



Improving Geospatial Information Policy, Processes and Services to support Emergency Responses

**Fact Finding Analysis and Proposed Strategic Framework
(Final Report)**

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**The Secretariat of
the United Nations Committee of Experts on Global Geospatial
Information Management (UN-GGIM)**



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Finally, the UN-GGIM Secretariat would like to thank the staff members of United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) for the support provided during the implementation of this project.



Executive summary

The fact finding analysis conducted as part of this project confirmed the existence of challenges and gaps when it comes to the availability, quality and accessibility of geospatial information as well as collaboration, coordination and communication issues among all the stakeholders and partners involved in the response to crisis.

The analysis also confirmed the opportunity to address some of these challenges and gaps through the geospatial information and technical capacities available within Governmental Agencies in countries. This being said, these capacities would need to be strengthened and policies established in order for them to be accessible to the international community in time of crisis.

The following six (6) core strategies have then be defined as key to address the above mentioned challenges and gaps on the basis of the results of this analysis:

- Awareness raising, capacity building and training;
- Common standards, protocols and processes;
- Collaboration, coordination and communication;
- Policies;
- Common infrastructures and services;
- Resources mobilizations.

These strategies defines the plan of action, and as such form the pillars, for the strategic framework which is being proposed here with the vision to ensure for the necessary geospatial information and geospatial information services are available, of quality and accessible in a coordinated way to decision making and operations during disasters.

While the vision is oriented towards the response phase, reaching it will require for all the stakeholders and partners involved in Disaster Risk Reduction (DRR) and emergency management with the mission to work together at ensuring the timely and effective delivery of quality geospatial information and geospatial information services across the whole emergency cycle.

To complement the strategic framework, a set of flowcharts for pre, during and post crisis have been developed in order to provide a visual representation of the elements that composes each of these strategies, how they are organized and how they relate to each other in an ideal situation and this across the whole emergency cycle.

By aiming at playing a leading role in setting the agenda for the development of global geospatial information and to promote its use to address key global challenges, the UN-GGIM Committee is well placed not only to contribute to several of the framework's core strategies but also to serve as a technical advisory group for the implementation of the overall framework and as an interface between the humanitarian and emergency responders community and the key Governmental Agencies involved in the provision of geospatial information and geospatial information services.



In view of the above, it is therefore recommended for the UN-GGIM Committee to:

- Consider including the improvement of geospatial information and geospatial information services to support emergency response as a formal agenda item;
- Establish a working group with the objective to:
 - ensure for emergency response, and therefore indirectly Disaster Risk Reduction, to be seen as a priority focus across its activities and for the recommendations, actions, guidelines and standards coming out of its work to address and support the needs of the humanitarian and emergency response community;
 - serve as the interface between the humanitarian and emergency response community and the key governmental institutions involved in the provision of geospatial information and geospatial information services;
 - continue working, in close collaboration with the humanitarian and emergency response community, at further developing the proposed strategic framework in order for it to include terms of reference and requirements as well as determine clear and complementary roles in delivering geospatial information and geospatial information services.
- Advocate for the humanitarian and emergency response community to come together with the objective to look into the proposed framework as a way to improve geospatial information and geospatial information services to support emergency response.

These recommendations together with the result of the fact finding analysis as well as the preliminary framework have been presented to the UN-GGIM Committee during the 5th session of the committee which took place from 3 to 7 August 2015 in New York.

Before presenting the above at the plenary session, a side event was organized on 3 August 2015 and gathered 55 participants from countries and other organizations. The presentations made and the discussions that followed confirmed the importance of the topic as well as the role that UN-GGIM could play in this regards.

The presentation made during the plenary did itself result in the establishment of a working group on geospatial information and services for disasters with the strong support of 32 Member States.



1. Background

At the time of a crisis, all the geospatial information necessary to support decision making should be accessible from authoritative sources, of good quality so that all the stakeholders involved use the same geospatial information to ensure a common operational picture of the situation during the emergency response as well as the recovery and reconstruction phases.

The mechanisms and resources that would allow for the above to take place are generally not in place before a crisis happens. As a result, the many actors simultaneously engaged in the response are not only generating an important volume of concurrent and frequently overlapping geospatial information initiatives but their competing priorities, combined with a lack of coordination and collaboration, are also adding to the burden of the local institutions, which already have to deal with limited resources.

Recent large scale events, such as typhoon Yolanda/Haiyan (2013), Ebola outbreak (2014-2015) and complex emergency situation in Iraq, have exacerbated several issues pertaining to the collection, use and sharing of geospatial information which has emphasized the need to find solutions aiming at improving not only the availability, quality and accessibility of geospatial information but also the coordination and collaboration among all the stakeholders involved in the provision of geospatial information services and this at all levels of decision making and operations and across the whole emergency cycle.

In this context, the Secretariat of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), upon request by and consultation with the UN-GGIM Bureau, has launched a project to aim at identifying best practices and benchmark for improving effective geospatial information management during an emergency response, with the objective to develop and implement a strategic framework that would address the above mentioned issues. The concept note for this project can be downloaded from here:

http://www.un.org/Depts/Cartographic/Improving_GI4ER/Concept_Note-Improving_GI4ER.pdf.

The present report aims at describing the results of the fact finding analysis and the strategic framework that is proposed in order to address the challenges and bottleneck that have been identified.

The vision, mission, purpose, stakeholders/partners and core strategies defined in this strategic framework will help identifying potential gaps which, if addressed by the geospatial community (national, regional and global geospatial players, including UN-GGIM, UN agencies, NGOs and Governmental Organizations), could improve quality, harmonization, coordination and collaboration to better support emergency response.

Addressing these issues is not only timely in view of the increasing number and impact of disasters in the world [1] but would also contribute to the implementation of the “Sendai Framework for Disaster Risk Reduction 2015-2030” [2] adopted during the Third United Nations World Conference on Disaster Risk Reduction (WCDRR) in March 2015 and subsequently endorsed by the United Nations General Assembly in June 2015.

Furthermore, Disaster Risk Reduction and disaster management are central to Sustainable Development. As such, the present works do contribute to the 2030 Agenda for Sustainable Development.



2. Fact finding analysis

Two surveys have been conducted in order to identify: a) the major challenges encountered by stakeholders and partners involved in the creation and/or use of geospatial information and geospatial information services during the response to recent events and this across sectors (non-governmental organization (NGO), government, private sector, etc.) and levels (technicians to decision makers); b) opportunities that exists among Governmental Agencies in relation to the same topic.

The method used and results obtained for both surveys are presented in the following sections.

2.1 Survey among people involved in recent major events

2.1.1. Method

The questionnaire (Annex 1) has been designed in collaboration with staff members from the UN Geospatial Information Section (UNGIS, formerly UN Cartographic Section), UN OCHA and iMMAP¹ to cover the question of access (obtain/collect) and use of geospatial data as well as the use and sharing of geospatial information products.

Focusing primarily on three particular events (Typhoon Yolanda/Haiyan, Ebola outbreak in Western Africa and the complex emergency in Iraq)² the questionnaire also allowed capturing feedback related to any other events which took place after 2010.

Additional questions have also been added in order to allow for the respondents to share what they considered as being major bottlenecks and/or success factors towards a more effective use of geospatial information to support response to crisis as well as provide recommendations for action and other thoughts on the project in general and/or the survey in particular.

The following set of definitions has also been shared with the respondents in order to ensure a common understanding among them:

- Data: Facts or statistics collected for reference or analysis [3]
- Data products: Tables, graphs and maps generated on the basis of data (defined in the context of the project);
- Information: Acts provided or learned about something or someone [3]
- Information products: Products combining data products and narrative information, i.e. situation report, bulletin, infographic product, etc. (defined in the context of the project);
- Geospatial information: Data or information with a spatial component on the surface of the earth (Modified from [5]);
- Geospatial information services: Technical capacity (unit and team) and associated platforms providing access to geospatial data as well as processed or published products based on geospatial information (defined in the context of the project).

¹ iMMAP is an international not-for-profit, non-governmental organization (NGO) that provides targeted information management support to partners responding to complex humanitarian and development challenges.

² These events have been selected as they represent recent large scale events that have exacerbated the problem and emphasized the need to find solutions aiming at improving not only the availability, quality and accessibility of geospatial information but also the coordination and collaboration among all the stakeholders involved in the collection, generation, management and sharing of this information and this at all levels and across the whole emergency cycle.



In order to obtain the largest number of response possible, the questionnaire has been placed online using Survey Monkey and shared widely over a period of two weeks (from April 30th to May 15th, 2015) through the following channels:

- Different UN inter-agency Skype groups including the one established during the response to typhoon Yolanda and the one used by Information Management Officers (IMOs) involved in the response to the Ebola outbreak;
- Member of different working groups/networks, including:
 - UN OCHA Information Management Working Group (IMWG) Members both at the global and national level (Philippines);
 - The United Nations Geographic Information Working Group (UNGIWG);
 - The World-Wide Human Geography Data Working Group (WWHGD WG);
 - The Decision Makers Needs (DMNeeds);
 - The Assessment Capacities Project (ACAPS);
 - The Digital Humanitarian Network (DHN);
 - The Disaster Resilience Lab (DRL);
 - The Eye On Earth Disaster Management Special Initiative (DM SI);
 - OpenStreetMap Philippines (OSM-PH)
- UN OCHA Information Management Officers (IMOs) and other agencies specific IMOs involved in the response to the Ebola outbreak and the complex emergency in Iraq;
- UN Missions including the UN Mission for Ebola Emergency Response (UNMEER);

In order to reach additional respondents, and identify key peoples among these networks, the questionnaire contained a final section (Annex 1) to capture the name and email address of people the respondent though important to involve in the survey. This process resulted in a list of 229 individuals which have also been contacted. 44 of them completed the survey.

While it is difficult to give the exact number of people who received the invitation to fill the survey, a rapid estimation locate them between 1000 and 1500.

2.1.2. Results

2.1.2.1 Profile of the respondents

The questionnaire has been filled by two-hundred-eighteen (218) peoples involved in the response to recent crisis. Ninety-five (95) respondents have actually been involved in more than one event and sometimes worked for different organizations and/or fulfilled different functions from one event to another which explains why the totals at the bottom of the tables presented here do not sum up to 218. The percentages in these same tables have nevertheless been calculated on the basis of the total number of respondents (218).

Almost half of the respondents were involved in the response to Typhoon Yolanda/Haiyan (47.2%) and/or the Ebola outbreak in Western Africa (44.9%) and 14.2% of them in the response to the complex emergency in Iraq (Annex 2).

The distribution of respondents according to their station during the crisis varies from one event to the other with more individuals on site than remotely during the response to Typhoon Yolanda/Haiyan, an equal distribution for Iraq and the opposite distribution for the Ebola outbreak (Annex 2, Table A2.1).



The majority of the respondents have worked at least once for the United Nations (83.5%) and/or another NGO (38.5%) during the event(s) in which they were involved (Annex 2, Table A2.2). Unfortunately, the survey was filled by a limited number of respondents from Governmental Agencies (11.5%). The first reason for this might be that these agencies are not necessarily involved in the groups/networks that have been used to channel the questionnaire. In addition to that, only a limited number of individuals working in Governmental Agencies have been mentioned as part of the snow ball. Both might be an indication of a potential disconnect between the respondents to the survey and these agencies.

When it comes to the functions occupied by the respondents (Annex 2, Table A2.3), half of the respondents have at least once been working as Information Management Officers (50%) or GIS officers/analysts (49.1%) and 31.2% of them have occupied a function of Coordinator/Managers.

2.1.2.2 Main Challenges

The preliminary analysis of the results for this section of the questionnaire (Annex 1) showed that the organization of the options provided to the respondents, as well as some of the answers the respondents gave in the "Other (please specify)" free text fields, were generating overlaps between the different issues that the questionnaire was trying to address.

The content of these free text fields as well as the options provided for each questions have therefore been re-organized to cover these issues

This re-organization does not generate any bias as the results are being expressed in terms of the number of times a particular issue has been mentioned

In addition to that, the following option has been inadvertently included twice in the questionnaire (once in question 3.1 and once in question 3.2): "The data used in a map/information product was not identified/sourced in the map and it was therefore not possible to find the dataset (access)". Only the highest number of answers collected for this option through question 3.1 (74) has therefore been used in the analysis.

Finally, respondents have been given the possibility to select multiple options in their answers. This explains why the totals at the bottom of each table reported in Annex 3 do not match the total number of respondents to the survey (218). The percentages presented in these same tables are themselves based on the total number of respondents (218).



Access to geospatial information

Main challenges in accessing geospatial information:

65% Lack of data collection standards

51% Data placed on many different platforms

47% Data access not timely

This section of the analysis actually looks at specific challenges: the availability of and accessibility to data as well potential coordination issues pertaining to data collection.

The availability of both baseline data as well as data about the event remains an issue respectively mentioned by 41.3% and 30.3% of the respondents (Annex 3).

When it comes to data accessibility (Annex 3, Table A3.1), the main issues concern the number of different platforms on which this data is being placed (mentioned by 50.9% of the respondents) and the fact that this data is not timely accessible (46.8%).

The unwillingness to share data and data access restrictions come right after that with both 45.4% and just before issues linked to the lack of documentation of the source of the data, making it therefore difficult to contact the data owner (between 33.9% and 39.9% depending on the option selected by the respondent).

With 64.7%, the lack of data collection standards agreed upon all stakeholders is itself seen as the major coordination challenge when it comes to obtaining/collecting geospatial information.

Use of geospatial information

Main challenges in using geospatial information:

63% Conflicting or contradicting datasets

55% Metadata is not available

51% Data of poor quality

Once the data has been accessed, the major challenge encountered by the respondents involved in the use of the data (Annex 3, Table A3.2) is the existence of conflicting/contradicting datasets (63.3%). When not conflicting, the release of many datasets makes it often difficult to decide on which one to be used (39.4%).

Data quality comes next with several issues ranging from the lack of documentation (metadata)

being mentioned the most (55%), general data quality issues (50.5%) and the fact that the data is not authoritative, in the sense of not being validated by the government (50%). To be associated to the metadata issue is the lack of information about the data flow which has been used to collect and process the data (48.2%).

Are also mentioned the question format in which the data is accessible and which is not always appropriate for being used in the response context (49.1%) and then restrictions put on the use of this data (36.7%).

