues: cadastral parcels 4%, hydrography 50%, land use 26% and images 61%.

Hungary, Bahrain, Republic of Korea, Palestine, Portugal, Slovakia and Venezuela did not respond to this question.

4. How much is the amount allocated (USD) and what percentage represents regarding the GDP of the country?

Most countries did not provide answer, which inhibits to a conclusion. Also, some data of respondents, are in very different ranges. Examples of this are the following:

- E.U .: 121 million USD
- Korea 1 trillion 4,495 hundreds of billions USD
- Spain: 19.8 million USD
- Mexico: 22.6 million USD

5. How is the funding used?

The highest percentage of application of the funding is reflected in the activities of production and renovation, which is an indication that these are the main activities.

Moreover, we show that the lowest percentage of application of the funding is used in research; this seems logical, from the point of view that this activity is not the primary role of national mapping agencies or institutions, which are mostly those who answered the questionnaire. See *Graphic-6 Application of funding*
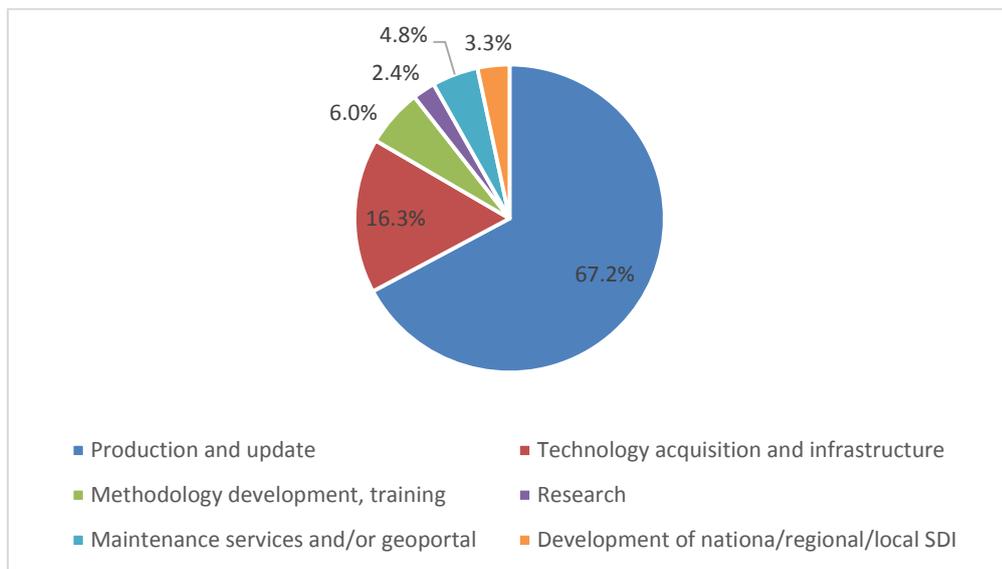
Graphic-6 Application of funding

6. Is there a model for the return of investment (ROI) derived from services, rent or sale of GRI?

Only six countries mentioned that they have some model of ROI; 21 countries did not answere; thus inhibit an analysis of the information and to formulate a conclusion.

The six countries that responded, commented as follows:

- Panama: We know that part of the proceeds from the sale of cartographic products are sent to a common account managed by the central government.
- UK: The government sets a target total return on capital employed.
- Mexico: There is a return on investment model in the issue of cadastral parcels.
- Canada: It will be launched tentatively Geomatics Canadian Environmental Analysis and Study of Value on April 30 2015. Although it is not a return on investment, shows study results.

- Norway: There are models of return on investment in the areas of: cadastral parcels, hydrography, elevation and images.
- Greece: There are models of return on investment on the issue of transport networks 100% compared to the percentage that goes to the production of GRI.

I.3   Analysis of Dissemination Systems

Regarding this issue, the questionnaire included 11 questions to determine the official media for the dissemination of GI and GRI, its mechanisms and the relationship of the official source with the academic and private sectors; and to identify the main products offered, cost and knowledge of best practices. The results were:

7. Which authority is responsible for spreading the official GRI in your country?

For topics of geographical names, administrative units, transport networks, hydrography, elevation, land use, images and settlements, 71.4% of the countries that responded to the questionnaire; lean on the national mapping agency, 39.3% of the countries is based on ministries and 17% in other institutions. In the particular issue of cadastral parcels, 11 countries rely on national mapping agency, eight in ministries and eight in other institutions.

This is reflected in *Graphic -7 Authority responsible for spreading the GRI*.
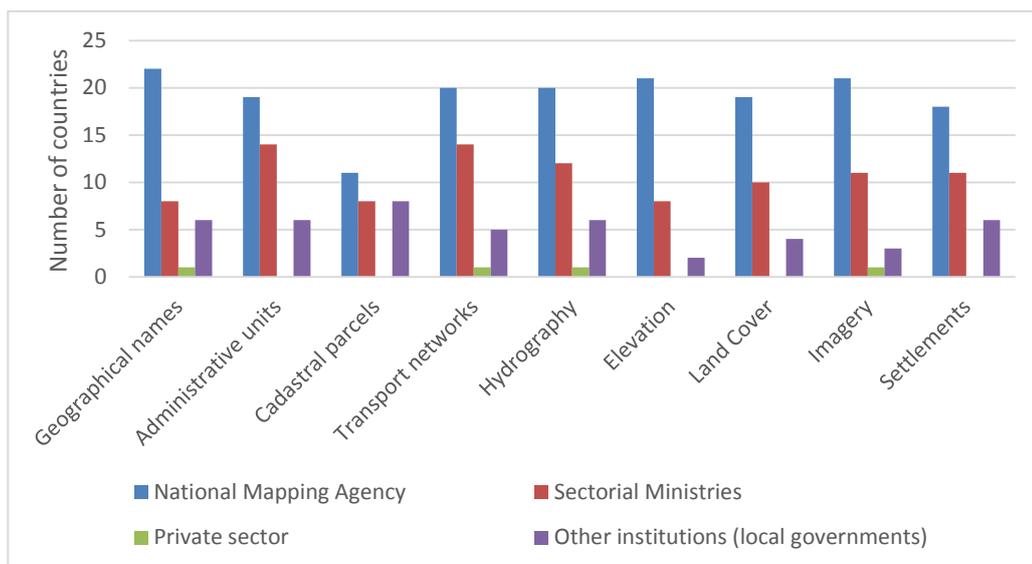
Graphic-7 Authority responsible for spreading the GRI

8. Which is currently the principal means for access and consulting GRI in your country?

66% of countries use web services and geoportals as the main means of access and consultation of GRI; However, even with the new available technologies, 65% of the countries responded that the information is spreading through physical means. The result shows the lowest percentage is cloud technology according to future trends in geospatial information management should be increasingly used. See *Graphic-8 Means of access and consultation of GRI.*
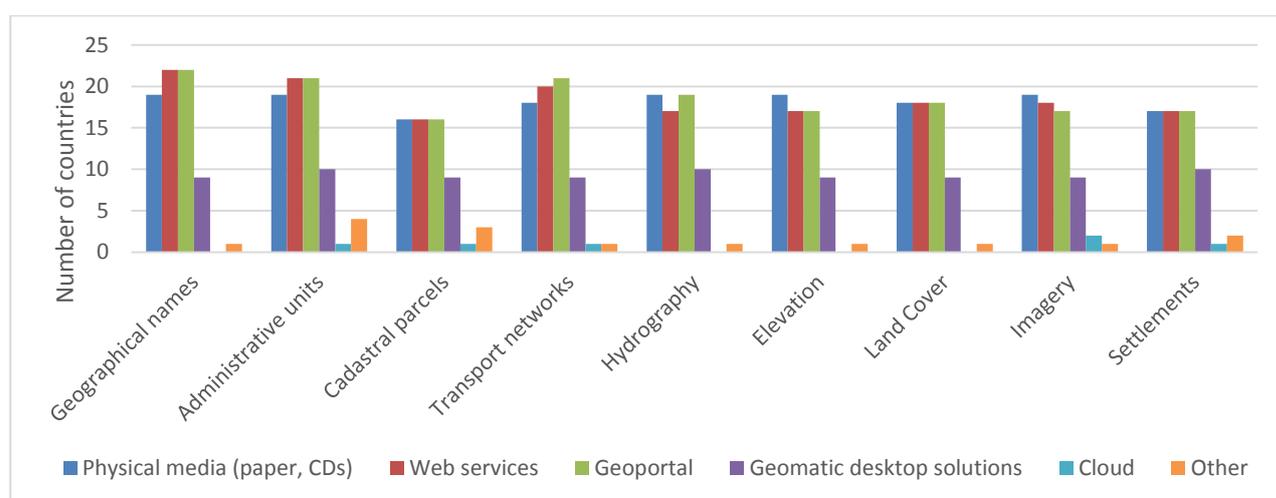
Graphic-8 Means of access and consultation GRI

9. Do you consider that the dissemination mechanisms for GRI implemented in your country are adequate to meet the needs for different users?

53.6% of countries considered that the spread of GRI mechanisms are adequate to meet the needs of different users, while 46.4% think the opposite. See *Graphic-9 Suitable mechanism to disseminate GRI*.
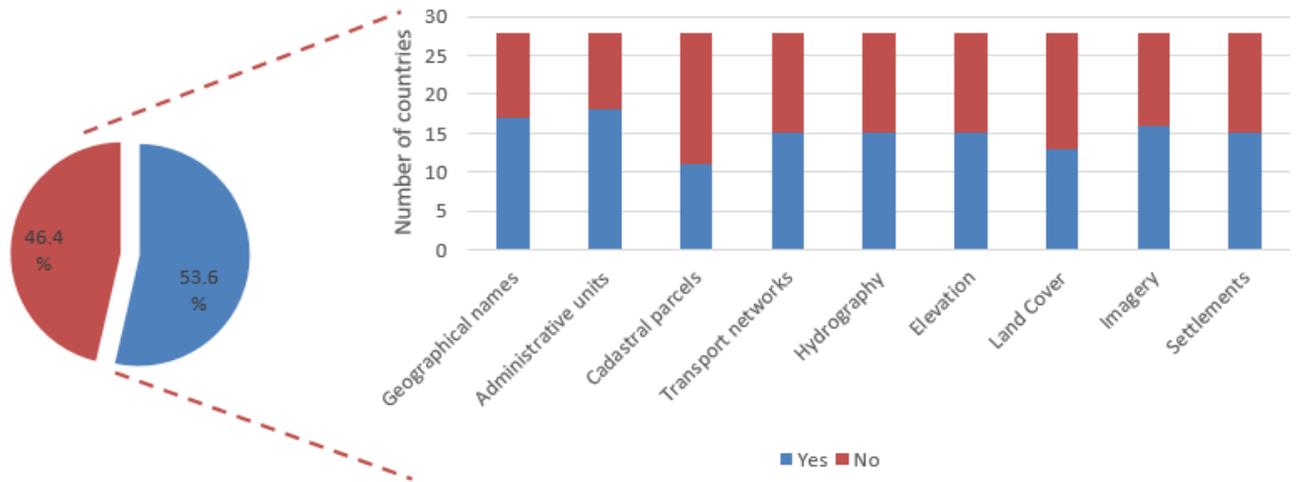
Graphic-9 Suitable mechanism to disseminate GRI

For the topic of cadastral parcels only 11 countries consider that the spread of GRI mechanisms are suitable.

10. Which means is used to publish available GI or GRI to the population of your country?

85.3% of countries say that the most widely used for publishing geographic information are the official websites; secondly, mechanisms of publication less used are TV and radio, as only 2% of the countries uses thereof. See *Graphic-10 Broadcast Media of GRI*.
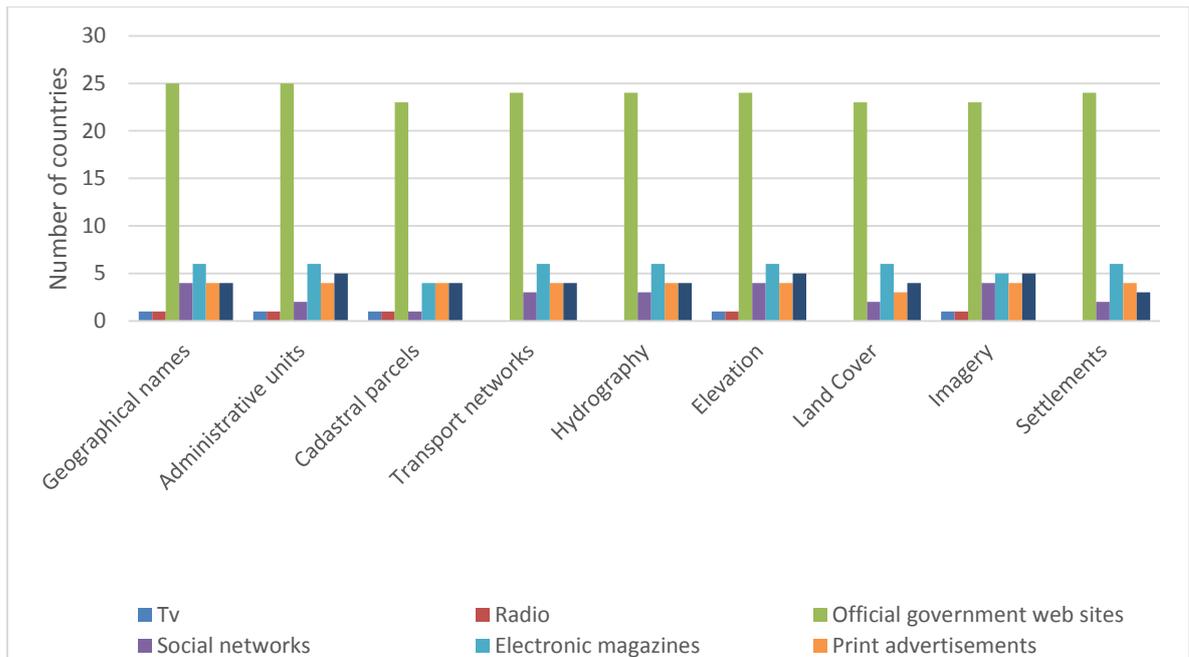
Graphic-10 Broadcast Media of GRI

11. Do you maintain relationship with the academy to promote awareness and use of GRI ?,
and
12. Do you maintain relationship with the private sector and/or non-governmental organizations to promote awareness and use of GI or GRI?

61.1% of the countries that responded to the questionnaire, claim to have all the issues regarding the academy and 55.2% with the private sector. Thus, it can be stated that the biggest rate to promote awareness and use of the GRI, originates in the relationship that is maintained with the academy

See *Graphic-11 Relationship with academia and the private sector by topic*.
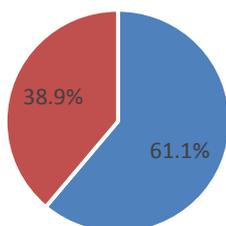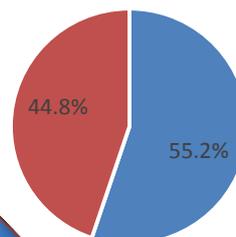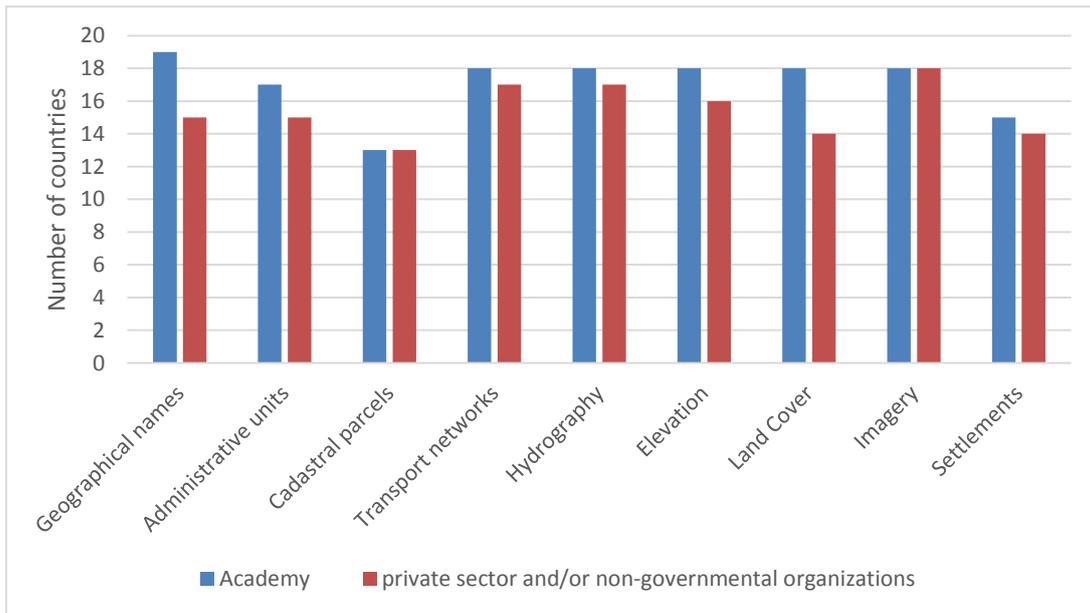
Graphic-11 Relationship with academia and the private sector by topic

It is noted that in the topic of cadastral parcels, only 13 countries report having relationship with academia, private sector or NGOs.

13. Is there awareness in your country of best practices for better dissemination of GI or GRI that have or not been implemented?

61.5% of countries have no knowledge of best practices for disseminating of GI or GRI on all topics. In the areas of transport networks and images mentioned 13 countries have knowledge of best practices. For this question, the best practices are not mentioned. See *Graphic-12 Knowledge of Best Practices.*

14. Which are the main products and services offered of GRI?

To this question, 22 countries provided the list of GRI products and services available. See *Graphic-13 Products and services response*
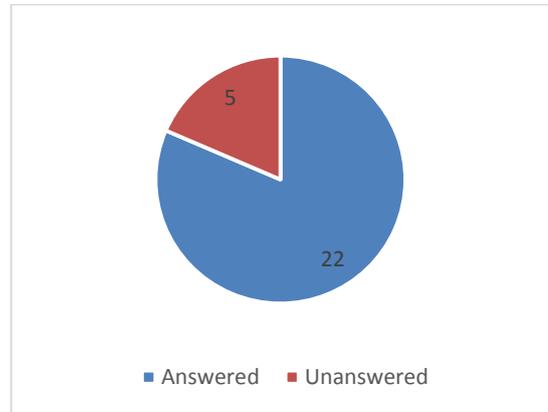
Graphic-13 Products and services responses

From the responses, it appears that the most recurrent products are:

Producto/servicio	Frecuency (Number of countries)	% of the responding countries
GIS	15	65 %
Digital and / or printed cartography	14	61 %
Geoservices	9	39 %

Annex 1 lists major products and services described in 23 countries.

15. Which is the accessibility level of official GI or GRI generated in your country?

Access 62.7% of the countries, to the GI, or official GRI, is well known for all subjects; however, to the issues of cadastral parcels and images, there is a more controlled access; in a similar case, it is the subject of elevation, where only 11 countries consider the level of access is public knowledge. See *Graphic-14 Accessibility Level GI or GRI.*
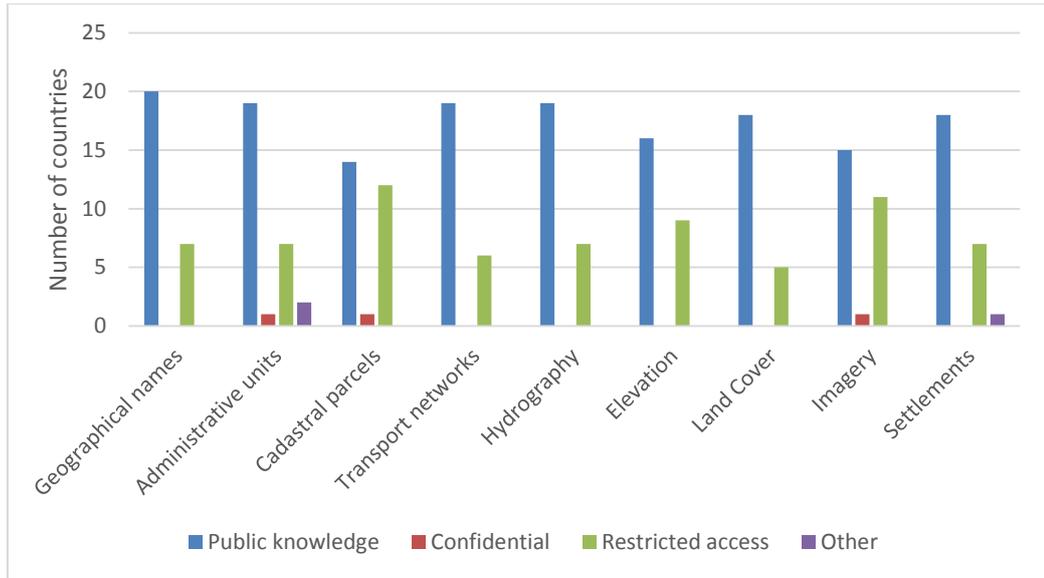
Graphics-14 Accessibility Level GI or GRI

16. Does GI or GRI use have a cost for the population?

As shown in *Graphic-15 Cost of using the GI or GRI by topic,* 63.9% of countries say the IG and the IGR do not have a cost to the population, while 36.1% assign a therefore cost.

In particular, for the topic of cadastral parcels, 13 countries say that GI or GRI have a cost, while 14 said no.
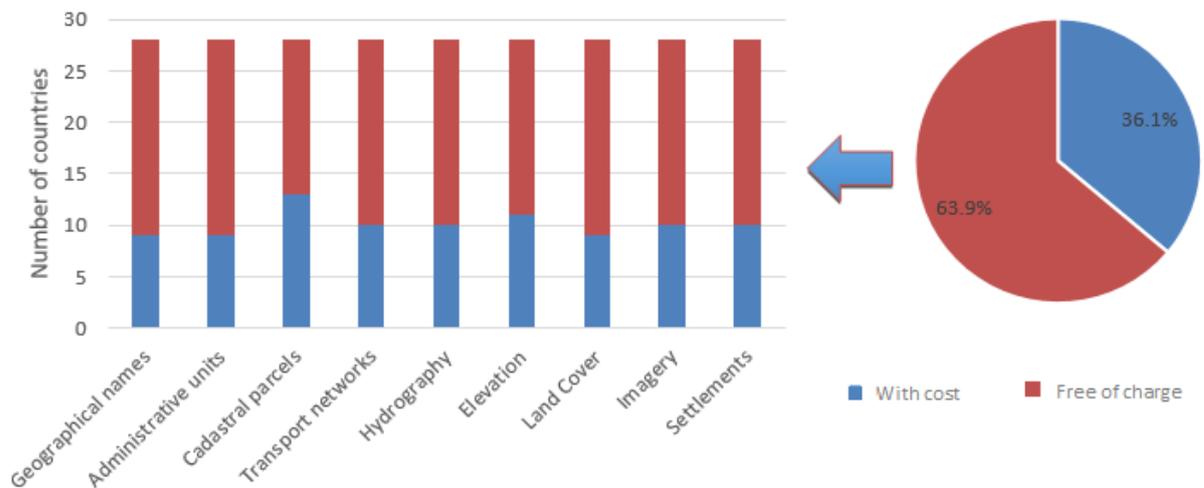
Graphic-15 Cost of using the GI or GRI by topic

17. Is there a feedback mechanism from users regarding the GRI available?

65.5% of the countries that answered the questionnaire said that feedback mechanisms exist with users to the GRI data, while 34.5% indicated otherwise (See *Graphic-16 Existence of feedback mechanism).*
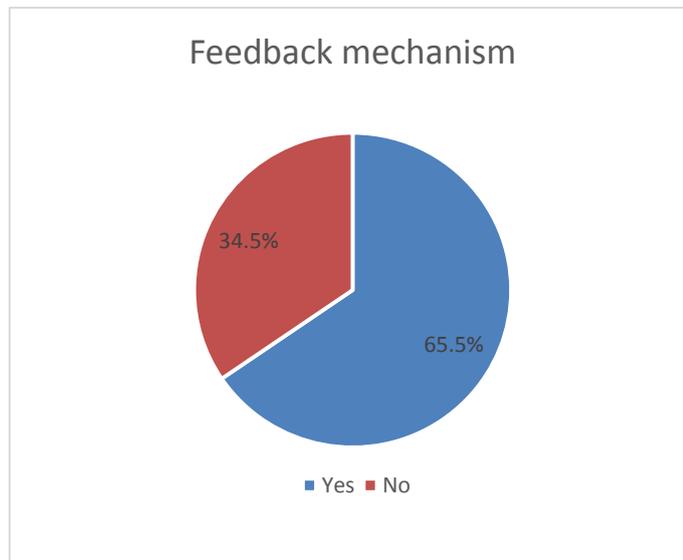
Graphic-16 Existence of feedback mechanism

The same result is reflected in the responses obtained for each topic. See *Graphic-17 Existence of feedback mechanism by topic.*
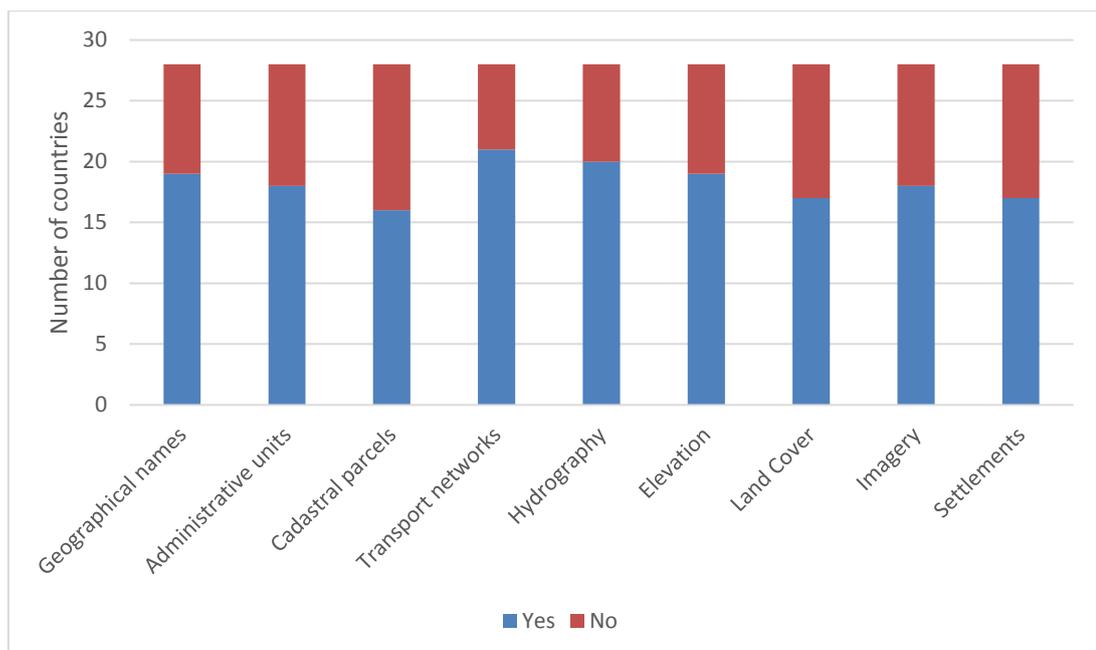
Graphic-17 Existence of feedback mechanism by topic

I.4 Analysis of data policy models

For this topic, eight questions were applied in order to meet the legal framework and its application level in terms of GI and GRI. The initiatives for the implementation of a Spatial Data Infrastructure (SDI) and policies concerning information governance. From the information gathered, the following data can be deduced:

18. Does the country have a legal framework that regulates the collection, generation, analysis, processing, dissemination and/or receipt of Geospatial Information?

61.11% of the countries that answered the questionnaire do have a regulatory framework for acquisition, processing and dissemination of GI in all subjects. In the areas of administrative units and hydrography, 19 countries have the regulatory framework for acquisition and processing and 20 countries for the dissemination of geospatial information. See *Graphic-18 Existence of legal framework.*
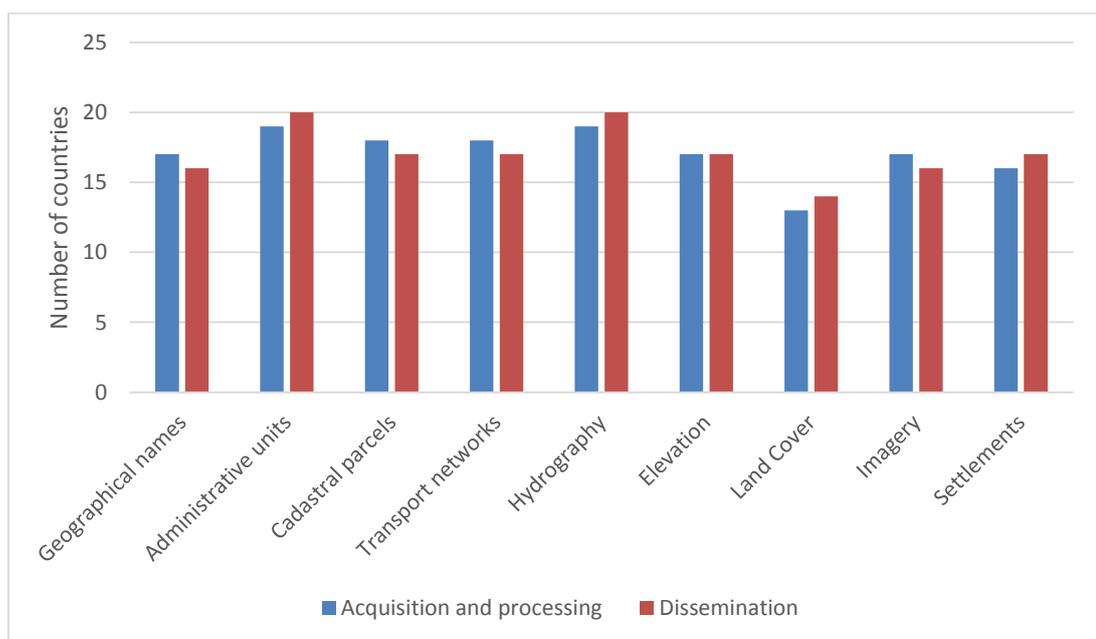
Graphic-18 Existence of legal framework

19. Is the legal framework aligned with international standards?

From the response level obtained in the previous question, as shown in *Graphic-19 Alignment legal framework to international standards by topic,* 60.7% of the countries report that the legal framework for acquisition, processing and dissemination is not aligned to international standards and 39.3% mentioned that this agreement is presented.
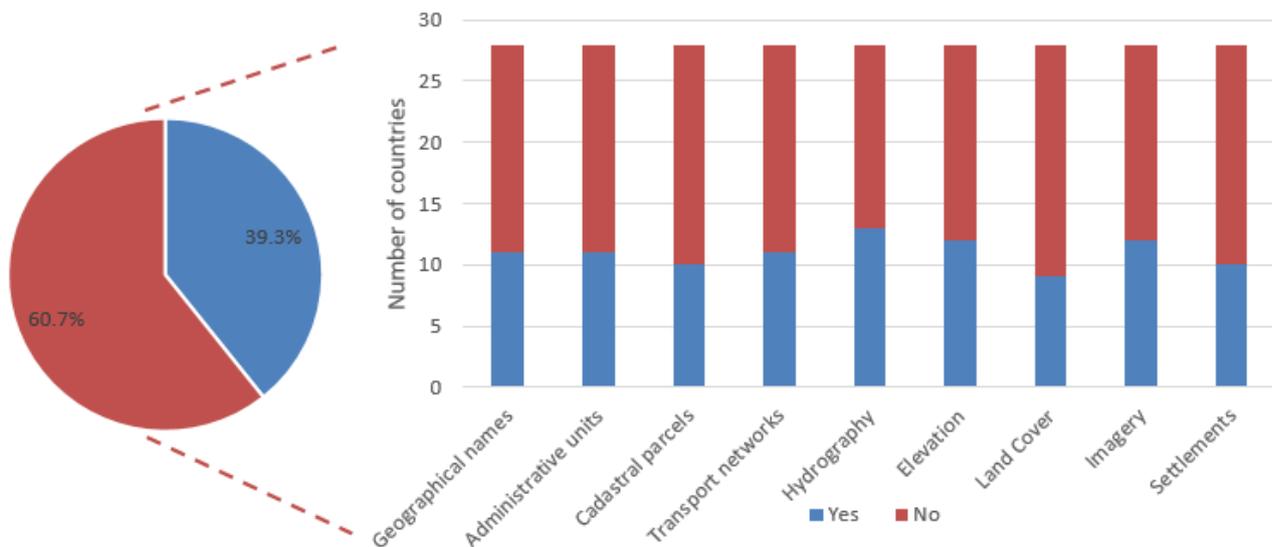
Graphic-19 Alignment legal framework to international standards by topic

Only eight of the countries whose legal framework is aligned to international standards, specified with which organizations or initiatives keeps that agreement. The result is shown, in the following table:

Internacional Standards	Frecuency (Number of countries)	% of the responding countries
INSPIRE	3	33 %
ISO	3	33 %
OGC	2	22 %

In Annex 2, the list of international standards that are aligned the legal framework for acquisition, processing and dissemination of GI is shown.

20. Is there any law of regulation being developed currently regarding the subject?

As shown in *Graphic-20 Development of law or regulation,* 65.1% of the responding countries manifests are not currently developing any law relating to the acquisition, processing and dissemination of IG; meanwhile 34.9% state it is.
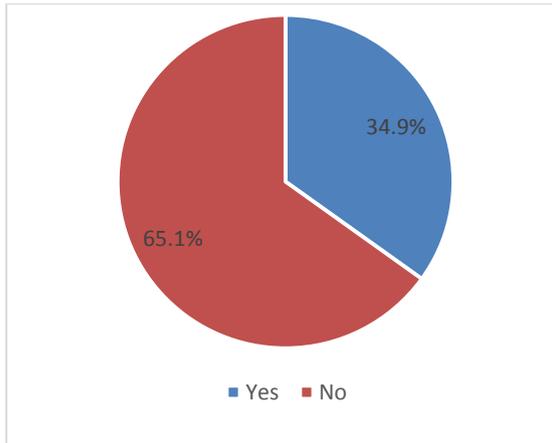
Graphic-20 Development of law or regulation

The theme of hydrography highlights slightly above the other, with a total of 11 countries currently developing a law related to the acquisition, processing and dissemination of IG. See *Graphic-21 Development law or regulation by topic*

.
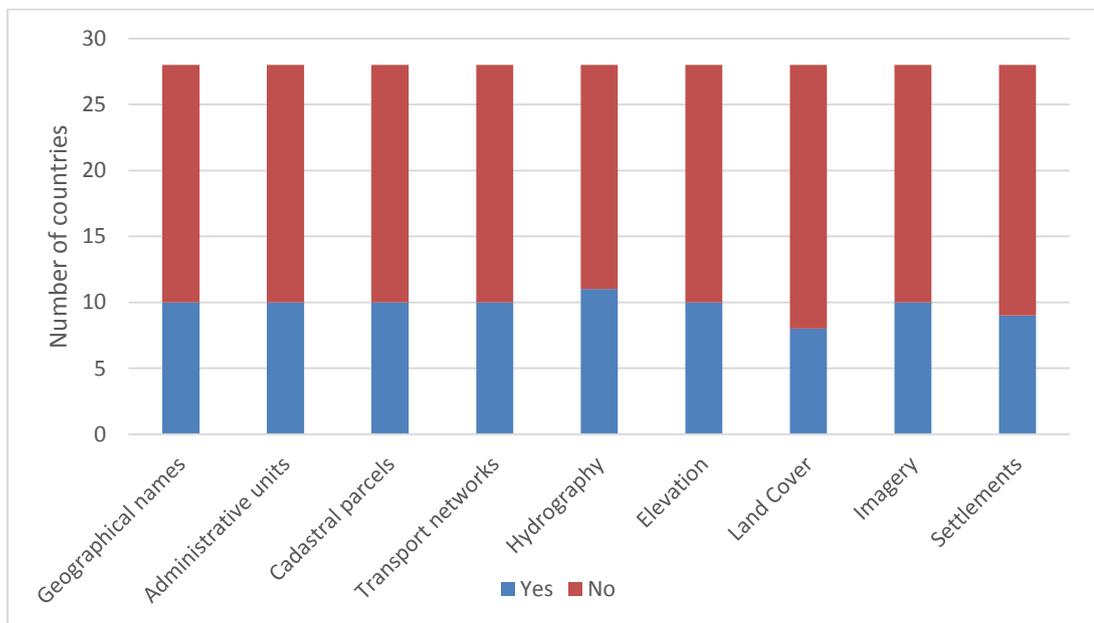
Graphic-21 Development law or regulation by topic

In Annex 3, the list of laws or regulations that are being developed for the acquisition, processing and dissemination of GI is shown.