The capacity necessary to use the data seems not being an issue among respondents as only mentioned by 2.8% of them.



Use of geospatial information based products for decision making

Main challenges in using products:

45% Duplicated products make information overwhelming

38% Duplicated products with conflicting information

Duplication of product, with or without conflicting information, comes at the top of the list of challenge mentioned by the respondents when it comes to the use of geospatial information based (Annex 3, Table A3.3).

The lack of documentation of the data sources on these products is next with 24.8% just before the difficulty to know where to find the information

products in question (19.3%).

The last challenge mentioned by the respondents concerns difficulties in using the products (3.7%). Finally 1.81% of them did not encounter any specific issues.

Sharing of geospatial information based products

Main challenges in sharing products:

57% Numerous platforms to share these products

30% Sharing of products not allowed

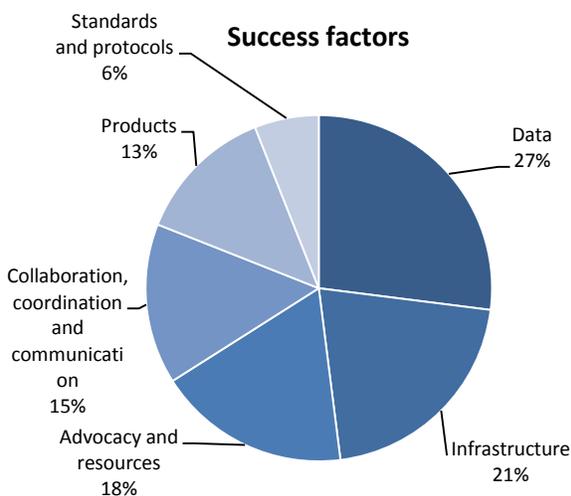
Annex 3 (Table A3.4) also provides the list of the main challenges encountered by the respondents when it comes to the sharing of information products.

The existence of numerous locations/platforms where these products are posted comes on top of this list with 57.3%. At the same time,

respondents find it a challenge to deal with the high volume of feeds referring to products being generated during the response to the crisis (17.4%)

Follows issues that limited the sharing of these products, including the question of data sharing, data restriction and data sensitivities (29.8%).

2.1.2.3 Major success factors and bottlenecks



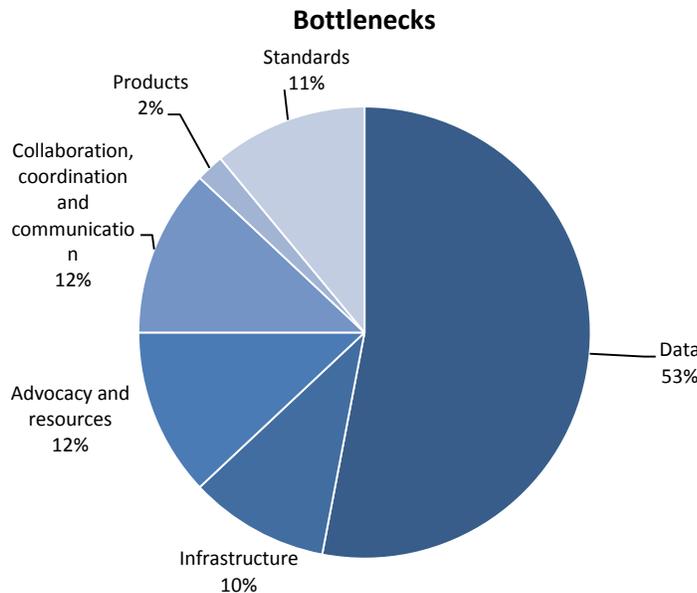
The major success factors and bottlenecks reported by the respondents have been grouped according to the following 6 specific areas in order to allow for comparison between the two (by alphabetical order):

- Advocacy and resources;
- Collaboration, coordination and communication;
- Data;
- Infrastructure;
- Products;
- Standards and protocols.



Annex 4 provides the detailed tables (Annex 4 Table A4.1 and A4.2) for both organized according to this grouping and the decreasing number of time each of them has been mentioned. Due to the large number of inputs, and the fact that these were not based on predefined options, the percentages reported in the table has been calculated based the total number of inputs (540 for the success factors and 667 for the major bottlenecks) and not the total number of respondents.

The availability, quality and accessibility of data is not only seen as the major success factor but also major bottleneck toward a more effective use of geospatial information to support response to crisis by the respondents thus confirming the need to address this issue in priority in the context of the framework.



The need for common infrastructures comes next in the list of success factors but is not seen as such a major bottleneck as being only placed in the fifth position in Annex 4 (Table A4.2) which tends to indicate that infrastructure issues are already been addressed during the response to recent crisis.

The availability of a well trained technical capacity together with the need to raise awareness finds itself in the third place in both tables indicating this as being of higher priority to be addressed compared to the question of common infrastructures.

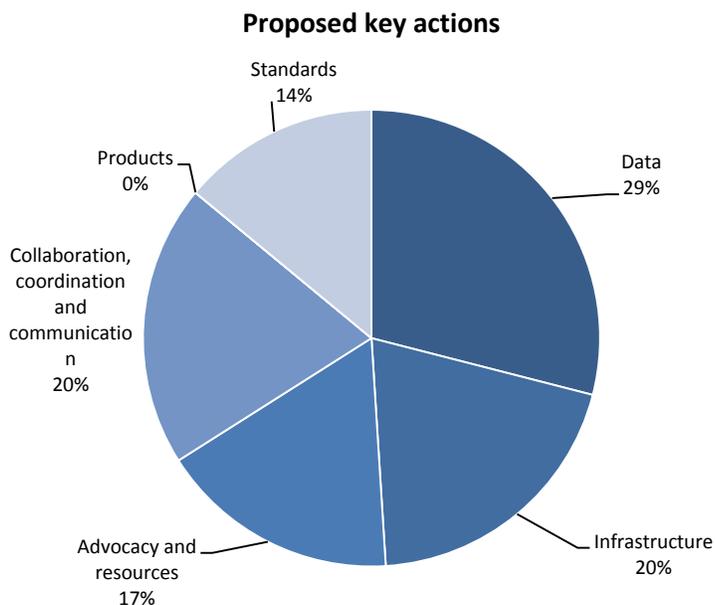
While placed in second position in the list of major bottlenecks, collaboration/ coordination/communication only comes in the fourth position in the list of success factors.

Interestingly, the issues linked to products are finding themselves at the bottom of the list in both Tables while you would have expected this to be an important issues being the final outcome of the all process.

Finally, while at they should be at the base of the all data management process, standards and protocols remains the least mentioned among success factors. They are nevertheless appearing proportionally higher than infrastructure and product related issues among bottlenecks.

2.1.2.4 Proposed key actions





As this could have been anticipated, key actions proposed by the respondents organized according to the same grouping (Annex 5) is following a similar order than the one observed for the success factors (Annex 4, Table A4.1).

The major difference between the two tables though is that none of the action proposed concerns the improvement of the quality or standardization of geospatial information based products.

The other difference is that collaboration, coordination and communication comes before advocacy and resources in the list of action.

2.1.2.5 Other thoughts

"I think this is a great initiative and I hope there are concrete action points that can be taken by those leading data initiatives in the UN, NGOs and Government. I hope the UN learns to share data more openly and at least among our organizations"

Seventy-eight (78) respondents provided additional thoughts either on the project in general or the survey in particular.

Apart from general comments supporting the project, most of respondents used this free text box to emphasize on certain issues addressed by the questionnaire. Among those, the need for a proper governance to be established to address the questions of

collaboration, coordination and communication among all the stakeholders and partners is the one that has been mentioned the most.

Right after that come the need to establish and follows common standards, protocols and process in order not only to improve the quality of data and products but also their timeliness.

The importance to raise awareness, establish common infrastructures, build capacities and invest in data preparedness has also been mentioned.

Finally, some respondents mentioned about other project and initiatives that do relates to the present project. Among those we can mention: the project initiated by the Gates Foundation to collect four (4) core data layers (administrative boundaries, settlement names/locations, population estimates and transportation/road networks) in developing countries; the work done by UN OCHA Information Management Working Group (IMWG) data subgroup on the coordinated data scramble or the Strengthening Information Infrastructure for Emergency Management project (SIEM) under the umbrella of the Eye on Earth initiative.



2.2 Survey with Governmental Agencies

The first survey having only reached a limited number of respondents working in Governmental Agencies, a second questionnaire has been developed in order to compensate for this and, at the same time, capture inputs and views from these agencies on the topic covered by this analysis.

Ideally, this questionnaire should have been sent to different Governmental Agencies involved in the collection, maintenance and sharing of the geospatial information and/or the provision of geospatial information services of importance during emergency response, namely, but not be limited to: the National Mapping Agency (NMA), the National Statistic Office (NSO) and the Ministries having the mandate on core operational datasets such as health facilities (Ministry of Health), schools (Ministry of Education), road network (National Road Authority), etc.

Unfortunately, by lack of time, and also direct contacts in the other agencies and Ministries mentioned here above, the questionnaire was finally only been sent to National Mapping Agencies (NMAs). While therefore not providing a comprehensive view of the situation observed in these countries, the answers received allows already having an idea of the major challenges encountered by Governmental Agencies in countries as well as opportunities they have to offer.

The following sections describe more in details the methods and the results obtained through the implementation of this questionnaire.

2.2.1 Method

The questionnaire has been designed to cover the following topics (Annex 6):

- Data custodianship (question 2);
- Existence of geospatial information services including a platform for the sharing of geospatial data (questions 3 and 4);
- Technical support received (question 5);
- Geospatial information and information services to support emergency response (question 6);
- Involvement in recent disaster/emergency events and leveraging of existing services (questions 7 and 8)

Before being shared, this questionnaire has been reviewed by UN-GGIM Bureau and Regional Co-chairs as well as staffs from the UN Geospatial Information Section and UN OCHA.

In order to ensure consistency in terms of terminology, the definitions used during the first survey (see Section 2.1.1) have also been shared with the contacted agencies.

Due to time limitation, the questionnaire has only been sent to a limited number of low and middle income countries selected in order for the survey to:



- cover countries particularly exposed to hazards and/or having recently experienced a large scale disaster including those listed by the respondents to the first survey (Annex 2, Table A2.1);
- be statistically representative at the continental level.

Additional countries of particular interest to UN-GGIM Regional Co-chairs have then also been added to the list. Table 1 present the distribution of these countries organized to the continent in which they are located.

Africa	Americas	Asia and the Pacific	Europe
Botswana	Antigua and Barbuda	Bangladesh	Albania
Central African Republic	Bahamas	Bhutan	Bosnia and Herzegovina
Ethiopia	Barbados	Cambodia	Bulgaria
Guinea	Belize	Fiji	Croatia
Liberia	Colombia	Iraq	Greece
Libya	Costa Rica	Kiribati	Hungary
Madagascar	Cuba	Lao People's democratic Republic	Latvia
Malawi	Dominica	Myanmar	Montenegro
Mali	Dominican Republic	Nepal	Republic of Moldova
Mozambique	Grenada	Pakistan	Romania
Niger	Guatemala	Philippines	Serbia
Nigeria	Guyana	Solomon Islands	Ukraine
Sierra Leone	Haiti	Sri Lanka	
Somalia	Honduras	Syria	
South Sudan	Jamaica	Timor-Leste	
Zimbabwe	Nicaragua	Tuvalu	
	Panama	Vanuatu	
	Saint Kitts and Nevis		
	Saint Lucia		
	Saint Vincent and the Grenadines		
	Suriname		
	Trinidad and Tobago		
	Venezuela		

Table 1 - Countries to which the questionnaire has been sent

The questionnaire has been placed online (Survey Monkey) for a period of 20 days (from June 1st to 20th) and the NMAs of the selected countries (Table 1) invited to fill it via an email sent by the UN-GGIM secretariat.

2.2.2 Results

2.2.2.1 Profile of the respondents



The questionnaire was filled by Governmental Agencies from 25 countries distributed as follow (Annex 7):

- 19 National Mapping Agencies (NMAs);
- 3 Disaster Management Organizations;
- 3 Other types of Agencies/Organizations dealing with geospatial information and/or geospatial information services.

While most of the respondents were indeed from the original target audience (NMAs) the answer are finally also covering other types of agencies.

In terms of geographic coverage, 6 agencies (24%) are based in Africa, 8 (32%) in the Americas, 5 in Asia and the Pacific (20%) and 6 (24%) in Europe. The results are therefore finally, and unfortunately, not covering Oceania.

2.2.2.2 Data custodianship

23 of the 25 Governmental Agencies that completed the survey indicated having custodianship on at least one geospatial data layer

The questionnaire looked into custodianship over seven (7) particular geospatial information layers: administrative boundaries, health facilities, schools, road network, hydrographic network, Digital Elevation Model (DEM)

and satellite images. Respondents were also given the possibility to indicate custodianship over other layers.

Annex 8 provides information regarding the last date of update (year), the coverage of this update as well as the accessibility from the internet and potential access and use restrictions put on these layers for the agencies that mentioned having custodianship on them.

While not comprehensive as the concept of custodianship might not have been understood the same way across respondents and taking into account that the quality (completeness, accuracy, etc.) of these data layers remains to be defined, Annex 8 and the summary presented in Table 2 are already giving an idea of data availability in these different countries.

The main observation that can be made from Annex 8 and Table 2 is that an important volume of data does exist in countries, that most of the time this data has been recently updated (in the last 5 years) but not always nationally. This being said the data is very often not accessible from the internet and data access/use restrictions may apply.



Country	Administrative boundaries	Health facilities	Schools	Road network	Hydrographic network	Satellite images	DEM
Antigua and Barbuda		X	X	X	X	X	X
Bahamas							
Bangladesh				X		X	X
Barbados	X			X			X
Bhutan							
Bosnia and Herzegovina	X						X
Botswana	X	X	X	X	X	X	X
Costa Rica	X				X		X
Cuba							
Ethiopia	X			X	X	X	X
Greece	X						
Hungary	X						X
Iraq				X	X	X	X
Jamaica		X	X	X	X	X	X
Latvia					X		X
Liberia	X	X	X	X	X	X	
Madagascar	X			X	X	X	X
Malawi	X	X	X	X	X	X	X
Mozambique	X			X	X	X	
Philippines					X	X	X
Republic of Moldova	X			X	X	X	X
Romania	X						
Saint Kitts and Nevis	X						X
Saint Vincent and the Grenadines	X						X
Sri Lanka	X	X	X	X	X	X	X

Table 2- Availability of the seven data layers among Governmental Agencies that completed the survey

A metadata was mentioned as being available for 67% of the layers reported by the agencies. Table 3 gives the distribution of which metadata standard has been used for these layers.

Metadata standard	Number of mention
Other (National)	36
ISO	32
Other (International)	11
FGDC	1

Table 3 - Metadata standards used by the agencies

Finally, it is interesting to know that Shapefile is the format being mentioned the most by agencies for data being downloadable from the internet (Table 4).

Format	Number of mention
Shapefile	41
Other	11
GeoTIFF	6
Esri Grid	1
MrSID	1

Table 4 - data layer format mentioned by the agencies



2.2.2.3 Existence of geospatial information services

All the Governmental Agencies except one have a GIS unit/team/data center with a number of staff ranging from 1 to more than 12

Except for the National Mapping Agency of Saint Vincent and the Grenadines, all the agencies who responded to the survey mentioned having a GIS unit/team/data center with a number of staff ranging from 1 and more than 12 (Annex 7).

In the case of the Lands and Surveys Department in Saint Vincent and the Grenadines, the absence of such capacity is linked to the fact that there are not enough requests to justify such a structure.

When such a unit/team/data center exists it has been for more than 5 years in majority of the cases (75%), going up to 28 years in the case of the Philippines (Annex 7).

In terms of equipment (Table 5) all agencies benefiting from such a unit/team/center are having access to computers, 23 of them to GIS software and at least one printer (the Department of Disaster Management in Bhutan being the agency not having access to these items). A server is available to 21 of these agencies and a Scanner to 19 of them.

Answer Options	Yes	No	Unspecified	Response Count
Computer	24	0		24
GIS software	23	1		24
Server	21	2	1	24
Plotter (A2 and above)	21	3		24
A3 Color Printer	19	5		24
Scanner	19	5		24
A3 Black&White Printer	15	5	4	24
Other equipment	7	0		7

Table 5 - Available equipment

The other type of equipment mentioned by 7 agencies concerns GPS devices/systems, photogrammetric suite and printing house.

Only 10 agencies have mentioned having an online platform for the sharing of geospatial information and for 9 of them the existence of this platform is very recent (after 2010) (Annex 7). Such a platform is currently being developed in the case of Bangladesh.

For the other agencies, the main reason mentioned for not having such a platform is the lack of financial resources or other reasons (Table 6).



Reason	Number of mention
Lack of financial resources	8
Other (please specify)	8
No access to a server	3
No demand for such a platform	1

Table 6 - Reasons for not having an online platform for the sharing of geospatial information

The other reasons being mentioned are the:

- lack of cooperation between agencies (Antigua and Barbuda and Barbados);
- lack of technical capacity and/or technical issues (Bahamas, Bhutan and Madagascar);
- absence of a NSDI policy (Ethiopia);
- reorganization of responsibilities in the country (Cuba).

It is also interesting to mention here that seven of these platforms are based on Open Geospatial Consortium (OGC) international standards, 2 aren't and one agency does not know if this is the case or not.

When a platform is not available, data are mainly shared using flash drives, DVDs or CDs (13 agencies, or through ftp/dropbox (4 agencies). The Liberia Institute of Statistics and Geo-Information Services (LISGIS) also mentioned sharing data via email while the State Commission on Survey mentioned not sharing its geospatial data.

2.2.2.4 Technical support received

44% of the Governmental Agencies that completed the survey received some technical support over the past 5 years but all of them indicated needing more support to be in position to deliver adequate geospatial information and geospatial information services

Eleven (44%) of the agencies that filled the questionnaire indicated having receive some technical support (in cash or in kind) from the international community over the past 5 years in relation to geospatial information and/or geospatial information services. For five of these agencies a support was received twice and for two of them more than twice. Twenty supporting "events" are therefore considered in the statistics that

follows (Annex 7).

The majority of the support received came from other countries (Table 7) and was mainly directed towards training or equipment (Table 8). In 85% of the case the support received answered the agency needs.



Source of support	Number of support
Other country	8
Other	5
Donor agencies	3
United Nations	3
Private organization	1
Total	20

Table 7 - Source of the support received

Nature of the support	Number of support
Training	7
Equipment (hardware, software)	7
Financial	4
Other	2
Total	20

Table 8 - Nature of the support received

The last question for this section was looking into additional support that the agencies would need to receive in order to be in the position to deliver adequate geospatial information and geospatial information services. Unfortunately, an error made in the online data collection form did not allow capturing this information for all the agencies but only for those having already mentioned as having received some support already.

These same eleven agencies were given the possibility to specify three types of support. Seven of them used this possibility; two agencies only mentioned two types of support and the last two only one type of support for a total of twenty-seven items used in the statistics that follows.

When it comes to the nature of support still needed, the 3 options given to the respondent have been mentioned quite equally (Table 9) therefore indicating not only the need for financial but also technical support.

Nature of the support	Number of support
Training	10
Financial	9
Equipment (hardware, software)	8
Total	27

Table 9 - Nature of the support still needed

For thirteen (13) of the requests (48.1%), the agency in question has already submitted a proposal to receive the support in question. When this has been done, the proposal has mainly been submitted to other type of institutions than the options proposed in the questionnaire (donor agency, United Nations, other country or private organization) (Table 10).



Proposal submitted to	Number of support
Other	8
Other country	3
Donor agency	2
Total	13

Table 10 - Institution to which the proposals for support have been submitted

2.2.2.5 Geospatial information and information services to support emergency response

A law, rules or regulations requesting for the Agency to provide geospatial information and/or geospatial information service in support to the response to an emergency exist in 10 of the 25 countries covered by the survey but only 3 covers the international community.

Ten (10) of the Governmental Agencies that filled the questionnaire (40%) indicated that there is a law, rules or regulations in the country that requires for them to provide geospatial information and/or geospatial information service in support to the response to an emergency but only 9 of them indicated the title of the document(s) in question (Annex 9).

In three instances (highlighted in grey in Annex 9) the document in question does also cover the provision of geospatial information and services to the international community for disaster risk reduction and/or emergency management.

2.2.2.6 Involvement in recent disaster/emergency events and leveraging of existing services

40% of the agencies that completed the questionnaire think that that the international community involved in the response did not leveraged enough their existing geospatial information and/or technical capacities.

Eighteen have reported having been involved in the provision of geospatial data and/or specific services during the response to a recent disaster/emergency. Table 11 gives the list of these countries together with the event in question.

It is nevertheless important to mention here that some of the other countries having not been involved in such activities have nevertheless faced natural and/or technological disasters over the past 15 years. Table 12 gives for example the total death toll generated by the top 10 natural and technological disasters experienced over the 2000-2015 period as reported for 3 of these countries in the EM-DAT Database³ [4].

³ The EM-DAT base is not comprehensive. The numbers reported in Table 20 might therefore be incomplete



Country	Event name	Event year
Antigua and Barbuda	Tropical storm Gonzalo	2014
Bahamas	Hurricane Irene	2011
Bosnia and Herzegovina	Floods	2014
Botswana	Floods	2013
Costa Rica	Earthquake	2012
Cuba	Hurricane Sandy	2012
Greece	Flood in Strymon River Northern Greece	2015
Hungary	Kolontár Red Mud Flood	2010
Iraq	South of Iraq flood	2013
Jamaica	Hurricane Sandy	2012
Liberia	Ebola outbreak	2014
Madagascar	Chedza tropical cyclone	2015
Malawi	Floods	2015
Philippines	Typhoon Haiyan (Yolanda)	2013
Republic of Moldova	Flooding of central part of Moldova/Prut region	2010
Romania	Landslide in the county of Bacau	2015
Saint Kitts and Nevis	Hurricane Lenny	1999
Sri Lanka	Provide base data for all kind of applications in disaster management and reductions	Unspecified

Table 11 - Most recent event for which the agency has provided geospatial data and/or specific services

Country	Number of deaths from natural disasters	Number of deaths from technological disasters	Total number of death
Bangladesh	7,789	3,231	11,020
Ethiopia	2,363	208	2,571
Mozambique	1,628	604	2,232

Table 12 - Death toll generated by the top 10 natural and technological disasters experienced over the 2000-2015 period

The products that have been generated by the agencies during the event in question mainly covered paper and online maps and mapping services. These products have been used by different governmental and non-governmental actors (Annex 10).

Only seven agencies reported having used products generated by the international community (NGOs, Private sector, Volunteers, etc.) during this response and these products mainly concerned GIS data (Table 13).



Country	Agency at the origin of the product being used	Products that has been used
Antigua and Barbuda	Unspecified	Unspecified
Cuba	United Nations	GIS data
Greece	European Commission/Copernicus	Printed maps, GIS data
Jamaica	NASA	Imagery
Liberia	Ministry of Health, MSF	Ebola Statistics, Ebola Statistics on communities in Monrovia
Malawi	Un Charter Service members, Regional Centre for Mapping Of resources, OpenStreetMap, Map Action	On line Maps, Geotiff, Shape files
Philippines	UNITAR/UNOSAT (EUSI), Copernicus Emergency Management Service	Damaged Structures

Table 13 - Use of products generated by the international community

For those who did not use these products (14 agencies), the reason indicated were that:

- they were not aware of these products (6 mentions);
- the products were not appropriate to their needs (5);
- the products were incomplete (1);
- they did not want to use products generated by international community but recognizing that satellite images are useful (1);
- the agency was the only one in charge of producing authoritative products in case of an emergency (1).

Six agencies received requests for geospatial information from the international community during that event (Table 14). All these request have been granted sometime with some restrictions attached to the data in question.

Country	Type of organization which initiated a request for geospatial information	Was the request granted?	Was any restriction attached this information (use, redistribution, acknowledgement,...) ?	Did the institution who received the information respected the restriction if any?	Do you think that the use of your data has been appropriately acknowledged in the products?
Bosnia and Herzegovina	Donor agency, other	Yes	Yes	Yes	Yes
Jamaica	United Nations	Yes	No	Not applicable	Yes
Liberia	Donor agency, United Nations, Other NGO and Volunteers	Yes	Yes	Yes	Yes
Malawi	United Nations, other NGO and Volunteers	Yes	Yes	Don't know	Yes (United Nations); Don't know (other NGO and Volunteers)
Mozambique	Private sector, Academic sector, Other NGO	Yes	No	Not applicable	Yes
Republic of Moldova	United Nations	Yes	No	Not applicable	Yes

Table 14 - Request for geospatial information received during the event



Four agencies did also receive some requests for geospatial information services (Table 15). These requests have also been granted but sometime with a cost.

Country	Type of organization which initiated the request	What was the nature of the request?	Was the request granted	Did the institution pay for the service?
Bosnia and Herzegovina	United Nations, Donor agency	Other	Yes	No
Liberia	Donor agency, United Nations, other NGO, volunteers	Map production, data collection	Yes	No (map production), yes (data collection)
Malawi	United Nations, other NGO	Map production	Yes	No
Mozambique	Private sector, academic sector	Map production and others	Yes	Yes

Table 15 - Request for geospatial information services received during the event

The last set of questions allowed respondents to provide their inputs regarding the leveraging of their geospatial information and technical skills and the potential improvements experiences after the response to that event.

First of all, ten (40%) of the agencies that filled the questionnaire think that that the international community involved in the response did not leveraged enough their existing geospatial information and/or technical capacities.

These agencies mentioned that the international community could have better benefited from this information and/or capacities by:

- providing free satellite imagery for mapping the disasters areas;
- establishing an international information system;
- getting to know who has what data and have far earlier identified that their agency was the focal point for spatial data sharing;
- helping their agency and other stakeholders in their efforts to share data according to international standards and in the effort of building functional SDI;
- better understanding the extent of the damaged by performing local change analysis using the agency datasets.

Only five agencies then mentioned having received the geospatial data collected by the international community during the response. All of them indicated having integrated this data back in their own dataset.

When asked if they were thinking that the country was now better prepared to use geospatial information and geospatial information services in times of crisis:

- Eleven agencies answered No and indicated the following reasons for that:
 - We need the better coordination among the government institutions;
 - No new policies have to be introduced;



- The data is too fragmented between the different Government agencies;
- not enough policy makers are aware of the power of GIS for this purpose;
- There is a lack of up-to-date and detailed spatial data,
- We did not receive any new data;
- Efficient geospatial data sharing mechanism is still required;
- Accessing the data can take time because of slow internet connection and the lack of technical capacity to handle the data remains.
- Eleven other agencies answered yes and indicated the following in this regards:
 - Awareness has been raised and it helped decision makers to better understand the importance of geospatial data;
 - Lessons have been identified and learned;
 - Communication and interagency integration has improved;
 - A lot was learned from international partners to deal with the response;
 - Helped local organization to integrate geospatial data into crisis management;
 - More information has been made available and used for creation of base maps

Finally, the agencies reported the following as actions to take place in order to improve the situation observed in their country:

- Create relevant legislations;
- Establish a centralized GIS unit and platform where all entities could provide their data for analysis by one body;
- Educate the policy makers and public service announcements;
- Strengthen existing technical capacity and increase the financial support to use geospatial information and geospatial information services in times of crisis;
- Involve volunteers in field data acquisition;
- Establish the National Spatial Data Infrastructure (NSDI);
- Improve internet speed.

2.3 Summary of the fact finding analysis

The first survey among people involved in recent events first confirmed the existence of challenges and gaps when it comes to the availability, quality (completeness, timeliness, accuracy, authoritativeness, documentation) and accessibility of geospatial information. Those issues are actually not only considered as the most important bottleneck during the response phase but also the most important success factor towards a more effective use of geospatial information to support response to crisis.

Collaboration, coordination and communication issues among all the stakeholders and partners involved in the response to crisis were also identified through this first survey and this at different levels starting from the lack of agreed upon data collection standards until the sharing of geospatial information based products.