21. Is the application of the legal framework required at a national, regional, local level (municipalities or districts), on the public or private industry, etc?

Respect to whether is mandatory implementation of the legal framework for private or public industry, positive and negative responses, of responding countries, are very similar in

percentage: 49.6% in positive cases, against 50.4% in negative. See *Graphic-22 Mandatory legal framework by topic*.
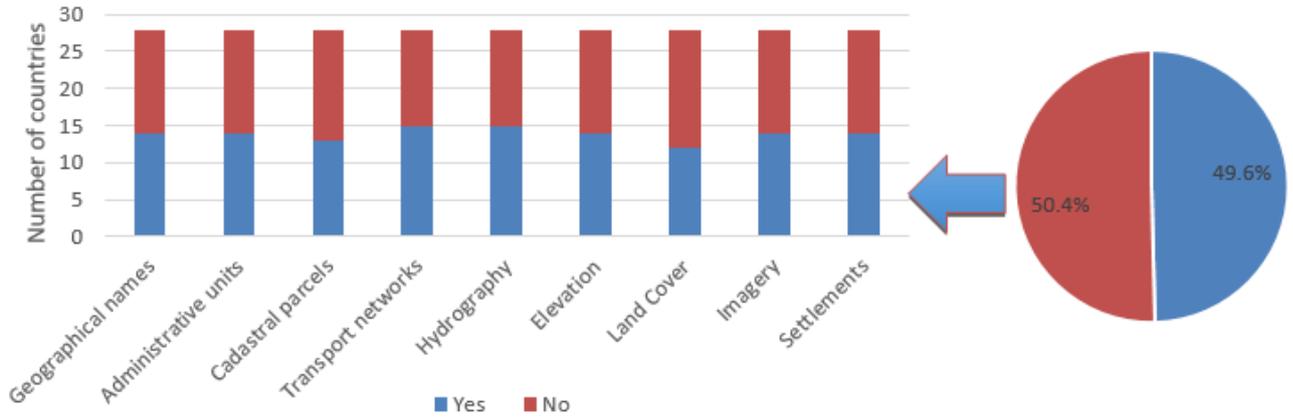
Graphic-22 Mandatory legal framework by topic

In each of the topics, the same behavior occurs. Is noted that in the topics of transport networks and Hydrography 15 countries say it is required to implement the legal framework at the national, regional and local level in the public or private industry.

22. Is there a law that promotes the establishment and maintenance of a national SDI?

As shown in *Graphic-23 Existence of law to an IDE,* 52.4% of the countries that answered the questionnaire think that his country does exists a law that promotes the establishment and maintenance of a national SDI; meanwhile 47.6% say no.
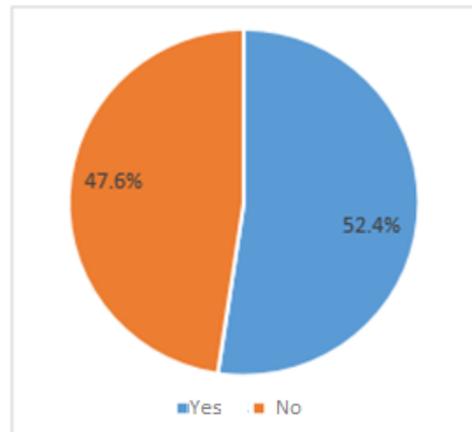
Graphic-23 Existence of law to an IDE

In Annex 4, the list of laws that promotes the establishment and maintenance of a national SDI is shown.

23. List the main policies or regulations that standarize access and distribution of geospatial data.

As shown in *Graphic-24 Standardization of access and distribution,* to this question, a total of 16 countries responded, but only 15 listed major policy or regulations that standardize access and distribution of geospatial data.
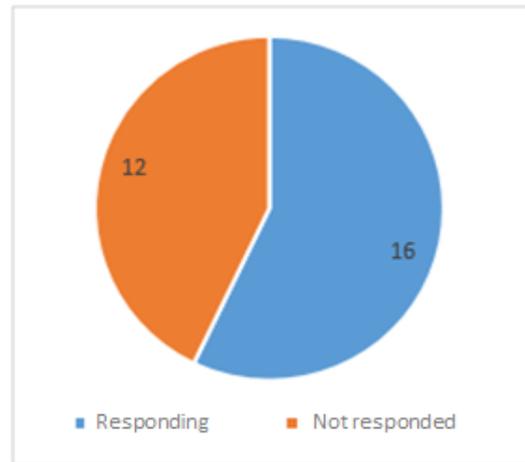
Graphic-24 Standardization of access and distribution

Annex 5 shows the list of laws that promotes the establishment and maintenance of a national SDI.

24. Has your country developed or is in process of having an open geoespatial data initiative?

With respect to whether it has developed, or is in the process of developing an initiative open geospatial data, 63.3% of the countries answered yes and 33.7% said no. See *Graphic-25 Development of open data initiative.*
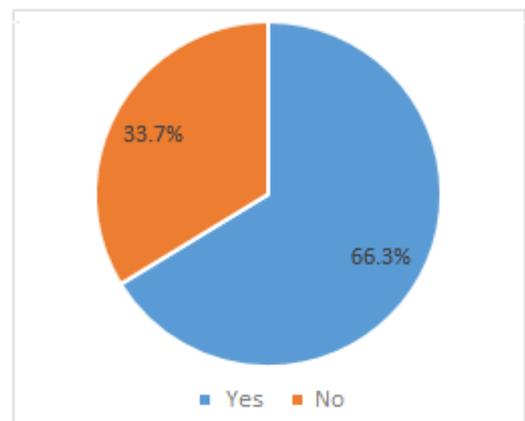
Graphic-25 Development of open data initiative

This question highlights the issue of geographical names, with 20 countries developing some initiative. See *Graphic-26 Development of open data initiative by topic.*
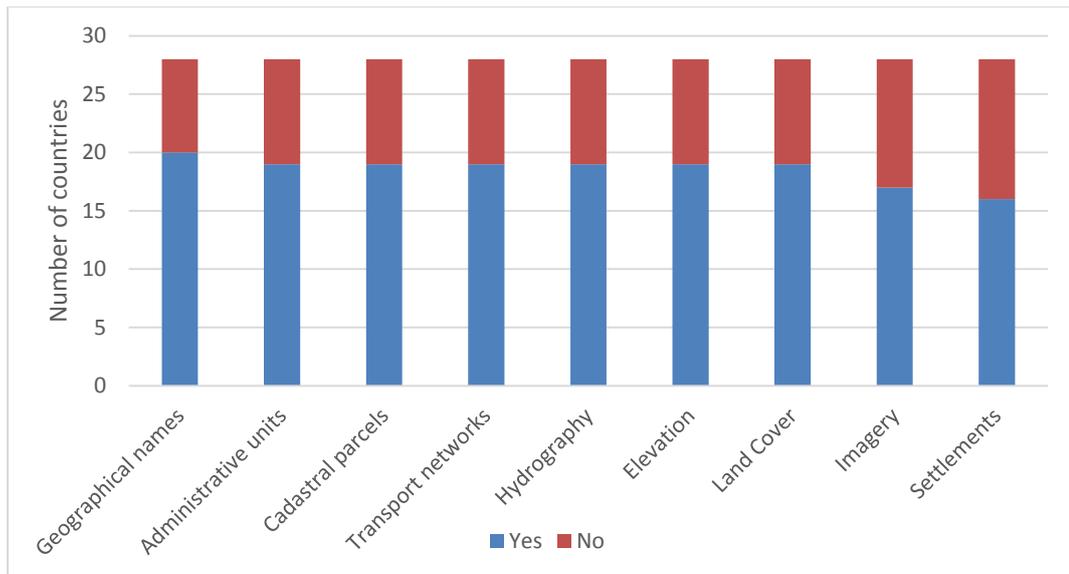
Graphic-26 Development of open data initiative by topic

In Annex 6, the list of open geospatial data initiatives is shown.

25. Is there a policy or strategy relating geoespatial awareness or governance information?

Regarding policies or strategies on geospatial knowledge or information governance, 46.8% of the countries expressed their existence, while 53.2% indicate otherwise. See *Graphic-27 Existence of policy or strategy geospatial awareness.* Of the 27 countries that responded to the questionnaire, 15 listed some of these policies or strategies, a list is included in Annex 7.
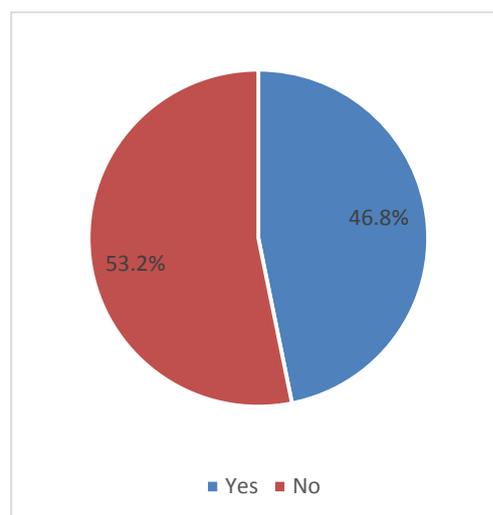
Graphic-27 Existence of policy or strategy geospatial awareness

I.5 Context statistical hypothesis testing to establish possible dependence between categorical data

Within the study of the responses of the surveyed countries, it is prudent to adopt and table analysis contrasting results of observations (countries), under the three-dimensional response. To do this, type analysis χ^2 (chi-square) contingency tables to study the independence of the data often prove to be very helpful. Therefore, at this point the fundamental elements of such statistical analysis are presented.

- Dimension 1: Sources of financing.
- Dimension 2: Dissemination systems.
- Dimension 3: Data policy models.

For this study, the agglomerated countries based on certain characteristics of the hypotheses that influence the level of response were:

- Individual countries.
- Continent.
- Level of development.
- Ethnicities.

So, with the considerations mentioned, a table was prepared recording the *observed values* of the individual, posted marginally totals for rows and columns.

In order to perform data analysis, a table of *expected values*, which are obtained should under the assumption of independence of treatments on individuals is created.

Subsequently, to determine whether the treatments have had an impact, or are not associated or what they reveal individuals, the following amount is calculated:

$$\chi^2 = \sum_i \frac{(o_i - e_i)^2}{e_i}$$

Where the sum is extended to all cells of the contingency table, If the chi-square is more empirical than $\chi^2_{\alpha,v}$ theoretical, with a significance level α of 0.05 y $v = (m-1)(n-1)$ degrees of freedom, the null hypothesis of independence at the level of significance is accepted α; otherwise rejects the null hypothesis.

Results of statistical analysis:

1. **Individual countries**.

As the $\chi^2_{0.05,\,v=(28-1)(3-1)=54} = 72.2 < \chi^2_o = 427.1$, there is still dependency.

2. **Continent.**

    As the $\chi^2_{0.05,\,v=(4-1)(3-1)=6} = 12.6 < \chi^2_o = 71.7$, there is still dependency.

3. **Level of development.**

    As the $\chi^2_{0.05,\,v=(2-1)(3-1)=2} = 6.0 < \chi^2_o = 7.0$, there is still dependency.

4. **Ethnicities.**

    As the $\chi^2_{0.05,\,v=(2-1)(3-1)=2} = 21.0 < \chi^2_o = 50.3$, there is still dependency.

In conclusion, the answers provided, depends directly on the country, the continent, the level of development, or ethnicity.

A. Funding Structures

Current situation:
- The processes of acquisition, processing and dissemination of the IG, remain in these expensive times, institutions and national mapping agencies in the public sector are absorbing practically all these (95%), without any involvement of other sectors , or without sharing them within the sector itself.
- Another situation that was found regarding financing structures refers to the amount allocated for the production of geospatial information and its relation to PIB (IPB), and that of the 27 countries that responded to the survey, there were only 7 responses; so we can deduce that most institutions have no records or clear data on this subject.
- Something similar happens regarding the existence of some sort of return on investment model, since the response level may be a reflection of lack of knowledge or little information we have about this item.

Trends:
- According to the questionnaire responses of the 27 countries, the issue of financing structures, it is clear that most of the resources for the acquisition, production, updating and dissemination of official IGR, lies in the sector public, since this is a function of their state.
- Regarding the use of resources, the answers show that 67.2% of the funding is used for the production and updating of IGR; however there is a considerable percentage applied to the acquisition of new technologies, reflecting the desirability of maintaining an update as to the trends related to the management of the IG.

B. Dissemination systems

Current situation:
- The results show that even with advances in technology geoservices, information continues to spread on physical media; for 65% of the country it remains one of the mainstream media, this due to the transition from analogue to the digital era, as well as the ease of providing information through optical disc (CD or DVD).

- On the mechanisms of dissemination of IGR to meet needs of the population, it is observed that still needed to implement new ways beyond the official websites to disseminate information, as other mechanisms such as electronic journals, social networks, advertising and other media such as TV and radio, are not very employee.
- There is little knowledge and thus only 34.9% of countries applying best practices related to the spread of IGR, which mostly reflected on the issues of geographical names, land use and settlements.
- It is noted that the issue of lifting there is still a high level of restricted access, which could limit its use and exploitation layer available as indispensable for the construction of several cartographic products and geomatics solutions.

Tends:
- Within each country, the authority responsible for disseminating government IGR remains the Institutions or National Mapping Agency and a lower percentage ministry.
- The trend in terms of the means to access and view the IGR are the web and geoportals services; however, it also shows that the physical resources are still widely used.
- Regarding the media of the IGR, preferences are the official websites; Moreover despite the rise of social networking, these are hardly used for this purpose.
- A provision is observed to maintain and improve the relationship with academia and the private sector, as a collaborative tool to promote awareness and use of the IG and the IGR.
- The main products and services are available IGR which are geographic information systems, print and digital cartography at different scales and geoservices.

C. Data Policy Models.

Current situation:
- Concerning the legal framework for the collection, generation, analysis, processing, dissemination and / or receiving IG, an average of 39.89% of the responding countries still do not have a legal framework; however, 72% of existing legal frameworks are aligned with international standards.
- The application of a legal framework to regulate the collection, generation, analysis, processing, dissemination and / or receiving IG, still not mandatory at national, regional or local level, public or private industry, making interoperability difficult.
- Within each country, there is still much work to do in terms of developing policies and strategies related to geospatial knowledge or information governance, since the results show that 53.2% of countries have no policy or on strategy knowledge or government geospatial information.

Tends:
- On the issue of data policy models, the trend regarding the legal framework for the collection, generation, processing, dissemination of IG should be directed to continue the development of policies or regulations to this issue and to make the application of legal framework at national, regional or local level, public or private industry.

- According to the questionnaire responses, it appears that one of the inertia in the future on the subject of data policies, is continuing to generate laws that promote the establishment and maintenance of a national SDI, and continue developing initiatives open geospatial data.