The following six (6) core strategies have then be defined as key to address the above mentioned challenges and gaps on the basis of the results of this analysis:

- Awareness raising, capacity building and training;
- Common standards, protocols and processes;
- Collaboration, coordination and communication;
- Policies;
- Common infrastructures and services;
- Resources mobilizations.

The survey among Governmental Agencies has itself not only confirmed the existence of geospatial information and technical capacity in countries but also the need to strengthen and better leverage these data and capacities in the emergency response context, thus re-enforcing the need for the first area of work mentioned here above.

This being said, only a limited number of these countries have the necessary laws, rules or regulations in place to facilitate the provision of such data or services to other stakeholders and partners during a crisis, therefore confirming the importance of the fourth area of work here above.

In conclusion, the fact finding analysis has not only provided the necessary evidence regarding the challenges and gaps observed during emergency response but also provided the base for the establishment of the strategic framework aiming at addressing them.



3. Proposed Strategic Framework

The strategic framework is meant to define who (Stakeholders and partner) is doing what (Mission), how (core strategies), with which target in mind (Vision) and why (Purpose).

The current version of this strategic framework (Figure 1) has been developed based on the following process:

1. The inputs obtained through the implementation of the survey conducted among people involved in recent major events (Section 2.1) and the questionnaire shared with National Mapping Agencies (Section 2.2) have been used to come up with the first version of the strategic framework;
2. The strategic framework resulting from step 1 has then been discussed internally with the UN-GGIM Secretariat before being shared with all the respondents to the initial survey and the focal points of the NMAs who filled the questionnaire in order to get their feedback;
3. The feedback received (16 individuals and 5 NMAs) have been integrated in the initial strategic framework.

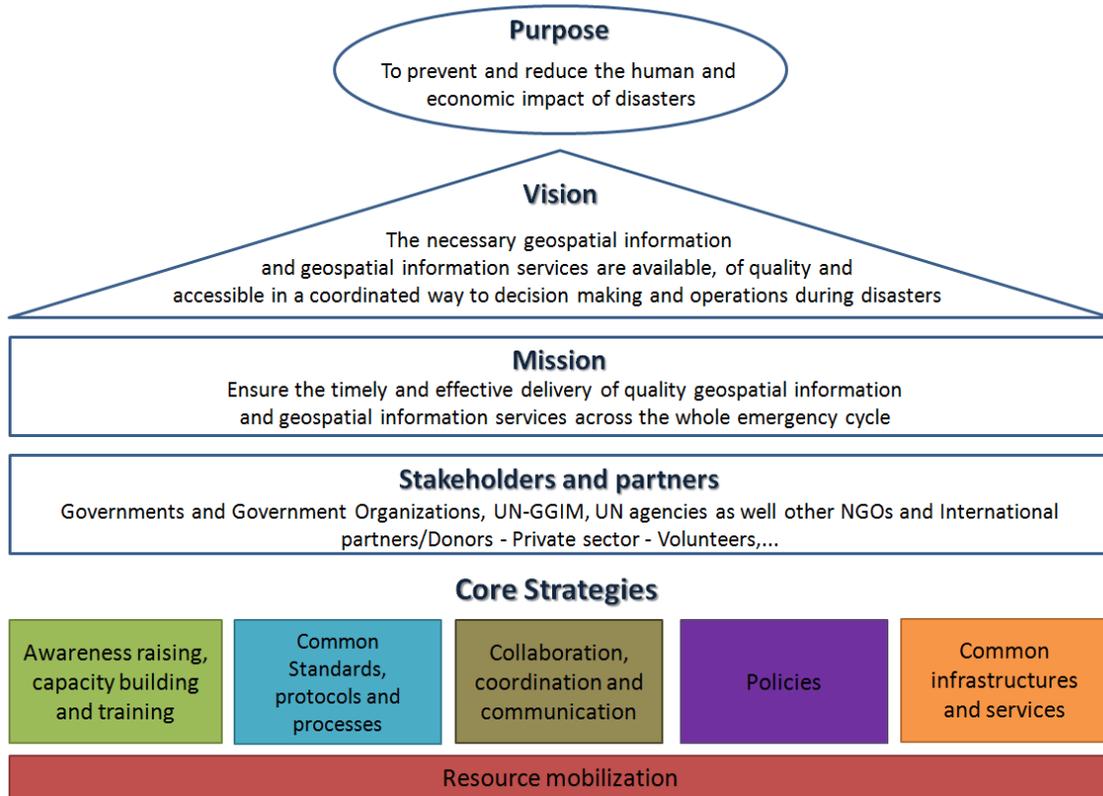


Figure 1 - Proposed Strategic Framework

The purpose of the Strategic Framework directly finds its roots in the responsibility for Member States and the international community to protect citizens from risks and disasters as well as provide support and assistance in case of a disaster or a humanitarian catastrophe.



As such, this purpose very much relates to the aims and goals of the Sendai Framework for Disaster Risk Reduction 2015-2030 [2] and the mandate and/or activities of a large number of organizations including but not limited to:

- Offices and Departments of the United Nations Secretariat like the United Nations Office for Disaster Risk Reduction (UN ISDR), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the Department of Field Support (DFS) and the Department of Peacekeeping Operations (DPKO);
- The programmes and specialized agencies of the United Nations and other international and non-governmental organizations serving as cluster lead in case of an emergency: the United Nations High Commissioner for Refugees (UNHCR), the World Food Programme (WFP), the World Health Organization (WHO), the Food and Agriculture Organization (FAO), the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the International Organization for Migration (IOM), the International Federation of Red Cross and Red Crescent Societies (IFRC) and Save the Children.
- Other Programs, initiatives governmental and non-governmental organizations and donors such as UN OOSA's United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), UNITAR's Operational Satellite Applications Programme (UNOSAT), OXFAM International, USAID, and Map Action.

The vision itself is designed to directly address the geospatial information and geospatial information services issues and challenges at the origin of this project and confirmed through the results of the two survey conducted as part of the fact finding analysis (see Chapter 2).

While the vision is oriented towards the response phase, it is recognized that it is not going to be possible to reach it without following an inclusive and comprehensive approach that covers the whole emergency cycle.

As such, the strategic framework is addressed to all the stakeholders and partners involved in Disaster Risk Reduction (DRR) and emergency management with the mission to work together at ensuring the timely and effective delivery of quality geospatial information and geospatial information services across the whole emergency cycle.

The core strategies define the plan of action to achieve the strategic framework's vision. These strategies have also been defined based on the results of the two surveys conducted as part of the fact finding analysis and the experience of the people involved in the project (see Chapter 2).

To complement the strategic framework, a set of flowcharts for pre, during and post crisis have been developed in order to provide a visual representation of the elements that composes each of these strategies, how they are organized and how they relate to each other in an ideal situation and this across the whole emergency cycle, as a big picture, namely:

- before the crisis (pre-crisis, preparedness phase) - Figure 2 and from [here](#) for the pdf version
- during a crisis (during crisis, response phase) - Figure 3 and from [here](#) for the pdf version
- after the crisis (post-crisis, recovery and reconstruction phases) - Figure 4 and from [here](#) for the pdf version



Please note that the number placed on the arrows observed in the different flowcharts have been added to facilitate the identification of a particular flow/process, they are therefore not appearing in any particular order.

Like for the strategic framework, these flowcharts have been generated on the basis of the results of the fact finding analysis and the experience of those involved in the project. These flowcharts have then been shared with the respondents to the two surveys and the feedback received (16 individuals and 5 NMAs) integrated in the version being presented here.



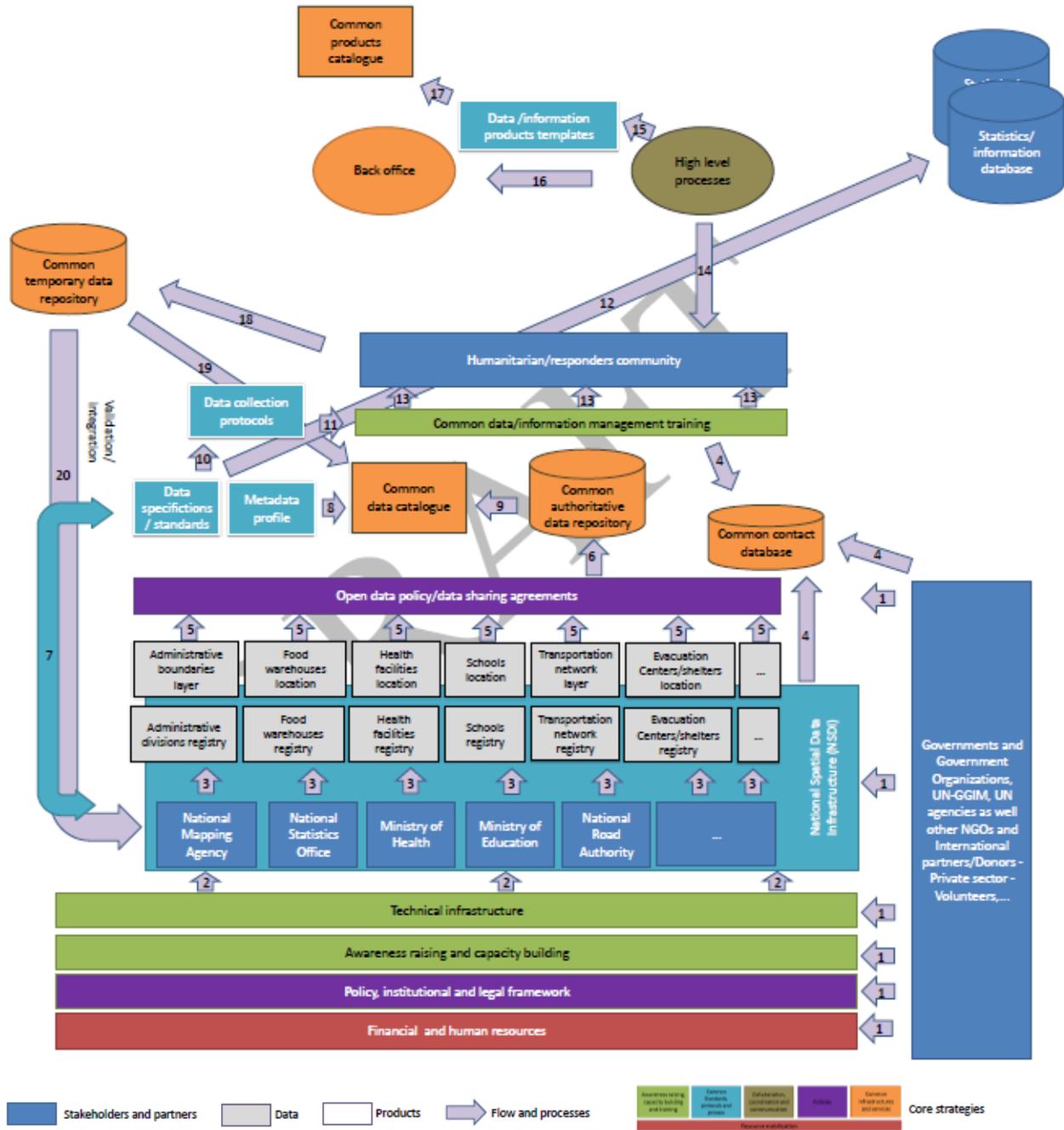


Figure 2 - Pre-crisis flowchart (preparedness phase)



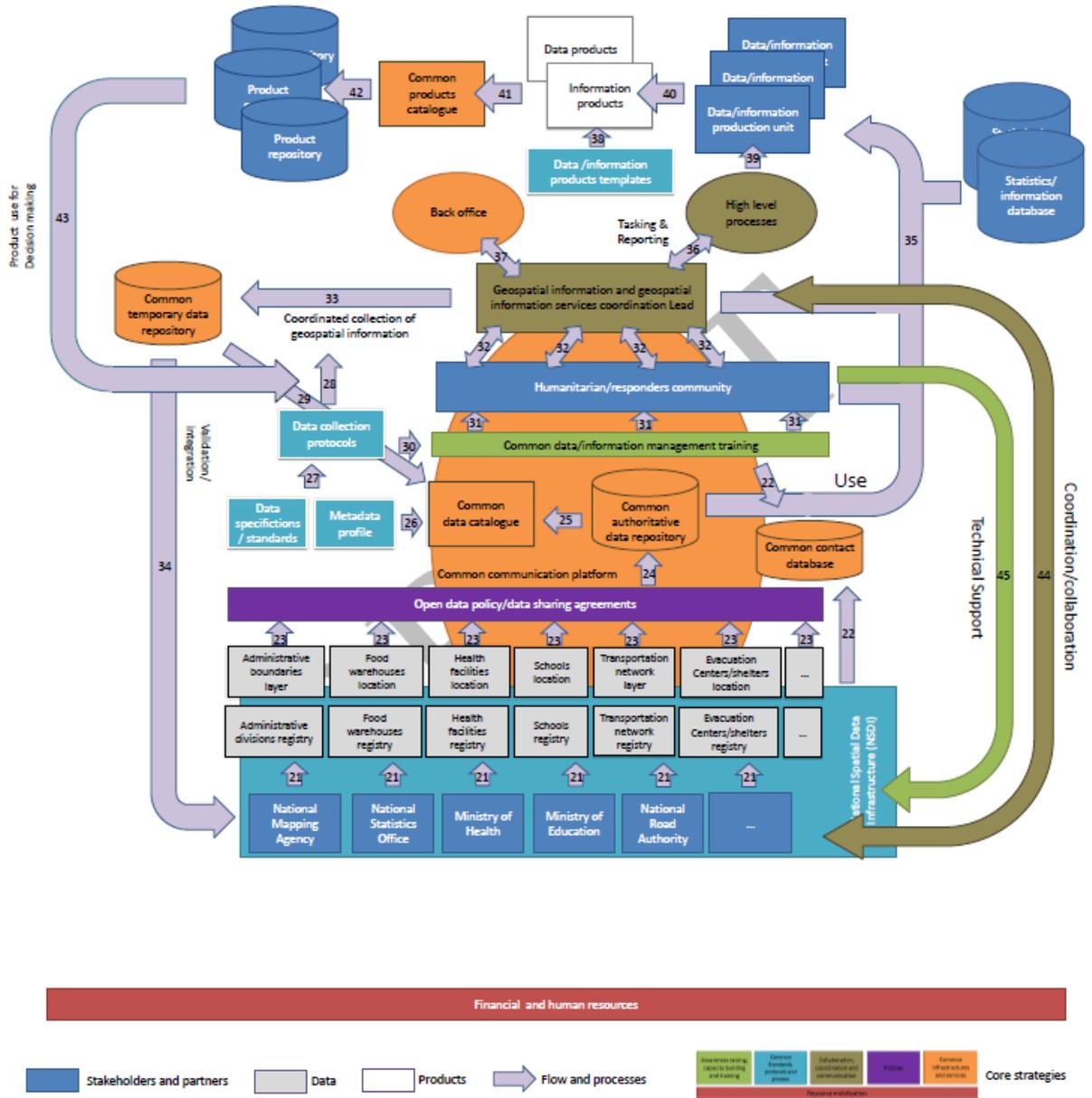


Figure 3 - During crisis flowchart (response phase)

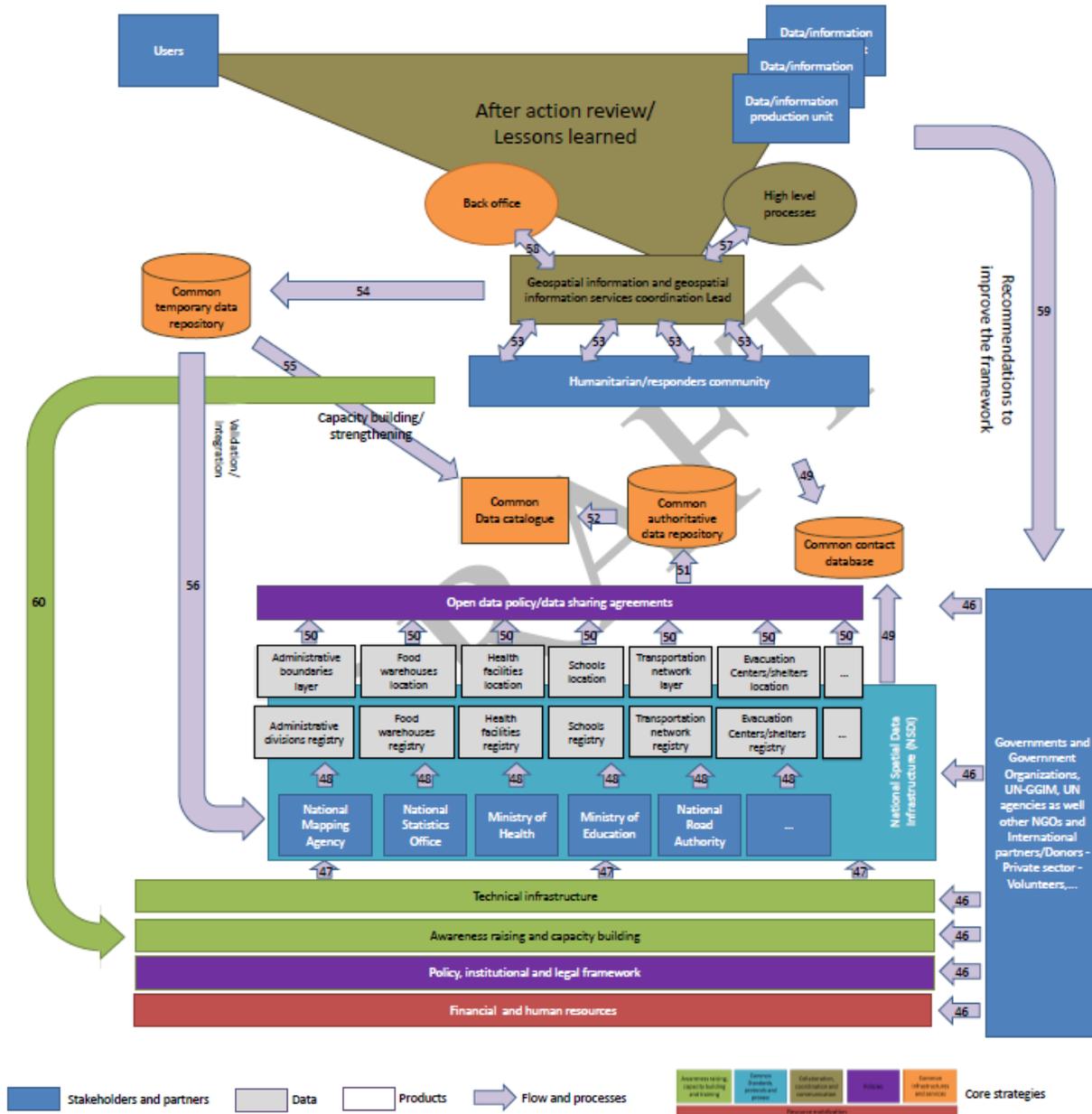


Figure 4 - Post-crisis flowchart (recovery and reconstructions phases)

As a support to read these flowcharts, Annex 11 provides the list of the different components of the core strategies and this across the different phases of the emergency cycle.

Finally, as these flowcharts represents an ideal situation that do not necessarily correspond to the reality observed on the ground during a crisis, 28 respondents to the first survey who were on site during the 3 focus events (typhoon Yolanda/Haiyan, Ebola outbreak in Western Africa and the complex emergency in Iraq) have been contacted to perform a comparison aiming at identifying if some of the key elements reported in the flowchart for the response phase were in place or missing and, in case of the later if their presence would actually have made a difference.

Unfortunately, only 4 individuals provided feedback (Annex 12). While not statistically representative, these feedbacks allow nevertheless for the following observations:

- Views on the availability and use of these elements during a same crisis might differs among responders;
- Certain platforms already exist and are being used for the storage and exchange of data or contact information. Among those we can mention:
 - The Common Operational and Fundamental Datasets (CODs/FODs) Registry for data storage (<http://www.humanitarianresponse.info/applications/data>)
 - The Humanitarian Data Exchange platform, also for data storage and cataloguing (<https://data.hdx.rwlab.org/>)
 - The Humanitarian ID platform for management and sharing of responders contact information (<https://app.humanitarian.id/#/>)
- Certain technologies for protected data sharing and communication are being used, including but not limited to:
 - Skype
 - Dropbox
 - Google drive
- There is indeed place for improvement when it comes to collaboration and coordination among stakeholders and partners, agreeing upon common standards and templates, the use of open data policy/data sharing agreements as well as technical support to be provided to governmental entities.



4. Conclusion and recommendations from the fact finding analysis and preliminary framework

Recommendations:

- ❑ Consider inclusion of geospatial information and geospatial information services in emergencies as a formal UN-GGIM agenda item
- ❑ Establish a Working Group on emergency response within UN-GGIM
- ❑ Advocate for the humanitarian and response community to review the framework as a way to improve geospatial information and geospatial information services to support emergency response

The fact finding analysis allowed identifying not only the challenges and bottlenecks encountered by stakeholders and partners during recent crisis but also the major success factor and opportunities to address them.

All of this was crystallized into a proposed strategic framework which, if implemented, would allow for the necessary geospatial information and geospatial information services to be available, of quality and accessible in a coordinated way to decision making and operations during disasters.

Reaching such a vision would require for all the stakeholders and partners involved in disaster risk reduction and/or emergency management to work together, ensuring the timely and effective delivery of quality geospatial information and geospatial information services across the whole emergency cycle.

The plan of action to be implemented in this regards is composed of six core strategies aiming at supporting the stakeholders and partners in this endeavor and this by unlocking the identified bottleneck and challenges as well as leveraging the already existing capacities and opportunities.

Flowcharts presenting the ideal situation have also been prepared in order to help visualizing how the different components of these core strategies are organized and do connect to each other across the different phases of the emergency cycle.

Converting these flowcharts into a reality will take time, require resources and need to benefit from all the available expertise, experience and skills possible.

By aiming at playing a leading role in setting the agenda for the development of global geospatial information and to promote its use to address key global challenges, the UN-GGIM is well placed to contribute to several of the core strategies mentioned in the strategic framework, starting with:

- Raising the awareness of Member States on the importance of data preparedness, National Spatial Data Infrastructure (NSDI) and open data policies;
- Developing and promoting common standards protocols and processes aiming at improving data quality and data interoperability at the global level;



- Developing and implementing policies aiming at improving the availability, quality and accessibility of geospatial information and geospatial information services in support to disaster risk reduction and emergency management.

As a matter of fact, the UN-GGIM is already working on these issues through the activities of:

- its expert group on the integration of statistical and geospatial information;
- some of its working groups starting with the one on the Development of a Statement of Shared Principles for the Management of Geospatial Information;
- its Regional Committees among which we can mention the one for Europe which has been working on the determination of global fundamental geospatial data themes;
- its Bureau and Secretariat aiming for example at looking into legal and policy frameworks, including issues related to authoritative data, as well as activities related to sustainable development and the 2030 Agenda for Sustainable Development;
- some of its members such as the one conducted the Open Geospatial Consortium (OGC), the technical committee 211 of the International Organization for Standardization (ISO/TC211), and the International Hydrographic Organization (IHO) on the implementation and adoption of standards for the global geospatial information community;

The UN-GGIM is also promoting certain projects and initiatives aiming at improving the availability, quality and compatibility of geospatial information at the global level (Global Geodetic Reference Frame (GGRF), United Nations Group of Experts on Geographical Names (UNGEGN), United Nations Regional Cartographic Conferences (UNRCC), UN Second Administrative Level Boundary (SALB), UN Gazetteer, etc.).

What remains to be done is to ensure that emergency response, and therefore indirectly Disaster Risk Reduction (DRR), are being seen as a priority focus across all the above mentioned activities, projects and initiatives and that the recommendations, actions, guidelines and standards coming out of the UN-GGIM do address and support the needs of the humanitarian and response community.

This would nevertheless not cover the other core strategies mentioned in the framework, strategies that would include capacity building and training; coordination, collaboration and communication as well as common infrastructures and services.

These issues are beyond the aim and objectives of the UN-GGIM and should therefore be addressed through the leveraging of the mandate and responsibilities of the programmes, specialized agencies and Offices and Department of the United Nations Secretariat in charge of DRR and emergency management (UN ISDR, OCHA, DFS, DPKO, UNHCR, WFP, WHO, FAO, etc.).

In this context, the UN-GGIM could not only serve as a technical advisory group for the implementation of the overall framework but also as an interface between the above mentioned institutions and key Governmental Agencies involved in the provision of geospatial information and geospatial information services.



In view of the above, it is recommended for the UN-GGIM Committee to:

- Consider including the improvement of geospatial information and geospatial information services to support emergency response as a formal agenda item;
- Establish a working group with the objective to:
 - ensure for emergency response, and therefore indirectly Disaster Risk Reduction, to be seen as a priority focus across UN-GGIM activities and for the recommendations, actions, guidelines and standards coming out of its work to address and support the needs of the humanitarian and response community;
 - serve as the interface between the humanitarian and response community and the key governmental institutions involved in the provision of geospatial information and geospatial information services;
 - continue working, in close collaboration with the humanitarian and response community, at further developing the proposed strategic framework in order for it to include terms of reference and requirements as well as determine clear and complementary roles in delivering geospatial information and geospatial information services.
- Advocate for the humanitarian and response community to come together with the objective to look into the proposed framework as a way to improve geospatial information and geospatial information services to support emergency response.

These recommendations have therefore been presented to the UN-GGIM Member during the 5th session of the committee.

The outcomes of this presentation are reported in the next Chapter of this document.



5. Outcomes of the 5th Committee of the UN-GGIM

The 5th session of the UN-GGIM Committee took place in New York from 3 to 7 August 2015.

The following sections describe the two events which took place during that week in relation to the present work and the outcomes that came out of them.

5.1 Side event

In order to introduce the present project, including its recommendations, to UN-GGIM Committee Members and get their buy in before having them presented in plenary a side event has been organized on 3 August 2015.

Fifty-five participants from 23 member states and other organizations gathered during the side event organized around the theme of the project.

The event started with the presentation of the fact finding analysis and preliminary framework to the participants. This presentation can be downloaded from [here](#).

This introduction has then been followed by presentations given by Mr. Hiroshi Murakami, Director General of the Planning Department at the Geospatial Information Authority of Japan (GSI) (slides accessible from [here](#)) and Mr. Efren P. Carandang, Deputy Administrator of the National Mapping and Resource Information Authority of the Philippines (NAMRIA) (slides accessible from [here](#)). These presentations reported on the lessons learned from recent events, respectively the great East Japan earthquake and tsunami in 2011 and typhoon Yoland/Haiyan, when it comes to the availability and use of geospatial information and services before presenting their views on the preliminary framework.

The two other presentations, given by Mr. Keran Wang, Chief of the Space Applications Section at UN-ESCAP (slides accessible from [here](#)) and Mr. Lorant Czarán, Programme Officer at UN-OOSA/UN-SPIDER (slide accessible from [here](#)) did themselves address the question of capacity building on Disaster Risk Reduction (DRR) and on space technology for developing countries in general and ASEAN countries in particular.

These presentations were then followed by interventions and questions from the participants. This discussion did not only highlight the importance of the topic being addressed by the project but also the role that UN-GGIM could play in this regards.

Among other things, this discussion also highlighted the need to:

- get all the lead players to agree on their respective roles and mandate regarding geospatial information and services during disasters;
- conduct drills (or exercises) involving all the players prior to disasters;



- Look at the bigger picture to ensure UN-GGIM does assist existing processes

5.2 Plenary session

On 7 August 2015, a summary of the fact finding analysis together with the preliminary strategic framework, outcomes from the side event and the recommendations were presented during the plenary under the "Coordination of United Nations activities related to geospatial information management" item in the agenda.

This presentation, accessible from [here](#), also highlighted the fact that other references to disaster management have been made during the week, emphasizing therefore the federating role that this topic is playing and the fact that it goes across sectors as well as talk to decision makers.

The important role that UN-GGIM Committee could play in this regards has then been highlighted by mentioning that the working group would be well placed to contribute to several of the core strategies reported in the preliminary strategic framework starting with:

- Raising the awareness of Member States on the importance of data preparedness, National Spatial Data Infrastructure (NSDI) and open data policies;
- Developing and promoting common standards, protocols and processes aiming at improving data quality and data interoperability at the global level;
- Developing and implementing policies aiming at improving the availability, quality and accessibility of geospatial information and services.