In the *Figure-2 Current Situation and GI Trends* a summary of the current situation and trends that has been considered most relevant is shown as result of diagnosis.
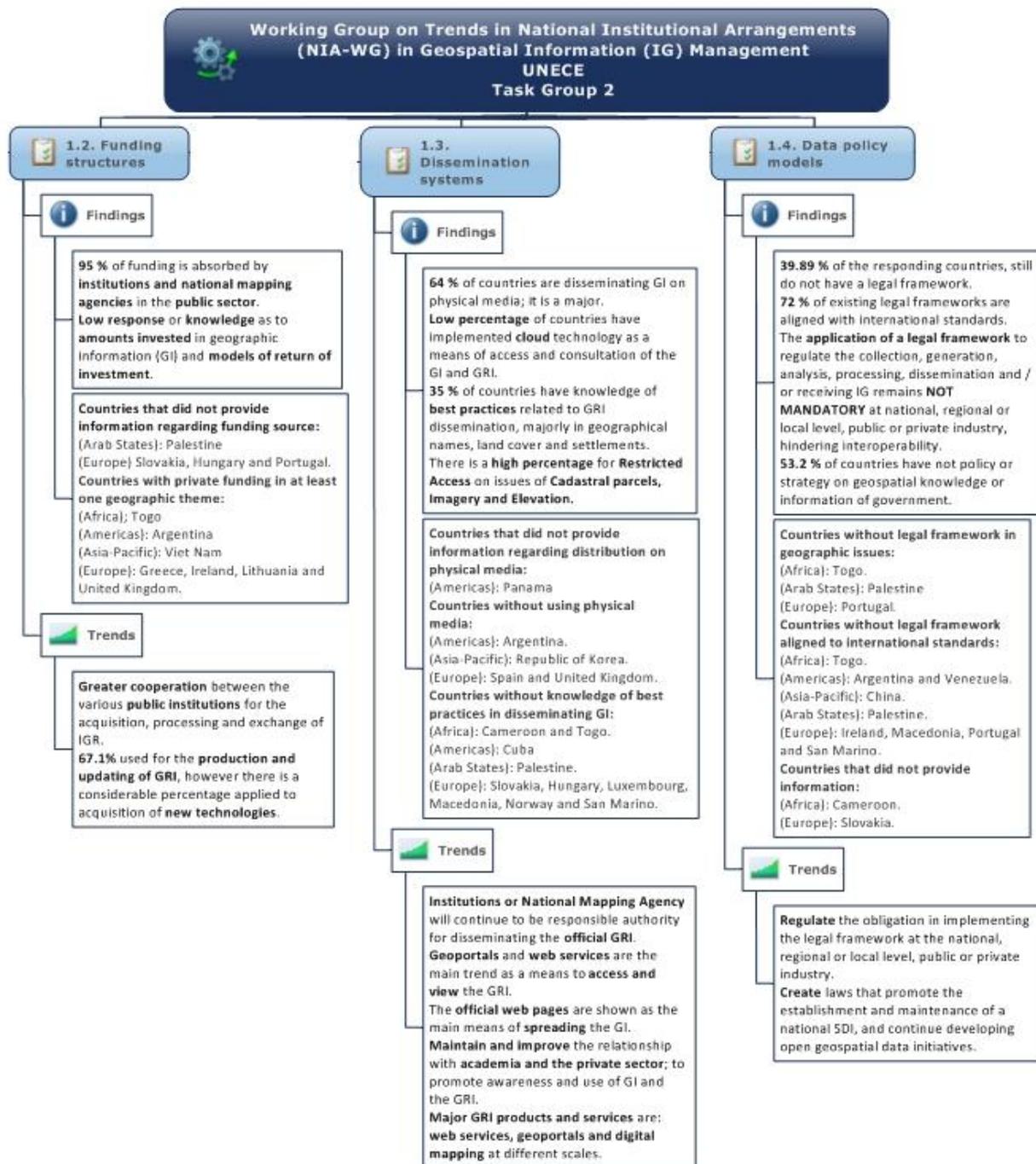
Figure-2 Current Situation and GI Trends

III. Conclusiones

I. Compilation and integration of information

- The results shown herein are based on the responses of the integrated questionnaire of the Working Group on Trends in National Institutional Arrangements for Geospatial Information Management (NIA-WG), corresponding only to the section of the Task Group (TG2), coordinated by Mexico.
- The collection instrument used to obtain the information necessary for this analysis was integrated questionnaire, which was sent to the 196 member countries of the UN-GGIM, of which only answer 27. He received the European continent is held higher level of participation, with the response from 12 countries.
- Of the three themes on which the questionnaire is divided, the greater level of response obtained was the section II: Dissemination systems. The theme of the lower percentage of responses obtained was the third: Data policy models.

II. Integration and representation of information

- The responses of all the questionnaires were concreted in a single file, taking into account the themes and categories (at least two for each answer, yes and no) of each question.
- Data tables were generated with the sum of the responses of each country and on that basis, two types of graphs were made: circular bars as follows:
    a. The topics for each category, is plotted on the y-axis "x" and the number of countries by category in the axis "y".
    b. For some questions had to be a circular graph, representing response rates of countries.
    c. For questions where a list of products or laws was requested, circular generated the response rate of the countries a graph.

III. Analysis and interpretation of results

- Regarding Funding structures it was identified that the largest funding for the collection, processing, generation and dissemination of GRI is from the public sector, while international funding is almost null.
- On the subject of Dissemination systems it shows that there are several areas of opportunity to strengthen the dissemination of GRI mechanisms designed to meet user needs. It is also noted that the knowledge lack about best practices for disseminating GRI as unknown or not applicable.

- In Data policy models, the results show that should continue working on creating a legal framework to regulate the generation, processing and dissemination of GI, in addition to further develop policies or regulations on the subject. Likewise, it should continue working on legislation to promote the establishment and maintenance of a national SDI.
- According to the statistical analysis model applied to data, it is concluded that the results do not reflect the situation in the region or continent but only what prevails in countries that answered the questionnaire.
- The amount and degree of response obtained -in comparison to the total universe of member countries of UN-GGIM- the results presented in this document, may be just a small reference in the panorama on Funding structures, Dissemination systems and Data policy models that exist in the global geographical community.
- The next version of this document will display some considerations about the informants, the questionnaire (questions need to restate equivocal responses, etc.), and the validation of responses when confronted with other documentary sources, among others.

IV. Participants

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Survey Report on the Structure of Geospatial Management Organization

Prepared by UN-GGIM National Institutional Arrangements Task Group 3
Coordinated by Lim Liyang (LIM_LIYANG@sla.gov.sg)

Contents

Survey Report on the Structure of Geospatial Management Organization

This paper presents the findings from the questionnaire on the Structure of Geospatial Management Organization. Extending the 2013 UN-GGIM's survey report which focused on the organizational aspects of Geospatial Information Management (GIM), this questionnaire aims to identify changes in national institutional arrangements; the roles of various stakeholders; and the policies and GIM areas deemed crucial by Member States in determining the effectiveness of GIM organizations.

1. Response Rate

1.1. The questionnaire was circulated to 193 Member States of the United Nations from 20 Jan 2015 to 27 Feb 2015. About 26% (or 51) of the Member States have responded to our questionnaire as shown in Figure 1 (Annex A provides the detailed breakdown). Figure 2 shows the breakdown of the respondents according to region.

Figure 1: Overall Response Rate

Figure 2: Breakdown of Responses
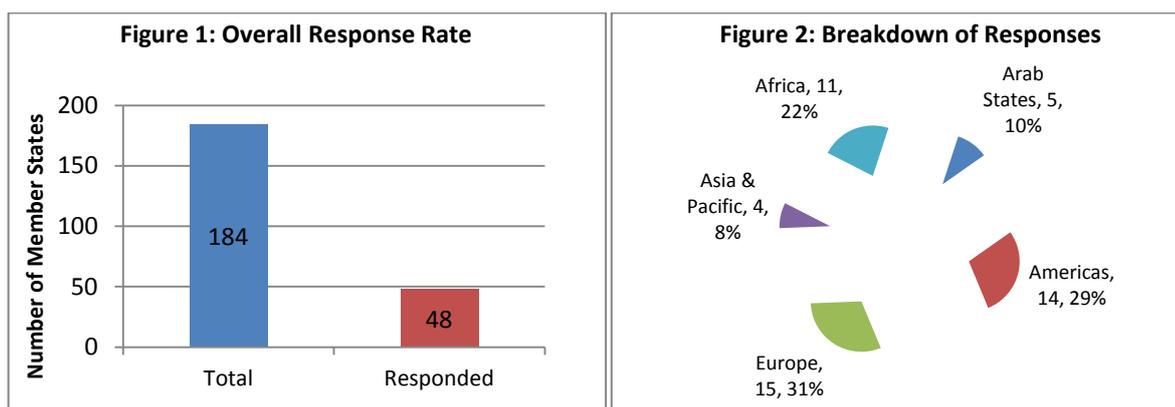
2. Presence of a National Initiative in Geospatial Information Management (GIM)

2.1. We asked respondents to indicate if they have a national initiative in GIM and its current stage. 44 out of the 51 respondents (86%) have a national initiative in GIM as shown in Figure 3. The remaining 7 respondents (14%) have indicated that they do not have a national GIM initiative but plan to begin one within the next 3 years.

Figure 3: Do you have a National GIM Initiative?

Yes 86%
No 14%

Figure 4: GIM Initiative by Region

Africa, 9, 20%
Arab States, 4, 9%
Asia & Pacific, 4, 9%
Europe, 13, 30%
Americas, 14, 32%
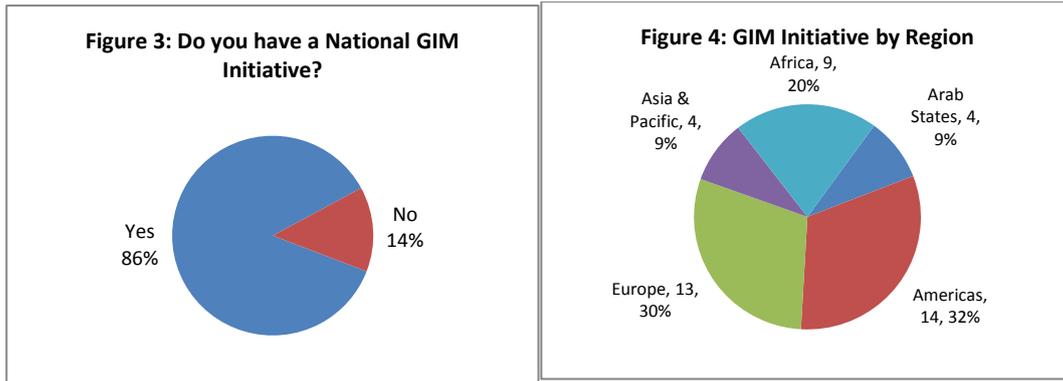
2.2. The breakdown by region of the 44 respondents with a national GIM initiative is shown in Figure 4.

3. Stage of National GIM Development

3.1. We asked respondents to indicate the stage of their current GIM development. Of the 44 respondents with a national GIM initiative, 55% of them have their GIM efforts in operation, 27% are currently developing their GIM efforts and the remaining 18% are in the planning or inception stage (Figure 5).

3.2. Most of the respondents with an operational GIM initiative are in the Americas (38%) and Europe (35%), as shown in Figure 6.

Figure 5: Stage of GIM Development

Planning 10%
Inception 8%
In Operation 55%
In Development 27%

Figure 6: Regions with GIM in Operation

Europe 33%
Asia & Pacific 8%
Africa 7%
Arab States 11%
Americas 41%
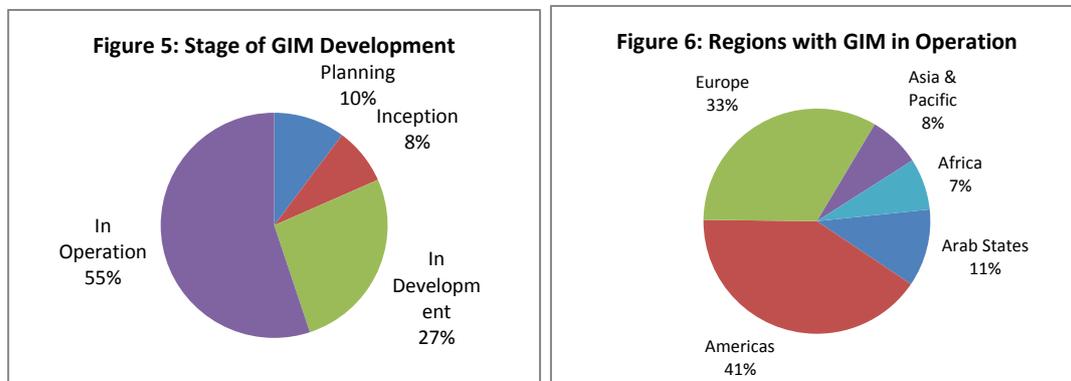
4. Long Term Strategy for GIM initiatives

4.1. 67% of the respondents indicated having a long term strategy for their GIM efforts (Figure 7) and the breakdown of these responses is shown in Figure 8.

Figure 7: Do you have a Long Term GIM Strategy?

No, 34%

Yes, 66%

Figure 8: Member States by Region with Long Term GIM Strategy

- Africa
- Asia & Pacific
- Europe
- Americas
- Arab States

Number of Member States

Yes   No
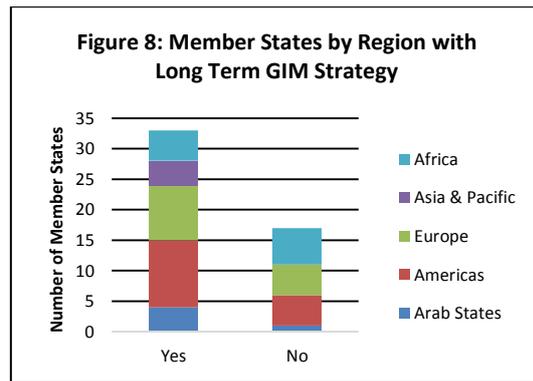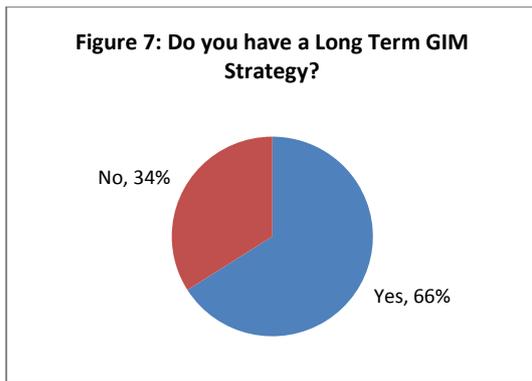
5. Relationships among Entities in the NIA

5.1. We asked respondents to indicate the types of relationship among the entities in their NIA. 65% of the respondents have indicated that their GIM arrangements are mandated (i.e. by a decree) as shown in Figure 9. The remainder relationship types are distributed among contractual agreement, Memorandum of Understanding (MOU) or voluntary arrangement.

5.2. A mandated arrangement appears to be used widely in Europe as presented in Figure 10, possibly influenced by the INSPIRE directive. Although the total number of respondents from the Americas is similar to number of respondents from Europe, far less of them are utilising a mandated arrangement.

Figure 9: Relationship among Entities

Contractual 15%

Mandated 65%

Voluntary 10%

MOU 10%

Figure 10: Member States with Mandated Arrangement by Region

Africa 24%

Arab States 4%

Asia & Pacific 12%

Americas 24%

Europe 36%
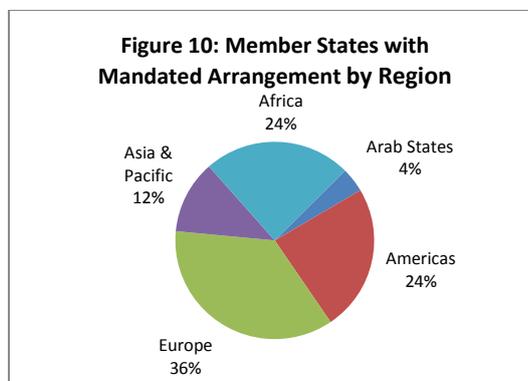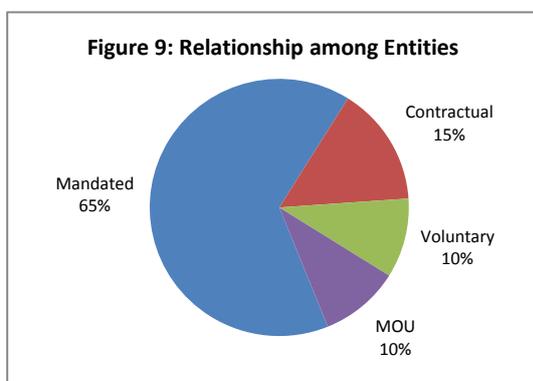
5.3. We further asked respondents to provide factors which contributed to their current GIM arrangements. The contributing factors can be broadly classified into the following categories:
   a) **Increased awareness of the importance of geospatial data**
      - Increased geospatial data demand and usage.
   b) **Advancement in technology**
      - Increased availability of information technology.
   c) **Provision of direction by higher authority**
      - UN-GGIM initiative.
      - INSPIRE Directive (EU).

d) **Lack of coordination among data provision entities**
- Duplication of effort.
- No common policies or program (i.e. standards).

6. Significant Changes in National Institutional Arrangements

6.1. Notably, 63% of the respondents have indicated that there were significant changes carried out or planned for their NIA (Figure 11).

Figure 11: Have there been any significant changes to your NIA?

No
37%

Yes
63%
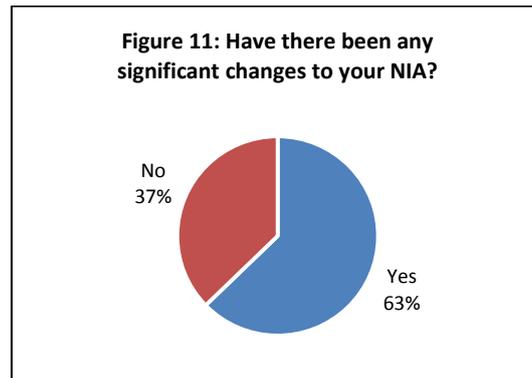
6.2. These changes can be broadly classified into the following 3 categories:

a) **Implementation of new policies**
- To address the quality and availability of data.
- To formalize the creation of an authoritative GIM organisation.

b) **Establishment of new organization or committee**
- Through re-organisation or existing organizations or committees.
- As a result of implementing new policies.

c) **Increased participation of stakeholders**
- To ensure wider representation of government agencies.
- To foster closer relationships among government bodies.
- To include the private sector in the management of geospatial information.

7. Stakeholder Participation in National GIM

7.1. We asked Member States to rate the various stakeholders' participation in their National GIM on a scale of 1 to 10, with 1 indicating a very low participation and 10 indicating a very high participation. Figure 12 shows that the government's participation is rated the highest (7.8/10), followed by the academia (5.1/10), private sector (5.1/10) and NGOs (4.0/10).