The presentation ended with the list of recommendations resulting from the study kindly asking for the UN-GGIM Committee members to endorse them.

During the discussion that followed, Member States welcomed the initiative of the Secretariat to commission the study and recognized it as being a very concrete example of practical UN cooperation in a highly relevant field.

The recommendations to establish a working group on geospatial information and services for disasters aiming at finalizing and implementing the preliminary framework has therefore been accepted with the strong support and following guidance from 32 Member States when it comes to this working group:

- That it be focused in a practical manner;
- Aligned with the outcome and follow-up to the Sendai Framework for disaster risk reduction and its implementation;
- Take into consideration the special needs of developing countries, especially with respect to capacity building and sharing knowledge; and
- Be broadly representative of different regions of the world and taking into account regional experiences;

Finally, Member States were invited to express their interest in being part of this working group.



References

- [1] UN ISDR (2015): Global Assessment Report on Disaster Risk Reduction 2015; Making Development Sustainable: The Future of Disaster Risk Management: http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf [Accessed July 15, 2015]
- [2] United Nations (2015): Sendai Framework for Disaster Risk Reduction 2015-2030: http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf [Accessed July 15, 2015]
- [3] Oxford Dictionaries web site. <http://www.oxforddictionaries.com/> [Accessed July 15, 2015]
- [4] EM-DAT database: <http://emdat.be/> [Accessed July 20, 2015]
- [5] Folger P. (2011): Geospatial Information and Geographic information Systems (GIS) An overview for Congress: https://www.fgdc.gov/library/whitepapers-reports/CRS_Reports/GIS-Overview-for-Congress-05182011.pdf [Accessed July 20, 2015]



Annex 1 - Questionnaire for the survey among people involved in recent major events

1. Respondent Profile

Please complete: (phone number is not mandatory)

- Full name: _____
- Email address: _____
- Phone number with country code: _____

2. Event(s) covered

Please fill the information for the event(s)/crisis you have been involved in:

Event/Crisis	Function occupied	Organization	Station during the event		Dates worked in the response	
			Country	Town	Start date (month)	End date (month)
Typhoon Yolanda/Haiyan (Philippines)						
Ebola outbreak (west Africa)						
Iraq						
Other event that took place after 2010						

3. Main challenges

Please check the main challenges you have encountered when dealing with geospatial information during the response to the above mentioned event/crisis, more specifically when it comes to:

3.1 Access to geospatial information (obtaining/collecting geospatial information)

- No baseline data available (e.g. admin boundaries, populated places, transport, hydrology, medical clinics)
- No data available about the event (e.g. storm surge, typhoon path, Ebola cases, affected persons locations, etc)
- Data sources were unknown (did not know who to ask for/where to find the data)
- Available data were not authoritative (not validated by the government)
- Conflicting/contradicting datasets (several datasets presenting a different information)
- Data placed on many different platforms and location to access was unknown
- Data access restrictions
- Lack of data collection standards agreed upon all stakeholder
- The data used in a map/information product was not identified/sourced in the map and it was therefore not possible to find the dataset
- Not involved in data collection



- Other (please specify): _____

3.2 Using geospatial data to generate data/information products

- Data was of poor quality and a great deal of work was required to clean/ correct it before it could be used
- Was not in a helpful format (e.g. PDF, broken URL, password protected website, table in word document)
- Metadata was not included making the data less reliable
- There were many datasets released making a decision about what dataset to use difficult
- Data was not timely
- Data use restrictions
- Data was not being shared making the products incomplete
- The data used in a map/information product was not identified/sourced in the map and it was therefore not possible to find the dataset
- Not involved in the generation of data/information products
- Other (please specify): _____

3.3 Using geospatial information products for decision making

- There were many duplicate products released making the information overwhelming
- There were many duplicate products released with conflicting information making the decision about what product to use difficult
- Did not know where to find information products
- There was no data sources on the information products making them less reliable
- The data flow (source, methodology for collection/processing/by whom) was unknown making the data less reliable
- Not involved in decision making
- Other (please specify): _____

3.4 Sharing geospatial information products

- There were numerous locations to post information products and no one location to find it all
- There were so many RSS and other feeds sharing products my email inbox was overwhelmed
- The geospatial information product was not allowed to be shared
- Not involved in product sharing
- Other (please specify) : _____

4. Bottlenecks and Successes

4.1 What are, according to you, the major bottleneck (up to 5) towards a more effective use of geospatial information to support response to crisis:

1. _____
2. _____
3. _____
4. _____
5. _____

4.2 What are, according to you, the major successes (up to 5) towards a more effective use of geospatial information to support response to crisis:



1. _____
2. _____
3. _____
4. _____
5. _____

5. Key actions

5.1 Please list the keys actions (up to 5) that would, according to you, improve the availability, quality, accessibility and use of geospatial information and geospatial data/information products during the response to major crisis:

1. _____
2. _____
3. _____
4. _____
5. _____

6. Further thoughts

6.1 Please share with us any further thoughts you could have either on the project itself and/or the topic it is looking at addressing.

7. Snow Ball

7.1 Please provide the full name and email address of up to 3 people (at least one) who you think should also reply the above questions (We will share the questionnaire with them):

- | | |
|---------------------|----------------------|
| 1. Full Name: _____ | Email address: _____ |
| 2. Full Name: _____ | Email address: _____ |
| 3. Full Name: _____ | Email address: _____ |

Thank you for taking the time to complete this survey. Your thoughts are appreciated and will be used to help improve geospatial information and services to support emergency responses.



Annex 2 - Profile of the respondents to the first survey

Focus crisis	Nbr (%) of respondents involved	Station during the crisis		
		On site	Remote	Not specified
Typhoon Yolanda/Haiyan	103 (47.2)	70	33	
Ebola outbreak	98 (45)	33	63	2
Iraq	31 (14.2)	15	14	2
Other Crisis (country)				
Philippines (other crisis)	18 (8.3)	18		
Syria	14 (6.4)	3	11	
Nepal	13 (6)		13	
Pakistan	13 (6)	11	2	
Haiti	8 (3.7)	3	5	
South Sudan	8 (3.7)	6	2	
Central African Republic	5 (2.3)	3	2	
United States of America	5 (2.3)	5		
Mali	4 (1.8)	2	2	
Not specified	4 (1.8)			4
Vanuatu	4 (1.8)	1	3	
Japan	3 (1.4)		3	
Libya	3 (1.4)	1	2	
Niger	3 (1.4)	2	1	
Nigeria	3 (1.4)	1	2	
Colombia	2 (0.9)	2		
Lebanon	2 (0.9)	2		
Myanmar	2 (0.9)	2		
Occupied Palestinian territories	2 (0.9)	2		
Somalia	2 (0.9)		2	
Ukraine	2 (0.9)	1	1	
Afghanistan	1 (0.5)	1		
Bolivia	1 (0.5)	1		
Bosnia and Herzegovina	1 (0.5)	1		
Brazil	1 (0.5)		1	
Cambodia	1 (0.5)		1	
Cameroun	1 (0.5)		1	
Chile	1 (0.5)		1	
Democratic Republic of Congo	1 (0.5)	1		
Indonesia	1 (0.5)	1		
Ivory coast	1 (0.5)		1	
Kenya	1 (0.5)	1		
Libia	1 (0.5)		1	
Mexico	1 (0.5)		1	
New Zealand	1 (0.5)	1		
Russia	1 (0.5)		1	
Senegal	1 (0.5)	1		
Sudan	1 (0.5)	1		
Turkey	1 (0.5)	1		
Yemen	1 (0.5)		1	
Total	371	193	170	8

Table A2.1 - Crisis covered by the respondents and their station during the event



Organization	Crisis				Total	%
	Yolanda	Ebola	Iraq	Other		
United Nations	45	57	21	59	182	83.5%
Other NGO	39	16	5	24	84	38.5%
Governmental agency	4	13	1	7	25	11.5%
Unspecified/Unclear	4	4	2	10	20	9.2%
Donor agency	6	4	1	4	15	6.9%
University	4	3	1	1	9	4.1%
Private company	1	1		1	3	1.4%
Total	103	98	31	106	338	

Table A2.2 - Organization for which the respondent was working during the events

Function	Crisis				Total	%
	Yolanda	Ebola	Iraq	Other		
Information Management Officer	33	18	17	41	109	50.0%
GIS Officer/Analyst	22	47	6	32	107	49.1%
Coordinator/Manager	27	21	5	15	68	31.2%
Unspecified/Unclear/Other	9	5	1	13	28	12.8%
Programme Officer	9	2	1	2	14	6.4%
Researcher	3	2	1	2	8	3.7%
Epidemiologist		2			2	0.9%
Medical Officer		1			1	0.5%
Monitoring and Evaluation Officer				1	1	0.5%
Total	103	98	31	106	338	

Table A2.3 - Function occupied by the respondents during the events



Annex 3 - Results of the first survey - Main challenges

Challenge/issue	Nbr of mention	% of all respondents
Data availability		
<i>No baseline data available (e.g. admin boundaries, populated places, transport, hydrology, medical clinics, etc)</i>	90	41.3%
<i>No data available about the event (e.g. storm surge, typhoon path, Ebola cases, affected persons locations, etc)</i>	66	30.3%
Data accessibility		
<i>Data placed on many different platforms and location to access was unknown</i>	111	50.9%
<i>Data access not timely</i>	102	46.8%
<i>Unwillingness to share data</i>	99	45.4%
<i>Data access restrictions (including Lack of pre-established agreement/licensing/channels and restrictive data licensing)</i>	99	45.4%
<i>Data sources were unknown (did not know who to ask for/where to find the data)</i>	87	39.9%
<i>The data used in a map/information product was not identified/sourced in the map and it was therefore not possible to find the dataset (access)</i>	74	33.9%
<i>Data sensitivities</i>	3	1.4%
Coordination issues		
<i>Lack of data collection standards agreed upon all stakeholders</i>	141	64.7%
<i>Other coordination issues</i>	2	0.9%
Total	874	

Table A3.1 - When obtaining/collecting geospatial information

Challenge/issue	Nbr of mention	% of all respondents
Conflicting/contradicting datasets (several datasets presenting a different information)	138	63.3%
Was not in a helpful format (e.g. PDF, table in word document,...)	107	49.1%
The data flow (source, methodology for collection/processing/by whom) was unknown making the data less reliable	105	48.2%
There were many datasets released making a decision about what dataset to use difficult	86	39.4%
Data use restriction	80	36.7%
Lack of technical capacity	6	2.8%
Data quality		
<i>Not documented (Metadata)</i>	120	55.0%
<i>Data was of poor quality and a great deal of work was required to clean/ correct it before it could be used</i>	110	50.5%
<i>Not authoritative (not validated by the government)</i>	109	50.0%
<i>Out-of-date</i>	8	3.7%
<i>Incomplete (including lack of code)</i>	5	2.3%
<i>Inaccurate</i>	2	0.9%
Total	876	

Table A3.2 - When using geospatial information



Challenge/issue	Nbr of mention	% of all
There were many duplicate products released making the information overwhelming	98	45.0%
There were many duplicate products released with conflicting information making the decision about what product to use difficult	82	37.6%
There was no data sources on the information products making them less reliable	54	24.8%
Did not know where to find information products	42	19.3%
Products difficult to use (different templates, purpose, quality...)	8	3.7%
No specific challenges encountered	4	1.8%
Total	288	

Table A3.3 - When using geospatial information based products for decision making

Challenge/issue	Nbr of mention	% of all respondents
There were numerous locations to post information products and no one location to find it all	125	57.3%
The geospatial information product was not allowed to be shared (including data sharing restrictions and sensitivities)	65	29.8%
There were so many RSS (Rich Site Summary) and other feeds sharing products my email inbox was overwhelmed	38	17.4%
No specific challenges encountered	5	2.3%
Technical capacity gap	3	1.4%
Internet access	1	0.5%
Total	237	

Table A3.4 - When sharing geospatial information based products



Annex 4 - Results of the first survey - Major success factors and bottlenecks towards a more effective use of geospatial information to support response to crisis

	Success factor	Nbr	%		
Data	Data preparedness	12	146	2.2%	27.0%
	Availability	33		6.1%	
	Accessibility (policies, licensing,...)	57		10.6%	
	Data timeliness	13		2.4%	
	Quality (complete, up-to-date, validated)	31		5.7%	
Infrastructure	Common data repository	44	115	8.1%	21.3%
	Common product repository	5		0.9%	
	Common communication platform	5		0.9%	
	Internet access	5		0.9%	
	Use of technology (online or not)	47		8.7%	
	Open source	5		0.9%	
	Customized tools	4		0.7%	
Advocacy and resources	Raise awareness	32	96	5.9%	17.8%
	Existence/presence of well trained technical staff	23		4.3%	
	Capacity building/ training	21		3.9%	
	Crowd sourcing/volunteers	17		3.1%	
	Funding	3		0.6%	
Collaboration, coordination and communication	Established coordination, collaboration and leadership	67	82	12.4%	15.2%
	Networking/communication	15		2.8%	
Products	Meaningful and useful products delivered to the right audience	60	69	11.1%	12.8%
	Strong analytical approach	9		1.7%	
Standards, protocols and processes	Data compatibility (p-codes,...)	18	32	3.3%	5.9%
	Data collection (GPS, forms,...)	3		0.6%	
	System interoperability (OGC,...)	11		2.0%	

Total 540

Table A4.1 - Major success factors



	Bottleneck	Nbr		%		
Data	Accessibility/sharing (policies, licensing, sensitivities)	106	353	15.9%	52.9%	
	Availability	59		8.8%		
	Data timeliness	21		3.1%		
	Conflicts between sources	20		3.0%		
	Data quality	Authoritative/reliable		53		7.9%
		Documented (metadata)		36		5.4%
		Out-of-date		25		3.7%
		Inaccurate		20		3.0%
Incomplete		13	1.9%			
Collaboration, coordination and communication	Lack of coordination	64	82	9.6%	12.3%	
	Lack of collaboration	16		2.4%		
	Lack of communication	2		0.3%		
Advocacy and resources	Technical capacity (staff gap, rotation, training)	51	80	7.6%	12.0%	
	Lack of awareness (including disconnect between technicians and managers)	22		3.3%		
	Financial resources (gap, inefficient use,...)	7		1.0%		
Standards, protocols and processes	Lack of common standards, protocols and practices	72	72	10.8%	10.8%	
Infrastructure	Lack of common data repository	36	65	5.4%	9.7%	
	Hardware/software issues (gap, interoperability,...)	21		3.1%		
	Limited internet access	8		1.2%		
Products	Product quality	5	15	0.7%	2.2%	
	Duplication and/or conflictual products	6		0.9%		
	Unclear product purpose	4		0.6%		

Total 667

Table A4.2 - Major bottlenecks



Annex 5 - Results of the first survey - Proposed key actions

	Proposed actions	Nbr		%	
Data	Improve data accessibility/timeliness (open data policy, data sharing agreements,...)	85	178	13.8%	28.8%
	Improve data quality (validation, completeness, update,...)	24		3.9%	
	Agree on a standardized and authoritative dataset	23		3.7%	
	Improve data documentation (metadata)	22		3.6%	
	Improve data availability	18		2.9%	
	Invest on data preparedness	6		1.0%	
Infrastructure	Establish a common or connect existing metadata catalogue and data repositories	76	126	12.3%	20.4%
	Establish a common product catalogue	6		1.0%	
	Improve access and use of technology (GIS software, internet)	13		2.1%	
	Improve existing/develop new apps/tools	31		5.0%	
Collaboration, coordination and communication	Improve coordination, collaboration, communication, leadership among all players involved (UN, Government, NGOs,...)	104	122	16.8%	19.7%
	Get feedback from decision makers on their need and use of products	9		1.5%	
	Develop necessary policies	9		1.5%	
Advocacy and resources	Build capacities/train (in countries, NGO, UN,...)	51	106	8.3%	17.2%
	Raise awareness	20		3.2%	
	Dedicate a person/team to manage data for use by everybody during the response	15		2.4%	
	Increase funding for equipment and staff	11		1.8%	
	Support crowd sourcing/volunteer community	9		1.5%	
Standards, protocols and processes	Improve and harmonize data related needs, processes and practices (SOP, guidelines, protocols, flows,...)	50	86	8.1%	13.9%
	Agree on data compatibility and system interoperability standards (metadata profile, HXL,...) and have them implemented	36		5.8%	

Total 618



Annex 6 - Questionnaire sent to Governmental Agencies

1. Respondent Profile

Please provide the following information about the focal point in your agency:

- Name of the Agency: _____
- Department/unit in which the focal point is working: _____
- Full name of the focal point: _____
- Country: _____
- Email address of the focal point: _____
- Phone number of the focal point (with country code): _____

2. Data custodianship

2.1 Does your institution have the custodianship on specific geospatial data?

If yes, Please complete the different columns for the geospatial data on which your agency have custodianship (Please leave unused rows blank).

	Does your institution have a legal mandate for the generation and custody of this data?	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	If downloadable, in which format?	Are there any access restriction put on this data?	Are there any use restriction put on this data?	Is there a metadata attached to this data?	If there is a metadata, which metadata standard is being used?
Administrative boundaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Road network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrographic network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital Elevation Model (DEM)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Satellite images	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other data 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other data 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other data 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you selected "Other data", please specify here the data type

- Other data 1: _____
- Other data 2: _____
- Other data 3: _____

3. Existence of Geospatial Information Services



3.1 Does your agency have a GIS Unit/Team/Data center?

If yes:

- When has this Unit/Team/Center been established (year)?: _____
- How many staff are composing this Unit/Team/Center today?: _____
- What equipment is at disposal to the Unit/Team/Center and operational today (please provide detail)

	Available	Number of units
Computer	<input type="text"/>	<input type="text"/>
Server	<input type="text"/>	<input type="text"/>
GIS software	<input type="text"/>	<input type="text"/>
A3 Black&White Printer	<input type="text"/>	<input type="text"/>
A3 Color Printer	<input type="text"/>	<input type="text"/>
Plotter (A2 and above)	<input type="text"/>	<input type="text"/>
Scanner	<input type="text"/>	<input type="text"/>
Other equipment 1 (to be specified in the next question)	<input type="text"/>	<input type="text"/>
Other equipment 2 (to be specified in the next question)	<input type="text"/>	<input type="text"/>
Other equipment 3 (to be specified in the next question)	<input type="text"/>	<input type="text"/>

If you selected "Other equipment," please specify here what type of equipment (with the indication of the corresponding number of units in between brackets):

- Other equipment 1: _____
- Other equipment 2: _____
- Other equipment 3: _____

If no:

- Why does your agency not have a GIS Unit/Team/Data center?
 - Not enough request to justify such a structure
 - Lack of financial resources
 - Other (please specify): _____

4. Existence of a platform for the sharing of geospatial data

4.1 Does your unit maintain a platform for the sharing of geospatial information (geoportal, metadata catalogue,...)?

If yes, please provide the following additional details regarding the platform in question:

- Since when (Month/Year) is this platform live? (MM/YYYY)?: _____
- Please provide us with the URL to this platform: _____
- Is the platform based on Open Geospatial Consortium (OGC) international standards?: _____

If no:

- why does your agency not have such a platform?
 - No demand for such a platform
 - Lack of financial resources



- No access to a server
- Other (Please specify): _____
- How do you then share your geospatial data with other agencies?
 - We don't share geospatial data
 - Flash drive/DVD/CD
 - Through ftp/dropbox
 - Other (please specify) : _____

5. Technical support received

5.1 Did your agency receive any technical support (in cash or in kind) from the international community (donors, NGOs, private sector, Volunteers, ...) over the past 5 years in relation to geospatial information and/or geospatial information services?

If yes, Please provide details regarding the latest support received by your agency (Please leave unused rows blank)

	Which type of institution provided this support?:	Nature of the support provided	Year when the service has been provided	Did the support answer your agency needs?
Support 1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Support 2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Support 3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

5.2 Which other support would your agency need to receive in order to be in the position to deliver adequate geospatial information and geospatial information services?:

	Type of support needed	Have you submitted a proposal to any institution/donor to receive such support?	If already submitted, to which type of institution?
Support 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
Support 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
Support 3	<input type="text"/>	<input type="text"/>	<input type="text"/>

6. Geospatial information and information services to support emergency response

6.1 Is there any law, rules or regulations in your country that requires for your institution to provide geospatial information and/or geospatial information service in support to the response to an emergency?

If yes, Please provide us the complete title for the laws, rules or regulations in question (please provide the reference number and year in between brackets):

- 1st document: _____
- 2nd document: _____
- 3rd document: _____
- 4th document: _____
- 5th document: _____

6.2 Does any of these document cover the provision of geospatial information and services to the international community for disaster risk reduction and/or emergency management? Please check the corresponding box if this is the case



- 1st document
- 2nd document
- 3rd document
- 4th document
- 5th document

7. Involvement in recent disaster/emergency events

7.1 Has your agency been involved (provision of geospatial data and/or specific services) in the response to a disaster/emergency over the past 10 years?

If yes:

- What is the name of the most recent disaster/emergency event in which your agency has been involved?: _____
- Please precise the starting year for this event (YYYY): _____

7.2 Did your agency generate data and/or information products to support the response to this event?

If yes:

- Which types of products were generated by your agency during the event (online maps, printed maps,...)?
 - Product 1: _____
 - Product 2: _____
 - Product 3: _____
 - Product 4: _____
 - Additional products: _____
- For which agency(ies) were these products generated?
 - For agency 1: _____
 - For agency 2: _____
 - For agency 3: _____
 - For agency 4: _____
 - Additional agencies: _____
- Were these products accessible from the internet?
 - Yes
 - No
 - Only partially

7.3 Did your agency use some of the geospatial information products generated by the international community (NGOs, Private sector, Volunteers,...) during this response?

If yes:

- which agency produced the products you used?
 - Agency 1: _____
 - Agency 2: _____
 - Agency 3: _____
 - Additional agencies: _____
- Which products did you use (printed map, online map, GIS data,...)
 - From agency 1: _____
 - From agency 2: _____
 - From agency 3: _____



- From agency 4: _____
- From other agencies: _____

If no, why?

- Not aware of the existence of these products
- Products not appropriate to our needs
- Other (please specify)

7.4 Did your agency receive requests from the international community during that event ?

If yes,

7.4.1 Did the request(s) concern geospatial information? (Answer No to this question if the request was for geospatial information services)

If yes, Please provide more information on the requested geospatial information (Please leave unused rows blank)

	Type of organization which initiated the request	Was the request granted	Was any restriction attached this information (use, redistribution, acknowledgement,...)?	Did the institution who received the information respected the restriction if any?	Do you think that the use of your data has been appropriately acknowledged in the products?
1st request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2nd request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3rd request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4th request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5th request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

7.4.2 Did the request(s) concern geospatial information services?

If yes, Please provide more information on the requested geospatial information services (Please leave unused rows blank)

	Type of organization which initiated the request	What was the nature of the request?	Was the request granted	Did the institution pay for the service?
1st request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2nd request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3rd request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4th request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5th request	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

8. Leverage of the existing geospatial information and geospatial information services

8.1 Do you think that the international community involved in the response leveraged enough your existing geospatial information and/or technical capacities?

If no, how do you think that the international community could have better benefited from your geospatial data and/or technical capacities?: _____



8.2 Did the international community provide you with the geospatial data that they have collected during the response?

If yes, did you integrate this geospatial data back into your own database?

8.3 After this event, do you think the country is now better prepared to use geospatial information and geospatial information services in times of crisis?

If yes, why?: _____

If no:

- Why?: _____
- What should take place in order to change this?: _____

Thank you for taking the time to complete this survey. Your thoughts are appreciated and will be used to help improve geospatial information and services to support emergency responses.



Annex 7 - Governmental Agencies having filled the questionnaire

Continent	Country (click on the hyperlink to get access to the complete answer)	Agency Name	Agency type	Have custodianship on data	Have a GIS Unit/Team / Data center	Year the unit/team/ data center was established	Number of staff composing this unit/team/center	Online platform for data sharing (starting date and URL if yes)	Number of technical support (in cash or in kind) received over the past 5 years	Provision of geospatial data and/or specific services during the response to a recent disaster/emergency (past 10 years)
Africa	Botswana	Ministry of Lands and Housing, Surveys and Mapping	National Mapping Agency	Yes	Yes	2000	more than 12	Yes (2012, unspecified)	0	Yes
Africa	Ethiopia	Ethiopian Mapping Agency	National Mapping Agency	Yes	Yes	2000	10	No	2	No
Africa	Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	National Mapping Agency	Yes	Yes	Unspecified	Unspecified	No	3	Yes
Africa	Madagascar	National Geographic and Hydrographic Institute	National Mapping Agency	Yes	Yes	1995	more than 12	No	2	Yes
Africa	Malawi	Department of Surveys	National Mapping Agency	Yes	Yes	2003	5	Yes (2012, www.masdap.mw)	1	Yes
Africa	Mozambique	National Remote Sensing and Cartography Center	National Mapping Agency	Yes	Yes	2004	5	No	0	No
Americas	Antigua and Barbuda	National Office of Disaster Services (NODS)	Disaster Management Organization	No	Yes	2009	1	No	1	Yes
Americas	Bahamas	Bahamas National GIS Centre	Other	No	Yes	2006	6	No	0	Yes
Americas	Barbados	Lands and Surveys Department	National Mapping Agency	Yes	Yes	1989	5	No	0	No
Americas	Costa Rica	Instituto Geográfico Nacional (IGNCR)	National Mapping Agency	Yes	Yes	2012	6	Yes (2014, www.snitcr.go.cr)	0	Yes
Americas	Cuba	Oficina Nacional de Estadística e Información	Other	No	Yes	2005	3	No	0	Yes
Americas	Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	National Mapping Agency	Yes	Yes	1995	more than 12	Yes (2010, www.nla.gov.jm/map.asp)	2	Yes
Americas	Saint Kitts and Nevis	Ministry of Sustainable Devevelopment, Lands and Surveys	National Mapping Agency	Yes	Yes	Unspecified	2	No	0	Yes
Americas	Saint Vincent and the Grenadines	Ministry of Housing, Lands and Surveys Department	National Mapping Agency	Yes	No	NA	NA	No	0	No
Asia	Bangladesh	Survey of Bangladesh	National Mapping Agency	Yes	Yes	2010	more than 12	No	2	No
Asia	Bhutan	Ministry of Home and Cultural Affairs, Department of Disaster	Disaster Management	No	Yes	2014	3	No	2	No



		Management	Organization							
Asia	Iraq	State Commission on Survey	National Mapping Agency	Yes	Yes	2003	more than 12	No	0	Yes
Asia	Philippines	National Mapping and Resource Information Authority (NAMRIA)	National Mapping Agency	Yes	Yes	1987	more than 12	Yes (2011, geoportal.gov.ph)	0	Yes
Asia	Sri Lanka	Survey Department	National Mapping Agency	Yes	Yes	1999	more than 12	No	1	Yes
Europe	Bosnia and Herzegovina	Federal Administration for Geodetic and Real Property Affairs	National Mapping Agency	Yes	Yes	2009	6	Yes (2013, www.katastar.ba)	3	Yes
Europe	Greece	General Secretariat for Civil Protection	Disaster Management Organization	No	Yes	2005	2	No	0	Yes
Europe	Hungary	Institute of Geodesy Cartography and Remote Sensing	National Mapping Agency	Yes	Yes	2010	more than 12	Yes (2010, www.geoshop.hu)	0	Yes
Europe	Latvia	Latvian Geospatial Information Agency	National Mapping Agency	Yes	Yes	2006	more than 12	Yes (2010, http://kartes.lgja.gov.lv)	0	No
Europe	Republic of Moldova	Agency for Land Relations and Cadastre	National Mapping Agency	Yes	Yes	1996	1	Yes (2007, www.geoportal.md/)	0	Yes
Europe	Romania	National Agency for Cadastre and Land Registration	National Mapping Agency	Yes	Yes	2004	more than 12	Yes (2011, www.geoportal.gov.ro)	2	Yes



Annex 8 - Results of the survey with Governmental Agencies - Last update (including coverage), accessibility from the internet and access/use restriction