Figure 12: Stakeholder Participation
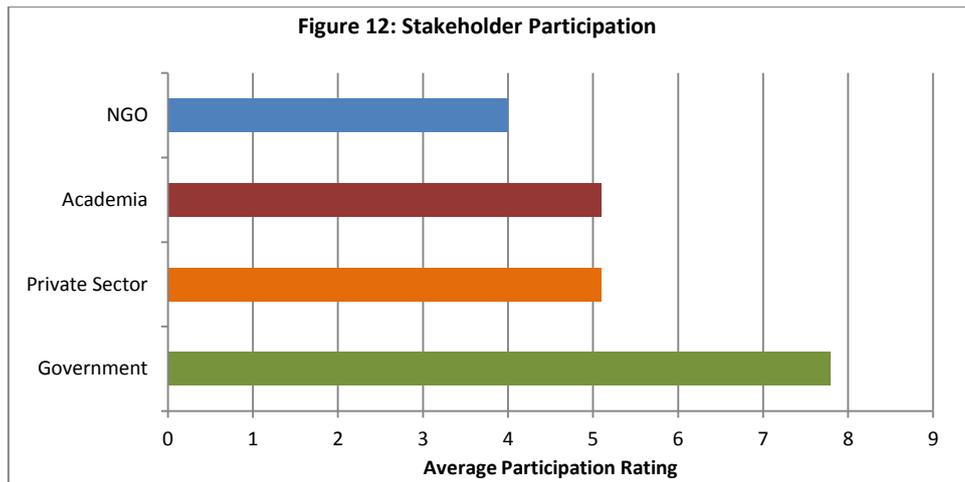
8. Responsibilities of Stakeholders in National GIM

8.1. We asked respondents to indicate the responsibilities of the various stakeholders in their national GIM and the results are presented in Figure 13.

Figure 13: Roles Played by the Various Stakeholders
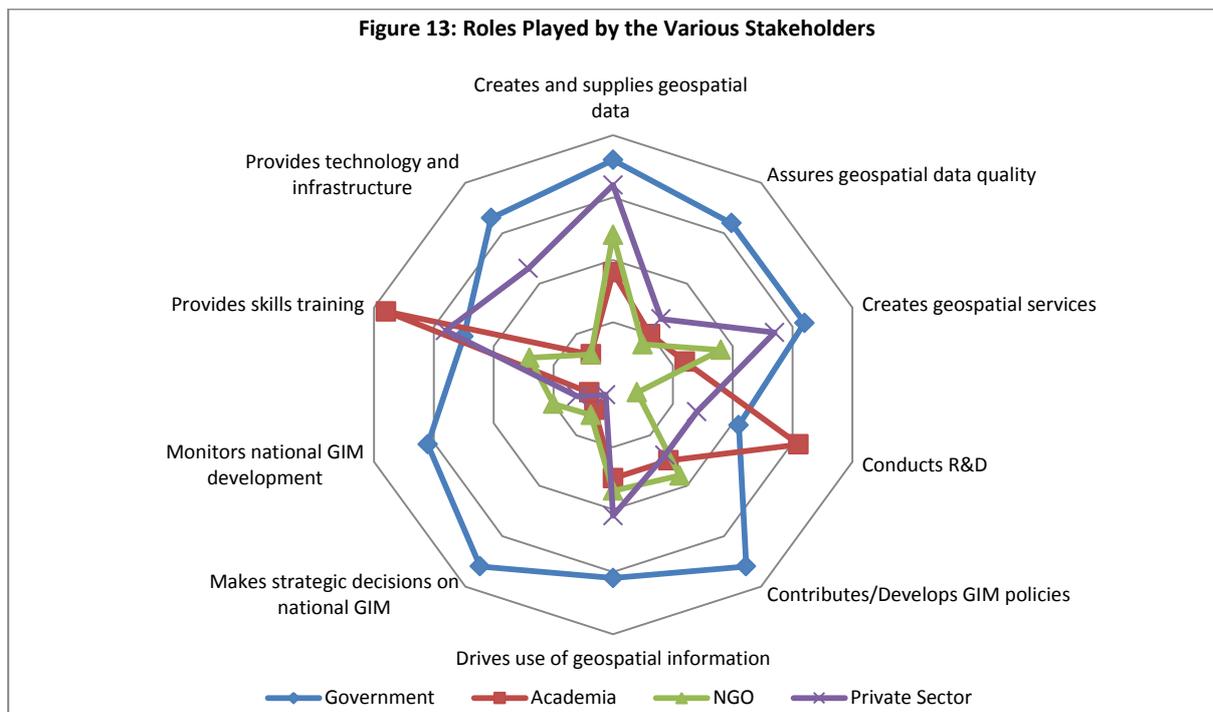
8.2. Our observations include:

a) Government: Covers most areas in GIM, including the development of GIM policies, creation of geospatial data and strategic decision-making for GIM.

b) Academia: Mainly provides skills training and conducts R&D.

c) Private Sector: Mainly creates geospatial data, provides skills training and creates geospatial services.

d) NGOs: Mainly creates geospatial data and to some extent, drives the use of geospatial information, creates geospatial services and contributes to GIM policies.

8.3. There are several complementary responsibility areas:

a) The government, private sector and NGOs appear to have a main responsibility of creating and supplying geospatial data. Hence, it may be useful to further distinguish the types of datasets collected by various stakeholders to help identify data gaps or reduce duplications.

b) The academia, private sector and government are actively providing skills training. There may be further collaborative opportunities to tap on each stakeholder's strengths, such as in in the development of curricula, accreditation and provision of industry and academic training.

c) The academia and the government are active in conducting R&D. It would be also useful to further identify and synergize the types of research (e.g. basic vs application) to help ensure the benefits from the investments in R&D can be realized as soon as possible.

9. Overall Leadership for National GIM

9.1. We asked the respondents to indicate the organisation that provides the overall leadership in their national GIM. 20% of the respondents have indicated that a national mapping agency is the organisation is providing overall leadership for their National GIM.

10. Top GIM Areas of Emphasis

10.1. We asked respondents to choose and rank the top five GIM areas deemed crucial by their current leadership in achieving an effective GIM organization (with rank 1 being the most important area and rank 5 being the least important area). Based on the results shown in Figure 14, the top three GIM areas (and a summary of the respective respondents' remarks) based on absolute number of choices by the respondents are:

a) **Coordination & collaboration among entities**

- There are multiple users and producers of geospatial data; promoting the use of geospatial data should not be the work of a single agency.
- Helps in achieving greater data sharing and adoption of geospatial information and technologies.
- Ensures data quality.

b) **Infrastructure & technological facilitation**

- Common base for data sharing.
c) **Policy & decision making**
- Driver of geospatial development.
- Ensures that geospatial data is used by agencies.

Figure 14: Respondents' Choices of GIM Areas of Emphasis

Figure 15: Top 3 GIM Areas of Emphasis
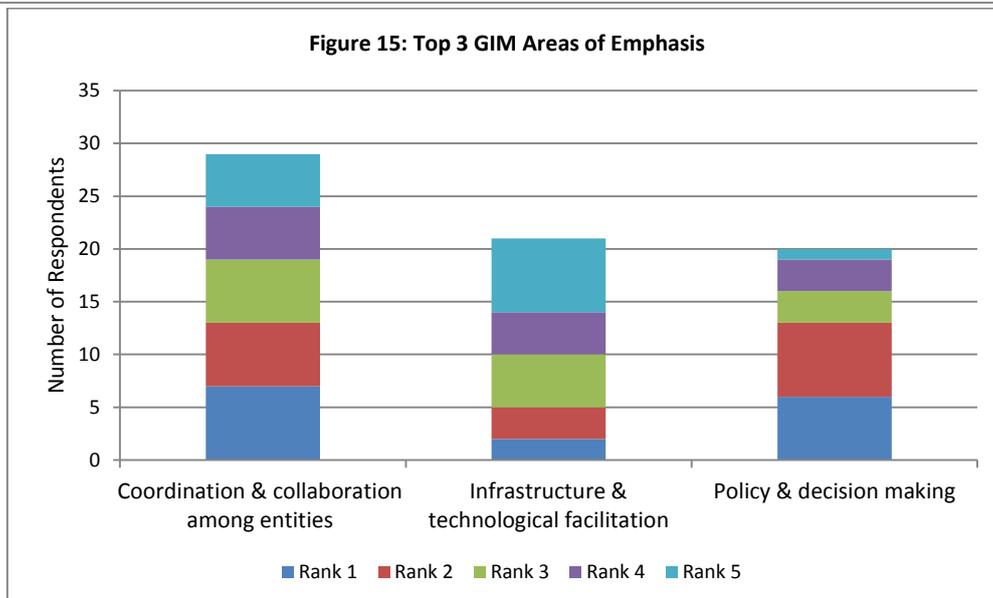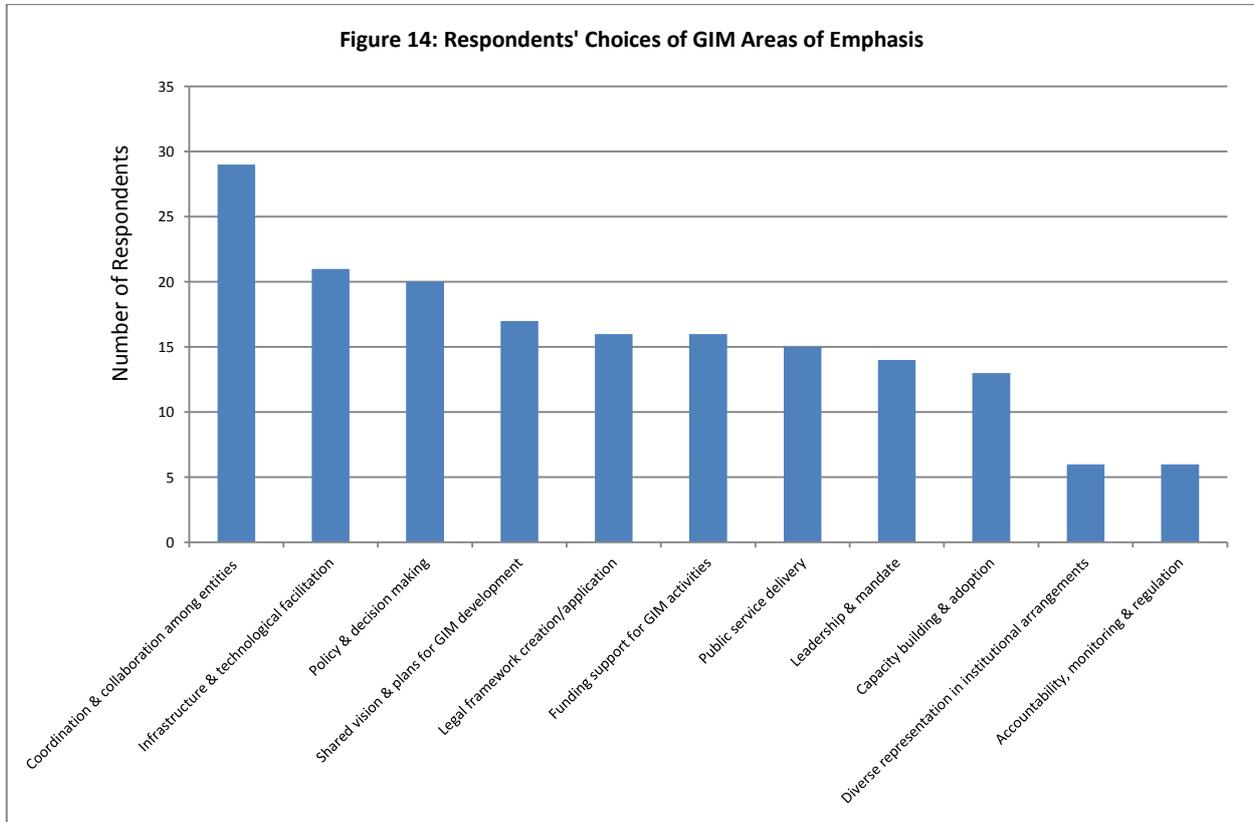
11. Top GIM Governance Policies

11.1. We asked respondents to choose and rank the top 5 GIM governance policies deemed crucial by their current leadership (with rank 1 being the most important

area and rank 5 being the least important area). Based on the results shown in Figure 16, the top 5 policies (and a summary of the respective respondents' remarks) based on the absolute number of choices are:

a) **Data Sharing**
   - Prevents duplication of efforts.
   - An essential factor in enabling other GIM initiatives.
b) **Open Data**
   - Promotes sharing and usage of geospatial data.
c) **Data/Service Standards**
   - Adopts international standards and norms.
   - Facilitates data integration.
   - Ensures data quality.

11.2. Data Sharing has been consistently chosen as the most important GIM policy. It was not only selected as the top choice for governance policy but was also the choice ranked by most of the respondents as rank 1 or rank 2 (Figure 17).

Figure 16: Respondents Choice of Governance Policy

Figure 17: Top 3 GIM Governance Policy

72
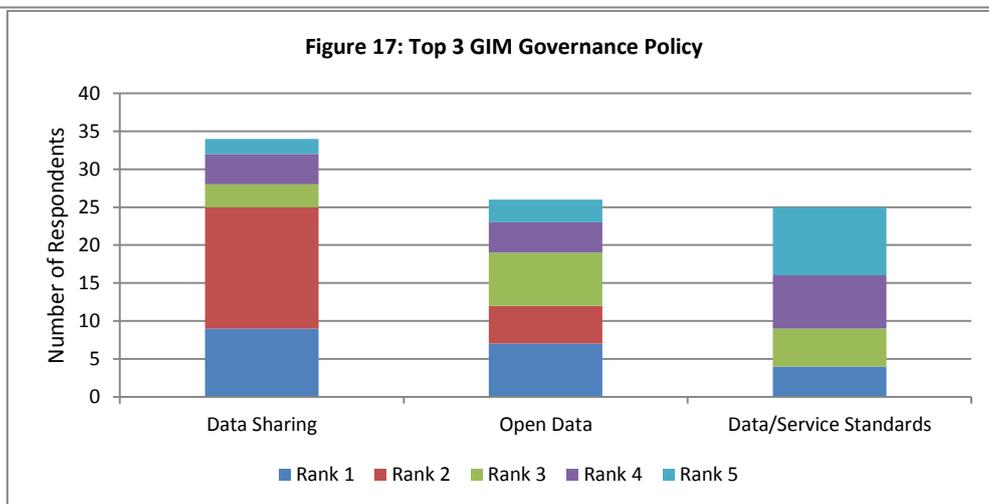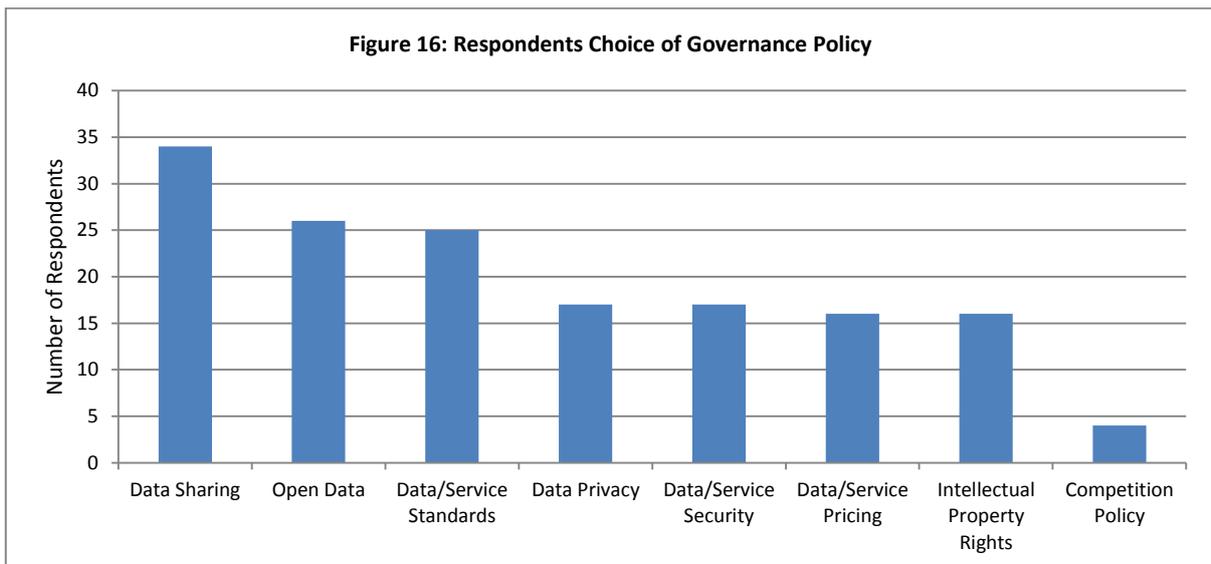
11.3. In addition, respondents have also indicated the importance of including digital technologies in GIM policies. They serve as an enabling tool to geotag, process and disseminate geospatial information and services.

12. Conclusions

12.1. While most Member States have a national initiative in GIM, these initiatives are still in the growth stage, with nearly half of them in development or in the inception stages. In this regard, Member States have carried out or planned for significant changes for their NIA. These changes include implementing new policies to address data quality and availability, establishing new committees to reorganize existing activities for better synergies, or increasing the participation of stakeholder to ensure wider representation and to foster closer relationships.

12.2. While participation in the NIA has traditionally been led by the government, there is room for further participation from academia, NGOs and the private sector. For example, academia and the private sector can supplement the government's role in the creation and provision of geospatial data; skills training; and in research and development.

12.3. Member States have identified 6 key focus areas which they consider crucial in enabling a successful GIM – (1) improving the coordination and collaboration among entities; (2) facilitating infrastructure and technology; (3) increasing the use of geospatial information for policy and decision-making; (4) increasing data sharing; (4) creating an open data environment; and (5) adopting of data and service standards.

13. Recommendations for Further Study

13.1. The results of the current questionnaire have helped to identify six potential key drivers for an effective GIM organization. This could be used to further develop a self-assessment tool for Member States to assess the effectiveness of their GIM organizations. We also recommend identifying Member States who have performed well in some or all of these areas, as possible candidates for best practice case studies. Together with the assessment tool, it should help Member States take practical steps to strengthen and accelerate the development of the national GIM.

Survey Report on Volunteer Geographic Information

Prepared by UN-GGIM National Institutional Arrangements Task Group 3
Coordinated by Lim Liyang (LIM_LIYANG@sla.gov.sg)

Contents

Survey Report on Volunteer Geographic Information

1. Introduction

This report presents the findings from the questionnaire on the Role of Volunteered Geographic Information (VGI). The questionnaire aims to identify the role of citizens as users and producers of VGI and its impact on Geospatial Information (GI) systems.

2. Response rate

2.1. The questionnaire was circulated to 195 Member States of the United Nations from 25 February to 27 March 2015. 50 of the Member States have responded to our questionnaire as shown in Figure 1. Figure 2 shows the breakdown of the respondents by region.

Figure1: Overall Response Rate

Figure2: Breakdown of Responses
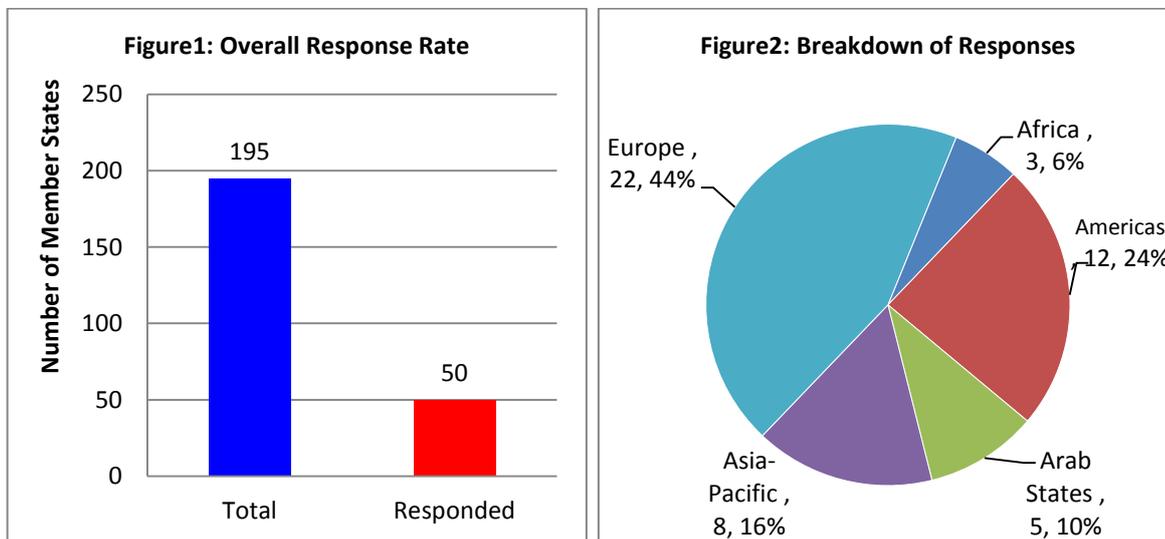
3. Making use of VGI

3.1. Out of the 50 Member State respondents, 68% (or 34) is not making use of VGI as shown in Figure 3.

Figure 3: Does your organization make use of VGI?

Figure 4: Making use of VGI by Region
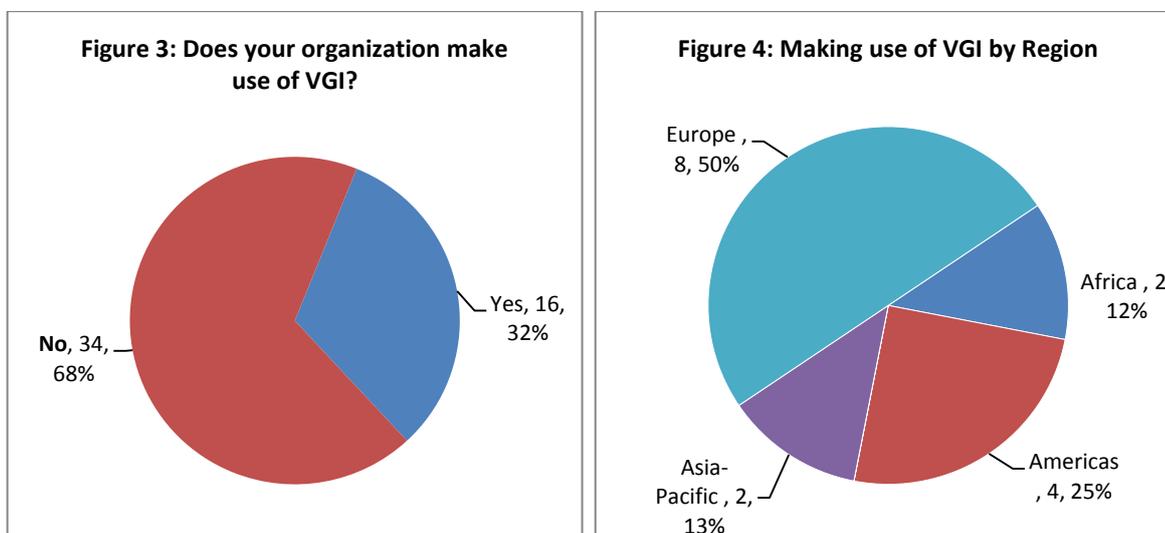
4. Leading contributors of VGI

4.1. The leading contributors of VGI are citizens (28%), experts (21%), NGOs (19%), and the private sector (17%), as shown in Figure 5.

Figure 5: Leading Contributors

Figure 6: Contributors by region
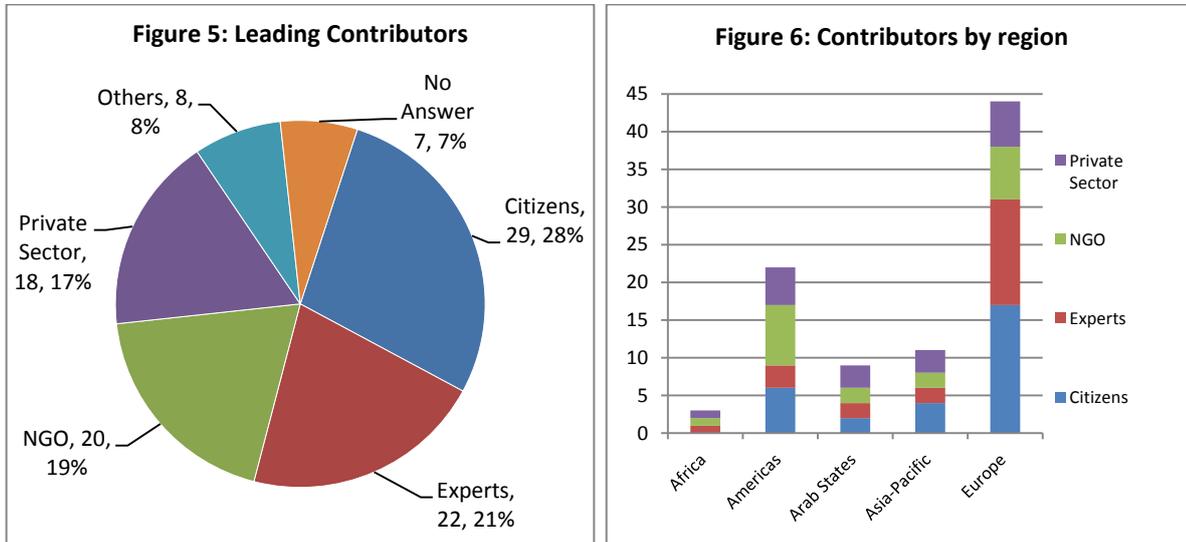
The leading contributors are next broken down by region as shown in Figure 6. Citizens are the leading contributors in Europe; and NGOs are the leading contributors in the Americas.

5. Leading users of VGI

5.1. The leading users of VGI are citizens (21%), experts (18%), NGOs (15%), and the private sector (17%), as shown in Figure 7. The breakdown of leading users of VGI by region is shown in Figure 8.

Figure 8: Users by region

Figure 7: Leading Users
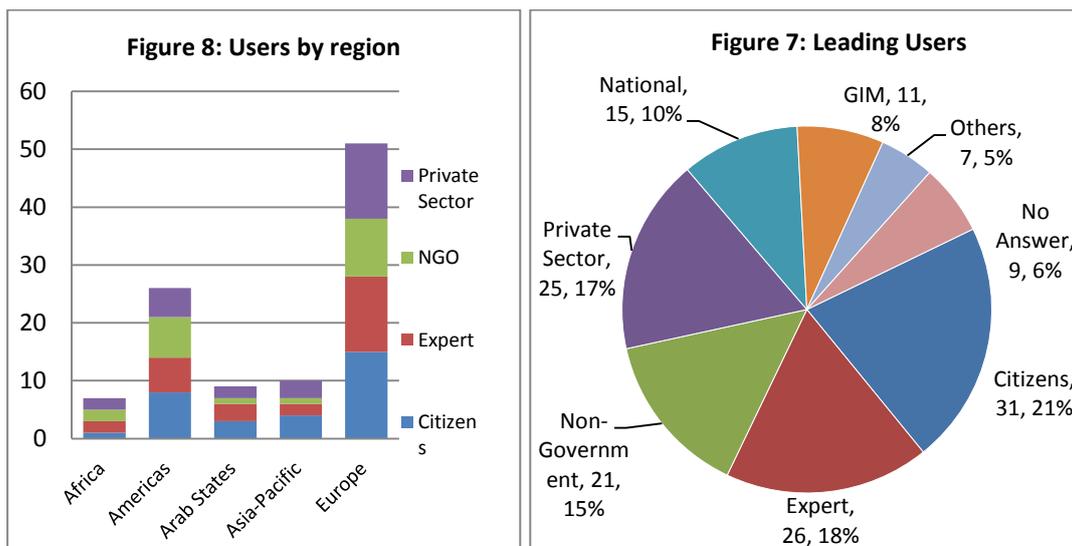
6. Main purpose for considering adopting VGI

6.1. The main purpose for considering adopting VGI is for change detection (21%), reducing costs of data collection (18%), satisfying user's needs (13%), and for natural emergency response (10%), as shown in Figure 9.

Figure 9: Main purpose for adopting VGI
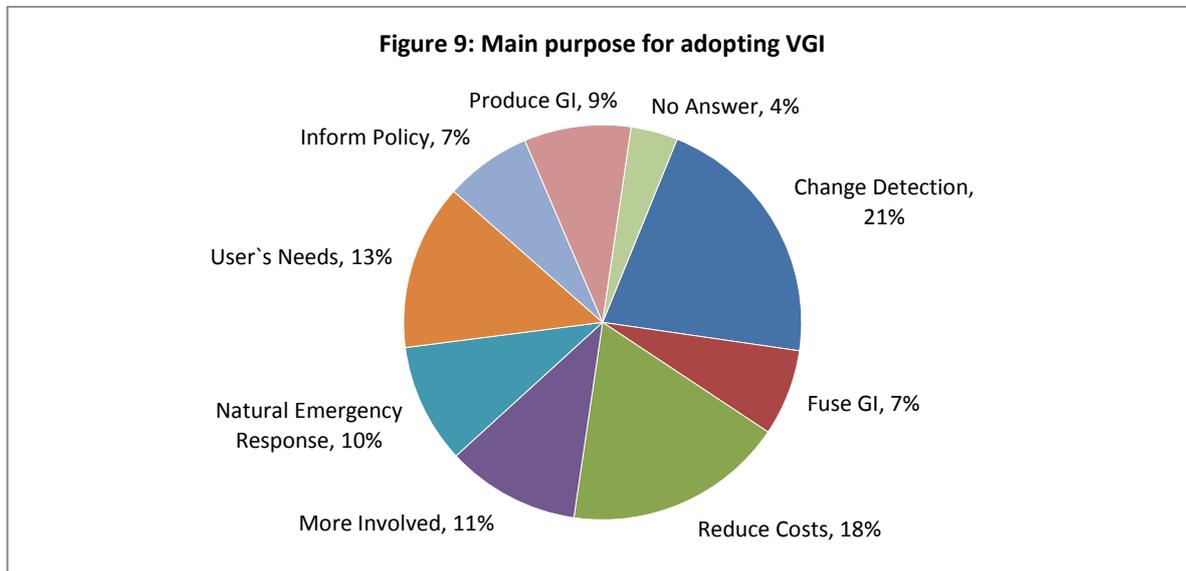
6.2. The breakdown of the main purposes by region is presented in Figure 10. Change detection and reducing costs of data collection take high positions in each region.

Figure 10: Main Purpose by regions
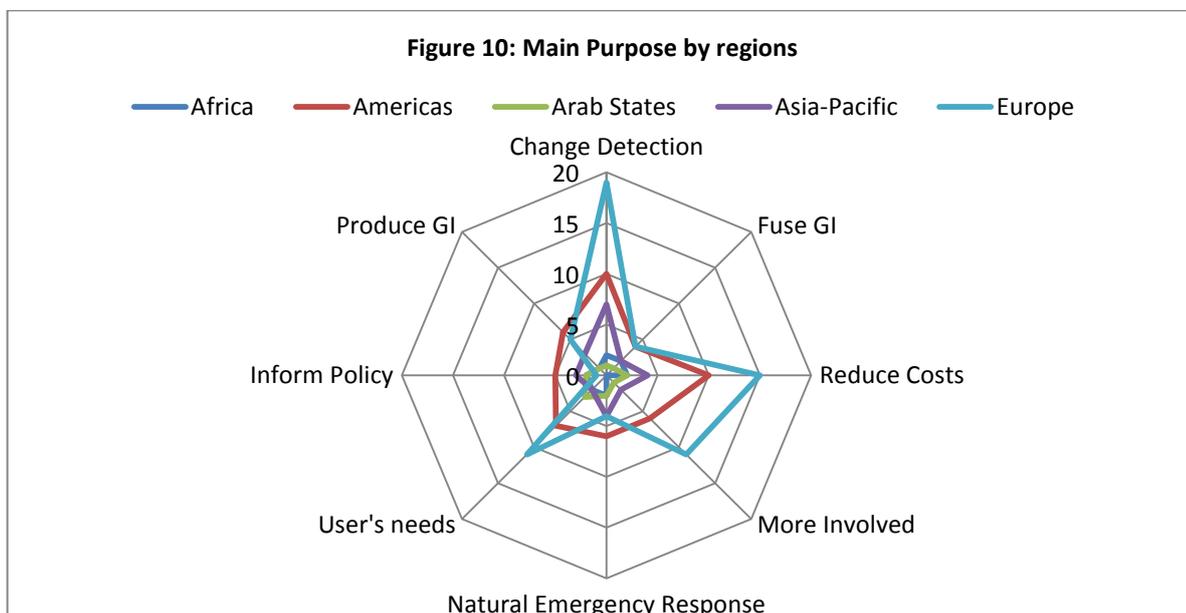
7. Importance of VGI

7.1. We asked Member States to rate the importance of VGI from 1 to 5, with 1 indicating a very low importance and 5 indicating a very high importance. The results are shown in Figure 11, with medium importance rated as the highest (34%).

8. Advantages of VGI

8.1. The breakdown in the advantages of VGI by region is presented in Figure 12. Updating the newest data accounts for 30% and the speed of data collection accounts for 29%.

Figure 11: Importance of VGI

High 3, 6%
Very High 3, 6%
Medium 17, 34%
No Answer 7, 14%
Very Low 8, 16%
Low 12, 24%

Figure 12. Advantages of VGI

Security, 12, 10%
Others, 2, 2%
Low Cost, 27, 23%
No Answer, 7, 6%
Update, 35, 30%
Speed, 33, 29%
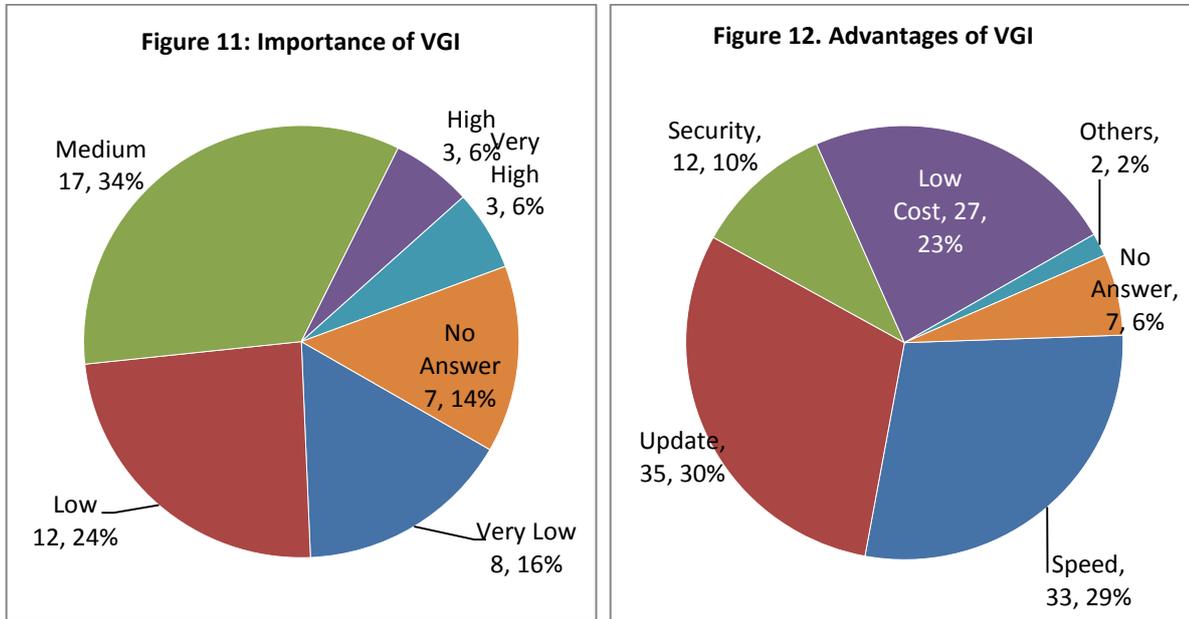
9. Weaknesses of VGI from the data and contributor's perspectives

9.1. The breakdowns for the weaknesses of VGI from the data and contributor's perspectives are presented in Figure 13 and Figure 14 respectively.

9.2. From the data perspective, the key weaknesses of VGI include its quality (28%), assurance or reliability (27%), and wrong data (23%), as shown in Figure 13.

9.3. From the contributor's perspective, the key weaknesses of VGI include the lack of expertise (36%), participation (30%), and identifying needs of VGI (21%), as shown in Figure 14.

Figure 13:Weaknees of VGI (Data)

Others, 2, 2%
No Answer, 7, 6%
Quality, 35, 28%
Assurance or Reliability, 34, 27%
Difficulty, 17, 14%
Wrong Data, 29, 23%

Figure 14:Weakness of VGI (Contributor)

Others, 3, 4%
No Answer, 8, 9%
Identifying Needs, 18, 21%
Participation, 26, 30%
Expertise, 31, 36%

Figure 15: Weakness of VGI by regions (Data)

Africa — Americas — Arab States — Asia-Pacific — Europe

Figure 16: Weakness of VGI by regions (Contributor)

Africa — Americas — Arab States — Asia-Pacific — Europe

9.4. As shown in Figures 15 and 16, the weaknesses of VGI from the data and contributor's perspectives show similar patterns when broken down by regions.

10. Items needed to tackle the weaknesses of VGI (Data perspective)

10.1. As shown in Figure 17, 31% of the respondents have indicated that establishing a system for verifying and assuring VGI collected data is needed.

Figure 17: Tackle VGI Weakness (Data)

Others, 2, 2%
No Answer, 7, 6%
Providing Data, 21, 18%
Providing program, 30, 25%
Verifying VGI, 37, 31%
Linking Users, 21, 18%

Figure 18: Tackle VGI Weakness by regions (Data)

Africa — Americas — Arab States — Asia-Pacific — Europe
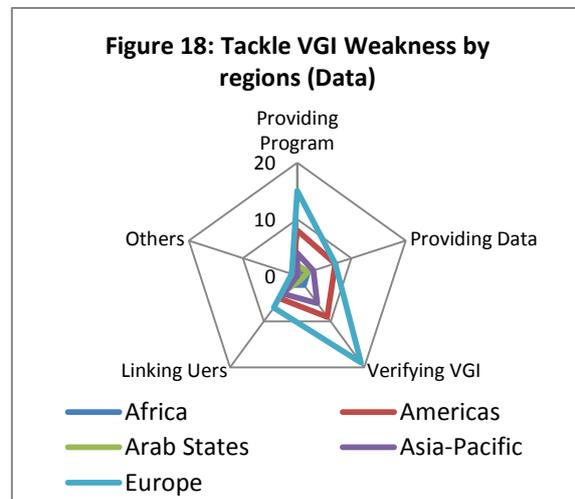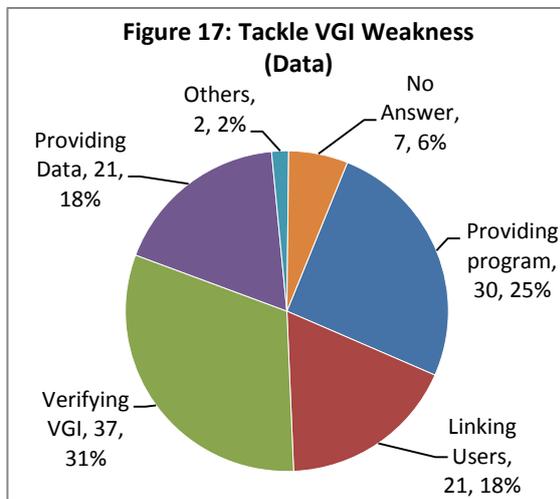
10.2 The breakdown by region is shown in Figure 18. It shows that establishing a system for verifying VGI is the most needed to tackle the weaknesses of VGI from the data perspective.

11. Items needed to tackle the weaknesses of VGI (Contributor's perspective)

11.1. 22% of the respondents have indicated that educating for enhancing user's VGI expertise is the most important in tackling weaknesses of VGI from the contributor's perspective, as shown in Figure 19.

Figure 19: Tackle VGI Weakness (Contributor)

Figure 20: Tackle VGI Weakness (Contributor)
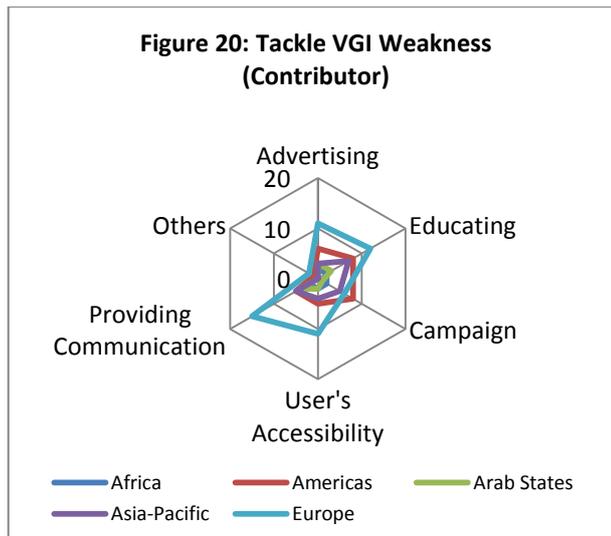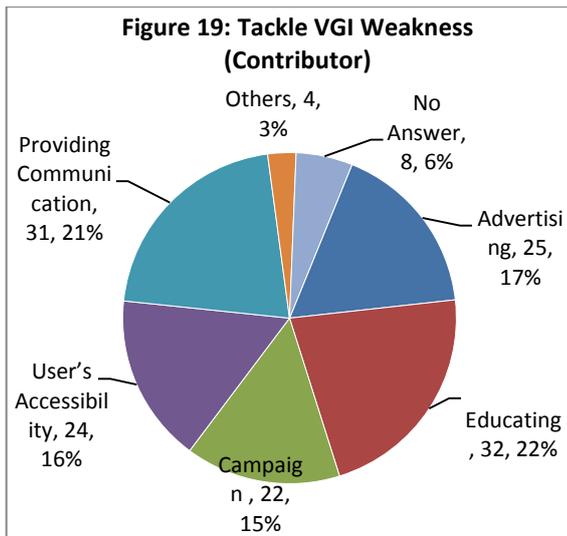
11.2. The breakdown by region is shown in Figure 20. It shows that educating VGI expertise is still the most important in tackling the weaknesses of VGI from the contributor's perspective.

12. Other thoughts on the role of VGI and its impact on GI systems

12.1 A major concern is data quality and verification.

12.2 VGI is an important and growing source of information for GI.

12.3 Community sourcing will be able to tackle some weaknesses of VGI e.g. data quality because community sourcing relies on trustworthy partners, e.g. local authorities, public services and governmental agencies.

13. Conclusions

13.1. From the survey responses, NMOs are in the early stages of introducing and making use of VGI.

13.2. Citizens are critical contributors and users of VGI. Domain experts, NGOs and the private sector also play major roles to contribute and use VGI.

13.3. The main purpose for adopting VGI is in change detection and in reducing the costs of data collection. NMOs also need to consider using VGI to satisfy users' needs.

13.4. The main advantages of VGI are to increase the speed of data collection and for updating datasets. However, VGI also has major weaknesses in areas of data quality and data assurance. Additionally, the shortage of expertise and participation in VGI are the main weaknesses in the contribution process.

13.5. In tackling the weaknesses of VGI, NMOs can establish systems for verifying VGI data and provide programs to contributors for managing certified data. NMOs can also

advertise and facilitate the understanding of VGI and provide communication channels between producers and VGI-users.

13.6. VGI would likely be a major emerging source for rapidly collecting geospatial data in areas of change detection and in updating of datasets. However, there are concerns about the shortage of quality assurance and participation. The challenge, moving forward, is to identify the advantages and weaknesses of VGI across the data and contributor's perspectives, and to encourage Member States to develop the best-practices concerning the collection, quality-assurance and application of VGI.

ANNEX A. Combined questionnaire

Questionnaires to inform the work of NIA Task Groups 1, 2 and 3
(to be circulated to UN-GGIM member states)

This questionnaire has 3 parts.

The first one is intended to inform the work of the Tasks Group 1 of UN GGIM NIA about the status of GRI production in the world. Please, when filling it take into account that **each theme must be consider separately. It is possible to mark more than one option for the same question.**

The second part aims to inform the Task Group 2 about funding structures, dissemination systems and data policy models .

The third part aims to identify the role of citizens as users and producers of Volunteered Geographic Information (VGI) and its impact on Geospatial Information (GI) systems. The results will be used to develop an index of the impact and usefulness of VGI. This questionnaire is developed by the UNGGIM Working Group on National Institutional Arrangements with an overall objective to identify the best practices on geospatial institutional arrangements.

We note that based on the scope of the questions asked and the variations in institutional structures/arrangements in each country, different units in your organization and/or different agencies/entities may be required to answer the questionnaire. We therefore ask that the relevant agencies/entities be asked to contribute to completing the questionnaire, to ensure it is done comprehensively. In addition, given the nature and criticality of the information sought, we also kindly request that an official with senior management authority for the subject area, complete and/or approve the questionnaire.

Please submit the completed questionnaire and any attachments in electronic format to Mr. Antonio Arozarena, Chair of NIA group (E-mail: aarozarena@fomento.es) and Cecille Blake Secretary of the NIA group (blake1@un.org) by **13 marzo 2015** at the latest.

Thank you in advance for your input.

BACKGROUND INFORMATION

Please provide the following information on the person filling the questionnaire:

Name of person filling the questionnaire:	
Functional title:	
Institution, department or unit:	
Country:	
E-mail:	
Individuals/Institutions consulted:	

		Geospatial Reference information (GRI) Themes						
		Geographical names	Administrative units	Cadastral parcels	Transport networks	Hydrography	Elevation	Land Cover
he methods applied for data tion/update are	Automatic							
	Semi-automatic							
	Manual							
he creation/update of GRI is done by	Own resources							
	Third parties							
	Collaborative (public and/or private)							
	VGI (Volunteered Geographic Information)							
he approach used in creation/update of is	Bottom-up (production with the maximum scale/resolution serves to lower scales/resolutions)							
	Top-down (production with lower scales/resolutions serves to higher scales/resolutions)							
	Independent production for each scale/resolution needed							
roduction scale	> 1:1.000							
	1:1.000-1:5.000							
	1:5.000-1:25.000							
	1:25.000-1:50.000							
	< 1:50.000							
ow the GRI data update is done?	Periodically							
	Continuously							
5b.- In case it is periodical, which is the update period?	1 - 2 years							
	3 - 5 years							
	5 - 10 years							
	>10 years							
ow is the data update done?	Complete (all territory)							
	Partial (part of territory)							
he update is done	for the complete theme							
	only for some features/attributes of the theme (*)							
sers of GRI	Government							
	Private sector							
	Academia							
	NGO's							
	Citizens							

ospatial Reference Information (GRI) are the core data sets that can be consider the skeleton of national geographic information; official, reliable, periodically updated and able to satisfy global needs from a n

xamples of features/attributes:

Transport Networks Axis
Width of the lane
....
Hydrography Axis

Questionnaire on Geospatial Reference Information (GRI) funding structures, dissemination systems and data policy models (TG2)

		Geospatial Reference information (GRI) Themes									GI
		Geographical names	Administrative units	Cadastral parcels	Transport networks	Hydrography	Elevation	Land Cover	Imagery	Settlements	Indicate them
Funding	1.- Are there any structured models for funding? Choose from the following options: 1. Public 1a. Public from only one source 1b. Public from many sources 2. Private sector 3. Others (donations, …)	Acquisition										
		Processing										
		Dissemination										
	2.- What is the main source of funding in your country for GRI production? Express the answer in percentage	Public (%)										
		Private (%)										
	3.- Does your country received any international funding for GRI production Express in percentage in relation to total USD question 4											
	4.- How much is the amount allocated (USD) and what percentage represents regarding the GDP of the country	Amount (USD)										
		%/GDP										
	5.- How is the funding used? Show aproximate percentages by activity	Production and update										
		Technology acquisition and infrastructure										
		Methodology development, training										
		Research										
		Maintenance services and/or geoportal										
		Development of nationa/regional/local SDI										
	6.- Is there a model for the return of investiment (ROI) derived from services, rent or sale of GRI? In affirmative case, give the percentage in relation to total USD question 4											
Dissemination	7.- Which authority is responsible for spreading the official GRI in your country? Make a cross in the relevant box	National Mapping Agency										
		Sectorial Ministries										
		Private sector										
		Other institutions (local governments)										
	8.- Which is currently the principal means for access and consulting GRI in your country? Make a cross in the relevant box	Physical media (paper, CDs)										
		Web services										
		Geoportal										
		Geomatic desktop solutions										
		Cloud										
		Other										
	9.- Do you consider that the dissemination mechanisms for GRI implemented in your country are adequate to meet the needs for different users? In affirmative case, make a cross											
	10.- Which means is used to publish available GI or GRI to the population of your country?	TV										
		Radio										
		Official government web sites										
		Social networks										

Dissemination	12.- Do you maintain relationship with the private sector and/or non-governmental organizations to promote awareness and use of GI or GRI? In affirmative case, make a cross										
	13.- Is there awareness in your country of best practices for better dissemination of GI or GRI that have or not been implemented? In affirmative case, make a cross										
	14.- Which are the main products and services offered of GRI? (1) Give a list with the main products										
	15.- Which is the accessibility level of official GI or GRI generated in your country? Make a cross in the relevant box	Public knowledge									
		Confidential									
		Restricted access									
		Other									
	16.- Does GI or GRI use have a cost for the population? In affirmative case, make a cross										
	17.- Is there a feedback mechanism from users regarding the GRI available? In affirmative case, make a cross										
Data policy	18.- Does the country have a legal framework that regulates the collection, generation, analysis, processing, dissemination and/or receipt of Geospatial Information? In affirmative case, make a cross	Acquisition and processing									
		Dissemination									
	19.- Is the legal framework aligned with international standards? (2) In affirmative case, make a cross and list which ones										
	20.- Is there any law or regulation being developed currently regarding the subject? (3) In affirmative case, make a cross and please provide name of and a copy of the document or address where they may be accessed										
	21.- Is the application of the legal framework required at a national, regional, local level (municipalities or districts), on the public or private industry, etc.? In affirmative case, make a cross										
	22.- Is there a law that promotes the establishment and maintenance of a national SDI? (4) In affirmative case, make a cross and specify										
	23.- List the main policies or regulations that standardize access and distribution of geospatial data (5)										
	24.- Has your country developed or is in process of having an open geospatial data initiative? (6) In affirmative case, make a cross and name the initiative, implementation date and data categories provided.										
	25.- Is there a policy or strategy relating geospatial awareness or governance information? (7) In affirmative case, make a cross and describe it.										

(1) List the main products
(2) List which ones
(3) Please provide name of and a copy of the document or address where they may be accessed
(4) Specify the law or regulation
(5) List the main policies or regulations that standardize access and distribution of geospatial data
(6) If so, name the initiative, implementation date and data categories provided.
(7) If yes, describe it.

Geospatial Reference Information (GRI) are the core data sets that can be consider the skeleton of national geographic information; official, reliable, periodically updated and able to satisfy global needs from a national and international perspective.

NIA   Working Group on Trends in National Institutional Arrangements   UN - GGIM

UN-GGIM
UNITED NATIONS
COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

Questionnaire on the Role of Volunteered Geographic Information (VGI [1]) (TG3)

*Please indicate your choice with an 'X'

1.- Does your GIM organization make use of VGI?	☐ Yes Please give an example (e.g traffic-map in city of Seoul) ☐ No Do you plan to make use of VGI and when? If you do not plan to use VGI, please provide reasons for you choice
2.- Who are the leading **contributors** of VGI in your country? Please check all that apply.	☐ Citizens ☐ Expert GIS users ☐ Non-Government Organizations ☐ Private Sector ☐ Others, please specify:
3.- Who are the leading **users** of VGI in your country? Please check all that apply.	☐ Citizens ☐ Expert GIS users ☐ Non-Government Organizations ☐ Private Sector ☐ National Mapping Organizations ☐ GIM Organizations ☐ Others, please specify
4.- What is the main purpose for considering adopting VGI? Please check all that apply.	☐ To detect and collect changes on maps ☐ Fuse GI with social datasets ☐ Reduce costs of data collection ☐ To become more involved with the stakeholder community ☐ Support natural emergency response situations ☐ Satisfy users' needs ☐ Inform policy-making and public service delivery ☐ Produce geospatial information; please identify what kinds of geospatial information or maps are produced (e.g national base map, thermatic maps, etc.):
5.- Please rate the importance of VGI in your organization, with 1 being not at all important and 5 being very important.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6.- What are the main advantages of VGI? (You may select multiple options)	☐ Increasing the speed of data collection ☐ Updating the newest data ☐ Securing the diversity of data (form, type, attribute, etc) ☐ Lowering costs / No further investments required ☐ Others:
7.- What are the major weaknesses of VGI from the **data** perspective? (You may select multiple	☐ Quality of VGI-based data ☐ Difficulty of arranging and handling with data ☐ Wrong or malicious data

options)?	Assurance or reliability of VGI-based data Others: _____
8.- What are the major weaknesses of VGI from the **contributor's** perspective? (You may select multiple options)	Lack of participation Lack of expertise Lack of identifying needs of VGI Others: _____
9.- Which of following can be established to tackle the weaknesses of VGI **data**? (You may select multiple options)	Providing quality-assured national base-map for base dataset of VGI activities Establishing system for linking users and helping to securely upload data without comprising personal privacy Establishing system for verifying and assuring VGI collected data Providing program to contributors for collecting and managing certified data Others: _____
10.- What can be done to tackle the weaknesses of VGI **contributors?** (You may select multiple options)	Advertising and facilitating the understanding of VGI Educating for enhancing user's VGI expertise Campaign for vitalizing communities and domain experts Increasing users' accessibility to participating VGI Providing communication channel between producers and VGI-users Others: _____
11.- Please let us know any other thoughts you have on the role of VGI and its impact on GI systems.	_____

[1] VGI or crowd sourced data, is defined as the harnessing of tools to create, assemble, and disseminate geographic data provided voluntarily by individuals (Goodchild,

ANNEX B

Anexo 2. Listado de principales productos y servicios disponibles en cada país.

País	Principales productos y servicios de IGR
España	Directorio Nacional de Geo-webservices
	Directorio de centros Geo-data
	Nomenclátor Nacional Geográfico
	Base de datos de unidades administrativas
	Cartografía Catastral Urbana
	Cartografía Catastral Rural
	CartoCiudad (red de transportes)
	Red Hidrográfica
	DTM and DSM
	Datos LiDAR
	SIOSE (cobertura terrestre & base de datos nacional de uso del suelo)
	CORINE LAND COVER
	PNOA (Ortofotografía 25-50 cm)
	Settlements database
	Geophysical monitoring information
Argentina	MDE_AR-IGN
	Imágenes (landsat, spot and radar)
	Fotografías aéreas
China	Conjunto de datos
	WMS
	WFS
Corea	Nombre Geograficos Nacionales
	DEM
Luxemburgo	Portal Web de mapas
	Webservices
Venezuela	Mapas Impresos y digitales
	Geoportal
	Geoservicios
Bahrain (Central Informatics Organization)	Servicios de Localización Web & Mobile (Bahrain Locator)
	Portal de Infraestructura de Datos Espaciales de Bahrain (BSDI)
	E-WayLeave Clearance System
	GIS Apps para Ministerio de Vivienda
	GIS Apps para Planificación del medio ambiente & Monitoreo
	GIS Apps para la Organización de Caridad Royal

	GIS Apps para FDPM
	GIS Sistema de Gestión de Datos
	Atlas de Vegetación Nacional
	Atlas Urbano Nacional
	Atlas de Cambios Nacional
Bahrain (Survey and Land Registration Bureau)	Red Geodésica Red de Referencia Permanente (PRN) Límites Catastrales de Propiedades Mapas Topográficos Series, 1k, 10k, 25k, 50k, 100k, 200k, 250k, 350k Global Map Título de propiedad Cartas de Navegación Tide Guages Tide Table http://82.194.61.180/spiderweb/frmIndex.aspx http://www.ysieconet.com/public/WebUI/Default.aspx?hidCustomerID=190 http://www.slrb.gov.bh/default.aspx
Eslovakia	WMS WFS WMTS WCS
Reino Unido	Diccionario Geográfico escala1:50 000 Meridiano 2 OS MasterMap, Capas Topográficas OS Open Map – Local OS Open Names OS VectorMap Distritos Strategi Límites OS VectorMap Local Planos de Título Index Polygons INSPIRE Index Polygons OS Localizador OS MasterMap Capa de Transporte Integrada OS Open Caminos OS MasterMap Layer de Red de agua - Beta OS Open Ríos OS Terreno 5 Land-Form PANORAMA

	OS Terreno 50 OS MasterMap Capa de Imágenes

Vietnam	1. Sistema de datos básicos de Geodesia:
	Sistema Nacional de coordenadas de referencia
	    Red de coordenadas y red geodésica del fondo del mar de 0 orders
	    Red de coordenadas of I, II, III orders
	Sistema Nacional de Referencias de Altura
	    Red de alturas of 1, 2, 3, 4 orders
	Sistema de estaciones permanentes GPS
	Red gravimétrica of I, II, III, IV orders
	2. Imágenes aéreas y satelitales:
	Existen varios tipos de imágenes en diferentes escalas tomadas de 1958 a 2007
	3. Base de Datos de nombres geográficos:
	Base de Datos para nombres Geográficos para mapas vietnamitas e internacionales
	4. Mapas topográficos en VN-2000 sistemas de referencia:
	(Mapa impreso y digital)
	    Escala 1:100,000 cubrimiento total de Vietnam
	    Escala 1:50,000 cubrimiento total de Vietnam
	    Escala 1:25,000 cubrimiento de áreas económicas desarrolladas
	    Escala 1:10,000 cubrimiento de principales áreas económicas desarrolladas
	    Escala 1:5,000 y 1:2,000 para ciudades y pueblos
	    Mapa topográfico del fondo del mar
	5. Base de Datos Topográfica para SIG:
	    Escala 1:2,000 y 1:5,000 para ciudades, pueblos y áreas económicas desarrolladas
	    Escala 1:10,000 y 1:25,000
	    Escala 1:50,000 para Vietnam
	6. Mapa Catastral base:
	Mapa base de ortofotos Base aéreas para mapas catastrales
	7. Otros mapas:
	Mapas topográficos de escalas de 1:2,000 to 1:1,000,000 en diferentes sistemas de referencia en diferentes versiones
	Atlas
	Mapas temáticos

Irlanda del Norte (UK)	Nombres Geográficos: Mapas a gran escala, mediana escala y pequeña escala Unidades Administrativas: Productos de direcciones, Mapas a gran escala, mediana escala y pequeña escala Parcelas Catastrales: Mapas a gran escala, mediana escala y pequeña escala, Ortofotos Redes de Trasnporte: Mapas a gran escala, mediana escala y pequeña escala Hidrografía: Mapas a gran escala, mediana escala y pequeña escala, Ortofotos Relieve: Mapas a gran escala, mediana escala y pequeña escala, productos de Alturas Uso del suelo: Mapas a gran escala, mediana escala y pequeña escala, Ortofotos Imágenes: Ortofotos Asentamientos: Mapas a gran escala, mediana escala y pequeña escala, Ortofotos, productos de direcciones
México	Nombres Geográficos 1. Nombres geográficos para consulta en Mapa Digital 2. Nombres geográficos para consulta tabular 3. Nombres Geográficos, servicio WMS, Unidades Administrativas 1. Catálogo Único de Claves de Áreas Geoestadísticas Estatales, Municipales y Localidades - consulta y descarga 2. Catálogo de Vialidades con clave por localidad 3. Marcos geoestadísticos - descarga 4. Localidades Geoestadísticas - Archivo histórico - Consulta Mapa Digital de México 5. Consulta, Servicios WMS, Parcelas Catastrales Consulta en línea de: 1. Información catastral de los núcleos agrarios por estado 2. Directorio de instituciones catastrales y registrales 3. Tabulados básicos. Información catastral de los núcleos agrarios 4. Descarga de Núcleos agrarios. 5. Tabulados básicos por municipio. 6. Cédulas de manifestación catastral, planos cartográficos, valuación de predios, deslinde catastral. Redes de Transporte 1. Conjunto de Datos Vectoriales de Carreteras y Vialidades Urbanas,

	Edición 1.0 (Distribución por Entidad Federativa)
	2. Red Nacional de Caminos RNC
	3. Consulta en Mapa Digital de México
	4. Red Carretera Nacional escala 1:50 000 servicio WMS
	Hidrografía
	1. Carta hidrológica Datos vectoriales escala 1:1 000 000
	2. Estudios hidrológicos estatales
	3. Mapa Digital de México - consulta
	4. Red hidrográfica escala 1:50 000 edición 2.0
	5. Zonas hidrogeológicas
	6. Simulador de Flujos de Agua de Cuencas Hidrográficas (SIATL),
	Elevaciones
	1. Continuo de Elevaciones Mexicano 3.0 (CEM 3.0) - descarga
	2. Modelos digitales de elevación
	3. Modelos Digitales de Elevación LIDAR
	4. Continúo de modelos digitales de elevación LIDAR de superficie con resolución de 15m
	5. Continúo de modelos digitales de elevación LIDAR de terreno con resolución de 15m
	6. Modelos digitales de elevación de alta resolución LIDAR
	7. Carta Batimétrica Internacional del Mar Caribe y Golfo de México (IBCCA)
	8. Carta Batimétrica de la Zona Económica Exclusiva (ZEE) Segunda versión
	Uso del suelo
	1. Cartas de uso del suelo y vegetación
	2. Datos vectoriales escala 1:250 000 serie V (Capa Unión) – descarga
	3. Datos vectoriales escala 1:1 000 000 - descarga
	4. Mapa Digital de México - consulta
	5. Carta de uso potencial del suelo
	Imágenes
	1. Fotografía aérea
	2. Ortofoto digital
	3. Imágenes de satélite
	Asentamientos
	1. Catálogo de Asentamientos Humanos 2004-2010
	2. Cartografía geoestadística urbana - descarga
	3. Ciudades capitales Información vectorial de localidades urbanas
Portugal	CAOP – Mapa Administrativo Nacional
	Parcelas
	Sub-parcelas
	Mapa de cubrimiento y uso del suelo de Portugal
	Ortoimágenes (50 cm resolución)

Cuba	Mapas Topográficos Digitales a escalas desde 1:10000 hasta 1:100000 Atlas Geográficos Mapas temáticos Sistemas de Información Geográfica Catálogos de coordenadas
Lituania	Conjunto de datos espaciales georreferenciados www.regia.lt Mapa de caminos de importancia nacional El catastro de los ríos Lagos y estanques de la Republica de Lithuania Datos de cobertura de la tierra Mapa digital de ortofotos raster
Singapur	Web services APIs
Estados Unidos de América	GNIS TIGER archivos y TIGER web Datos de parcelas total de estados – 20 estados, datos locales parcialmente publicados en 30 estados Conjunto de datos estandarizado PLSS para todos los 30 estados de dominio publico
Togo	Mapa de uso del suelo, establecimiento del sistema MRV
San Marino	Cartografía, cartografía digital, fotografías aéreas, cartografía en formato DXF y DWG
Canadá	Búsqueda, descubrimiento, Conjunto de datos de parcelas catastrales

Annex C – Questionnaire on Structure of Geospatial Management Organisation

Questionnaire on Structure of Geospatial Management Organization

This questionnaire aims to identify and describe the types of entities, organizational structures, types of leadership and policies in GIM organizations. The results will be used to develop an index to measure the effectiveness of geospatial institutional arrangements[3]. This questionnaire is developed by the UNGGIM Working Group on National Institutional Arrangements with an overall objective to identify the best practices, sets of institutional models and legal frameworks for national GIM.

The questionnaire is divided into 3 sections: Organizational, Leadership and Governance Policies. The questions are posed in order to gain a comprehensive picture of the status of geospatial management organization and therefore we ask for your patience and kind cooperation. Please note that the information provided would be treated in confidence and only aggregated results will be made available to the wider community.

We note that based on the scope of the questions asked and the variations in institutional structures/arrangements in each country, different units in your organization and/or different agencies/entities may be required to answer the questionnaire. We therefore ask that the relevant agencies/entities be asked to contribute to completing the questionnaire, to ensure it is done comprehensively. In addition, given the nature and criticality of the information sought, we also kindly request that an official with senior management authority for the subject area, complete and/or approve the questionnaire.

Please submit the completed questionnaire and supporting documents in electronic format to Ms Cecille Blake, e-mail blake1@un.org or Ms. Vilma Frani, e-mail frani@un.org on or before 20 February 2015. Thanking you for your cooperation and assistance in fulfilling this important task of the Working Group. Please insert the details of person completing this questionnaire.

Name:
Position Title:
Name of Organisation:
Mailing Address:
Country:
Telephone number:
Fax Number:
Email:
Institution and Name of Person Consulted:

Section 1: Organizational

1. Do you have a national initiative in geospatial information management (GIM)?

---

[3] National Institutional Arrangements (NIA) for Geospatial Information Management (GIM) is defined as the cooperation structures carried out between public or private institutions and organizations with the intention to establish a legal, organizational and productive framework, which will allow a sustainable management of Geospatial Information, regarding its creation, updating and dissemination, in order to provide an authoritative, reliable and sustainable Geospatial Information base for all final users.

☐ Yes   ☐ No

i.　If Yes to Q1, at what stage of development would you classify your GIM work?

☐Planning　　☐ Inception　☐In Development　☐In Operation

ii.　If No to Q1, do you plan to begin a GIM initiative and when?

☐ Yes
　　☐ in the next 12 months
　　☐ in the next 2 to 3 years

☐ No,　　please provide reasons for not having a GIM initiative.

………………………………………………………………………………

2. Is there a long term strategy document and/or implementation plan for your GIM?

☐ Yes   ☐ No

If Yes, please provide a copy or web address where the document(s) may be downloaded.

3. Please describe in detail, using the template below, the institutional arrangements for the governing and management of your national GIM. Also comment on what factors contributed to the evolution of existing institutional arrangements. An example for Q3 & 4 has been attached for reference:

Example of
Singapore's Institution

S/n	Description
a	Provide background on overall political/administrative system in your country.
b	Describe your GIM institutional arrangement, including the mandate, types of entities, configuration, portfolios, Terms of Reference, monitoring tools and organizational chart, where available.
c	Types of relationships among entities. For example, are the linkages mandated partnerships (an edict of law), or are they voluntary, governed by MOUs, contractual agreements etc.

d	Factors contributing to the evolution of existing institutional arrangements.

4. Have there been significant changes carried out/planned for your country's institutional arrangements? If yes, please say what changes and comment on the rationale for the change. E.g. Creation of an independent GIM organization because of recognized importance of GI to national development, changes in leadership, organizations structure, and policy.

………………………………………………………………………………………………..

……………………………………………………………………………….................

5. Please rate the extent of the participation of the following stakeholders in your national GIM, based on a scale of 1 to 10, with 1 being very low and 10 being very high. For each stakeholder group, please check all the responsibilities that apply.

S/n	Type of stakeholders	Your rating	Check the responsibilities of the stakeholders below
a	Government		☐ Creates and supplies geospatial data ☐ Assures geospatial data quality ☐ Creates geospatial services ☐ Conducts R&D ☐ Contributes/Develops GIM policies ☐ Drives use of geospatial information ☐ Makes strategic decisions on national GIM ☐ Monitors national GIM development ☐ Provides skills training ☐ Provides technology and infrastructure
b	Academia		☐ Create and supplies geospatial data ☐ Assures geospatial data quality ☐ Creates geospatial services ☐ Conducts R&D ☐ Contributes/Develops GIM policies ☐ Drives use of geospatial information ☐ Makes strategic decisions on national GIM ☐ Monitors national GIM development ☐ Provides skills training ☐ Provides technology and infrastructure
c	NGO		☐ Creates and supplies geospatial data ☐ Assures geospatial data quality ☐ Creates geospatial services ☐ Conducts R&D ☐ Contributes/Develops GIM policies ☐ Drives use of geospatial information ☐ Makes strategic decisions on national GIM ☐ Monitors national GIM development

			☐ Provides skills training
			☐ Provides technology and infrastructure
d	Private Sector		☐ Creates and supplies geospatial data
			☐ Assures geospatial data quality
			☐ Creates geospatial services
			☐ Conducts R&D
			☐ Contributes/Develops GIM policies
			☐ Drives use of geospatial information
			☐ Makes strategic decisions on national GIM
			☐ Monitors national GIM development
			☐ Provides skills training
			☐ Provides technology and infrastructure

Section 2: Leadership

6. Who provides overall leadership in your national GIM? Please provide the name and title of the responsible officer and organization.

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7. Please rank the top 5 GIM areas placed by your current leadership where their availability or implementation is deemed crucial in determining the effectiveness of GIM organizations. Rank 1 for the area being the most important, 2 being the second most important and so on. You may provide a brief statement to support your selection

S/n	GIM areas	Your ranking	Remarks on selection
a	Capacity building & adoption		
b	Coordination & collaboration among entities		
c	Diverse representation in institutional arrangements		
d	Funding support for GIM activities		
e	Infrastructure & technological facilitation		
f	Leadership & mandate		
g	Legal framework creation/application		
h	Policy & decision making		
i	Public service delivery		
j	Shared vision & plans for GIM		

S/n			
	development		
k	Accountability, monitoring & regulation		
l	Others, please specify:		

Section 3: Governance Policies

8. Rank the top 5 governance policies as relates to GIM, in the order of importance placed by your current administration, with 1 being the most important, 2 being the second most important and so on. You may provide a brief statement to support your selection.

S/n	Governance policies	Your ranking	Remarks on selection
a	Competition Policy		
b	Intellectual Property Rights		
c	Open Data		
d	Data Privacy		
e	Data Sharing		
f	Data/Service Pricing		
g	Data/Service Security		
h	Data/Service Standards		
i	Others, please specify		

9. Please select which instrument(s) is/are used specific to GIM (e.g. establishing the GIM, geospatial governance policies). Kindly provide a copy of the document(s) or a web address where they may be accessed.

S/n	Type of instrument	Name/Title of instrument
a	☐ Legislation:	
b	☐ Executive Order/Decisions	
c	☐ National Policy	
d	☐ Cooperation Agreements	

e	☐ Others, please specify	

10. Comment on the factors that contributed to the need for the various instruments in your country and the outcomes post enactment of the instruments.

Instruments	Contributing Factors	Outcomes

11. Please let us know any other thoughts you have on key drivers or issues in determining the effectiveness of geospatial institutional arrangements.

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