Administrative boundaries

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Barbados	Lands and Surveys Department	Before 2000	Complete (National)	No	No	No
Bosnia and Herzegovina	Federal Administration for Geodetic and Real Property Affairs	2015	Complete (National)	Yes	Yes	Yes
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2012	Complete (National)	Yes	No	No
Costa Rica	Instituto Geográfico Nacional (IGNCR)	2015	Complete (National)	No	No	No
Ethiopia	Ethiopian Mapping Agency	2010	Complete (National)	No	No	No
Greece	General Secretariat for Civil Protection	2014	Complete (National)	Yes	No	No
Hungary	Institute of Geodesy Cartography and Remote Sensing	2014	Complete (National)	Yes	No	Yes
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2007	Complete (National)	Yes	No	No
Madagascar	National Geographic and Hydrographic Institute	2006	Complete (National)	No	No	No
Malawi	Department of Surveys	Before 2000	Complete (National)	Yes	No	No
Mozambique	National Remote Sensing and Cartography Center	2013	Complete (National)	No	Yes	Yes
Republic of Moldova	Agency for Land Relations and Cadastre	Before 2000	Complete (National)	Yes	No	No
Romania	National Agency for Cadastre and Land Registration	2015	Partial	Yes	No	No
Saint Kitts and Nevis	Ministry of Sustainable Devevelopment,Lands and Surveys	2001	Partial	No	Yes	Yes
Saint Vincent and the Grenadines	Ministry of Housing,Lands and Surveys Department	2007	Complete (National)	No	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes

Health facilities

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2013	Complete (National)	No	No	No
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2012	Complete (National)	Yes	No	No
Jamaica	Ministry of Water, Land, Environment & Climate Change,National Spatial Data Management Division	2014	Partial	No	No	No
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2010	Complete (National)	Yes	No	No
Malawi	Department of Surveys	2008	Complete (National)	Yes	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes

Schools

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2011	Complete (National)	No	No	No
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2014	Complete (National)	Yes	No	No
Jamaica	Ministry of Water, Land, Environment & Climate Change,National Spatial Data Management Division	2011	Partial	No	No	No
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2011	Complete (National)	No		
Malawi	Department of Surveys	2013	Complete (National)	Yes	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes



Road network

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2014	Complete (National)	No	No	No
Bangladesh	Survey of Bangladesh	2015	Partial	No	Yes	Yes
Barbados	Lands and Surveys Department	2006	Complete (National)	No	No	No
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2015	Complete (National)	Yes	No	No
Ethiopia	Ethiopian Mapping Agency	2010	Partial	No	No	No
Iraq	State Commission on Survey	2010	Partial	No	No	No
Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	2015	Complete (National)	No	Yes	Yes
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2006	Partial	Unspecified	Unspecified	Unspecified
Madagascar	National Geographic and Hydrographic Institute	2008	Complete (National)	No	No	No
Malawi	Department of Surveys	2008	Complete (National)	Yes	No	No
Mozambique	National Remote Sensing and Cartography Center	2010	Partial	No	No	No
Republic of Moldova	Agency for Land Relations and Cadastre	2012	Complete (National)	Yes	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes

Hydrographic network

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2008	Complete (National)	No	Yes	No
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2010	Complete (National)	Yes	No	No
Costa Rica	Instituto Geográfico Nacional (IGNCR)	2009	Complete (National)	No	No	No
Ethiopia	Ethiopian Mapping Agency	2010	Unspecified	No	No	No
Iraq	State Commission on Survey	2014	Complete (National)	No	Yes	Yes
Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	2015	Complete (National)	Yes	Yes	Yes
Latvia	Latvian Geospatial Information Agency	2014	Partial	No	Yes	No
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2006	Unspecified			
Madagascar	National Geographic and Hydrographic Institute	Before 2000	Complete (National)	No	No	No
Malawi	Department of Surveys	Before 2000	Complete (National)	Yes	No	No
Mozambique	National Remote Sensing and Cartography Center	2013	Complete (National)	No	No	No
Philippines	National Mapping and Resource Information Authority (NAMRIA)	2013	Partial	Yes	Yes	No
Republic of Moldova	Agency for Land Relations and Cadastre	2012	Complete (National)	Yes	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes

Satellite images

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2000	Complete (National)	No	No	No
Bangladesh	Survey of Bangladesh	2011	Partial	No	Yes	Yes
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2015	Partial	No	Yes	No
Ethiopia	Ethiopian Mapping Agency	2005	Unspecified	No	Yes	No
Iraq	State Commission on Survey	2010	Complete (National)	No	Yes	Yes
Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	2001	Complete (National)	Yes	Yes	Yes
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	2014	Partial	No	Unspecified	Unspecified
Madagascar	National Geographic and Hydrographic Institute	2013	Complete (National)	No	No	No
Malawi	Department of Surveys	2013	Partial	No	Unspecified	Unspecified
Mozambique	National Remote Sensing and Cartography Center	2014	Partial	No	No	No
Philippines	National Mapping and Resource Information Authority (NAMRIA)	2013	Complete (National)	No	Yes	Yes
Republic of Moldova	Agency for Land Relations and Cadastre	Before 2000	Partial	Yes	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes



Digital Elevation Model (DEM)

Country	Agency	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Antigua and Barbuda	National Office of Disaster Services (NODS)	2000	Complete (National)	No	Yes	No
Bangladesh	Survey of Bangladesh	2015	Partial	No	Yes	Yes
Barbados	Lands and Surveys Department	2006	Complete (National)	No	No	No
Bosnia and Herzegovina	Federal Administration for Geodetic and Real Property Affairs	2013	Complete (National)	Yes	Yes	Yes
Botswana	Ministry of Lands and Housing, Surveys and Mapping	2010	Complete (National)	Yes	No	No
Costa Rica	Instituto Geográfico Nacional (IGNCR)	2009	Complete (National)	No	No	No
Ethiopia	Ethiopian Mapping Agency	2010	Partial	No	Yes	No
Hungary	Institute of Geodesy Cartography and Remote Sensing	2014	Complete (National)	Yes	No	No
Iraq	State Commission on Survey	Before 2000	Partial	Yes	Yes	Yes
Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	2001	Partial	Yes	Yes	Yes
Latvia	Latvian Geospatial Information Agency	2014	Partial	Yes	Yes	No
Madagascar	National Geographic and Hydrographic Institute	Before 2000	Complete (National)	No	No	No
Malawi	Department of Surveys	Before 2000	Complete (National)	Yes	Yes	No
Philippines	National Mapping and Resource Information Authority (NAMRIA)	2014	Complete (National)	No	Yes	No
Republic of Moldova	Agency for Land Relations and Cadastre	2009	Complete (National)	Yes	No	No
Saint Kitts and Nevis	Ministry of Sustainable Devevelopment, Lands and Surveys	2001	Partial	No	Yes	Yes
Saint Vincent and the Grenadines	Ministry of Housing, Lands and Surveys Department	2007	Complete (National)	No	No	No
Sri Lanka	Survey Department	2014	Partial	No	No	Yes

Other layers mentioned by the agencies

Country	Agency	Other layer	When was the data updated for the last time (year)?	What was the coverage of this update?	Is the data accessible for download from the internet?	Are there any access restriction put on this data?	Are there any use restriction put on this data?
Bangladesh	Survey of Bangladesh	Aerial Photograph	2010	Partial	No	Yes	Yes
		Other topographical features	2015	Partial	No	Yes	Yes
Barbados	Lands and Surveys Department	Parcels	2015	Partial	No	Yes	Yes
Bhutan	Ministry of Home and Cultural Affairs, Department of Disaster Management	Risk Map	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
Bosnia and Herzegovina	Federal Administration for Geodetic and Real Property Affairs	Digital orthoimagery	2013	Complete (National)	Yes	Yes	Yes
		Cadastral data (parcel, buildings...)	2015	Partial	Yes	Yes	Yes
		Topographic data	2015	Complete (National)	No	Yes	Yes
Botswana	Ministry of Lands and Housing, Surveys and Mapping	Aerial photographs	2015	Partial	No	No	No
		OPM	2015	Partial	No	No	No
		Land use/cover data	2015	Partial	No	No	No
			2015	Partial	No	No	No
Costa Rica	Instituto Geográfico Nacional (IGNCR)	Basic maps	2009	Complete (National)	No	No	No
Ethiopia	Ethiopian Mapping Agency	Contour	Before 2000	Unspecified	No	Yes	No
		Geodetic control network	Before 2000	Unspecified	No	Yes	No
		Geographic Names	Before 2000	Unspecified	No	Yes	No
Greece	General Secretariat for Civil Protection	Fire risk map	2015	Complete (National)	Yes	No	No
		Areas in state of emergency	2015	Complete (National)	No	Unspecified	Unspecified
Hungary	Institute of Geodesy Cartography and Remote Sensing	Cadastral Maps	2015	Complete (National)	Yes	No	Yes
		Land Cover	2012	Complete (National)	Yes	No	No
		Orthophotos	2015	Complete (National)	Yes	No	Yes
			2015	Complete (National)	Yes	No	Yes
Jamaica	Ministry of Water, Land, Environment & Climate Change, National Spatial Data Management Division	cadastral	2014	Partial	No	Yes	Yes
Latvia	Latvian Geospatial Information Agency	Orthoimagery from aerial photos	2014	Partial	Yes	Yes	No
		Topographic maps in scale 1:2000, 1:10000, 1:50000 and 1:250000	2014	Partial	Yes	Yes	No
		State border line			No	Yes	No
Liberia	Liberia Institute of Statistics and Geo-Information Services (LISGIS)	Water Point	2013	Complete (National)	No	Unspecified	Unspecified
Madagascar	National Geographic and Hydrographic Institute	Levelling network	Before 2000	Complete (National)	No	No	No
		Geodetic network	Before 2000	Complete (National)	No	No	No
		Settlements	Before 2000	Partial	No	No	No
Malawi	Department of Surveys	Villages	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
		Water points	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
		Agriculture zones	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
Mozambique	National Remote Sensing and Cartography Center	Geodetic network	2014	Partial	No	Yes	Yes
		Land use and land cover	2013	Complete (National)	No	No	No
Philippines	National Mapping and Resource Information Authority (NAMRIA)	Topographic Maps (various scales)	2014	Partial	Yes	Yes	No
		Nautical Charts (various scales)	2013	Partial	Yes	Yes	No
Republic of Moldova	Agency for Land Relations and Cadastre	Orthophoto map	2009	Complete (National)	Yes	No	No
		Lidar scanning map	2009	Partial	Yes	No	No
Romania	National Agency for Cadastre and Land Registration	Cadastral Parcels	2015	Partial	No	Yes	Yes
Saint Kitts and Nevis	Ministry of Sustainable Devevelopment, Lands and Surveys	Topographic maps	2001	Partial	No	Yes	Yes
Saint Vincent and the Grenadines	Ministry of Housing, Lands and Surveys Department	Cadastral boundaries	2015	Partial	No	Yes	No
Sri Lanka	Survey Department	Land use coverage shown in topographic datasets	2014	Partial	No	No	Yes
		Place names shown in topographic datasets	2014	Partial	No	No	Yes
		Buildings shown in topographic datasets	2014	Partial	No	No	Yes



Annex 9 - Law, rules or regulations in the country that requires for them to provide geospatial information and/or geospatial information service in support to the response to an emergency

Country	Title of the first document	Title of the second document	Title of the third document
Antigua and Barbuda	Unspecified		
Bahamas	The Bahamas Spatial Data Infrastructure Act (2014)		
Bangladesh	The Survey act of Bangladesh (unspecified)		
Bosnia and Herzegovina	Law on Survey and Real Estate Cadastre ("Official Gazette of SR BiH", no. 22/84, 12/87, 26/90 and 36/90 and "Official Gazette of RBiH" no.4/93 and 13/94)	Law on Survey and Land Cadastre ("Official Gazette of SR BiH", 1978)	Regulation on spatial data infrastructure FEDERATION OF BOSNIA AND HERZEGOVINA (Službene novine Federacije BiH», broj 89/14)
Hungary	[XLVI. 2012] Act on Surveying and Mapping Activities	[CXXVIII. 2011] Act on Disaster Recovery	
Latvia	Geospatial Information Law (2009), Art. 30	Civil Protection Law (2006)	Rules of the Cabinet of Ministers No.423 "Structure of the civil protection plan for local municipality, enterprise and institution and procedure for development and approval of this plan" (2007)
Philippines	Republic Act 10121 (2010)	Joint Memo Circular 2014-01 (2014)	
Republic of Moldova	Law on Geodesy and Mapping Nr. 778-XV din 27.12.2001		
Romania	Government Ordinance on issuing of national spatial data infrastructure (no 4/2010)		
Sri Lanka	Decision taken by the cabinet of Ministers in year 2013 to establish infrastructure for the sharing of spatial data		



Annex 10 - Products generated by the Governmental Agencies with the indication of their beneficiaries

Country	Products that have been generated	Agency(ies) for which the products have been generated	Products placed on the internet
Antigua and Barbuda	Unspecified	Unspecified	Unspecified
Bahamas	Printed maps	Ministry of Work, National Emergency Management Agency	Only partially
Bosnia and Herzegovina	OGC (WMS, WFS, WCS) services for Administrative boundaries, orthoimagery, DEM and cadastral data	JRC (European Union); Federal Agency for Civil protection, UNDP, the Agency for Sava river basin, World Bank team, the Federal meteorology institute	Yes
Botswana	Maps, aerial images and OPMs	Disaster Management, Land Boards, Security agencies	Yes
Costa Rica	Printed maps, photographs	National Emergency Commission	No
Cuba	Sistema de partes y evaluación de desastres naturales	La Defensa Civil	No
Greece	Printed map of the affected area	Local and regional civil protection authorities, Generic Land Reclamation Organization of Serres, Serres Municipality/Section of Environment, Forestry Directorate of Serres	Only partially
Hungary	DEM, orthophotos, land administration data (cadastral maps + land records), satellite images, Land Parcel Identification System (LPIS)	Disaster Management Agency	Only partially
Iraq	Printed maps	Ministry of water resources	No
Jamaica	Web Application, shelter maps, incidence Maps	Office of Disaster Preparedness & Emergency Management, Planning Institute of Jamaica	Yes
Liberia	Printed Maps, statistics	UNMEER, MSF, UNICEF, UNDP and other agencies involved in the response	Only partially
Madagascar	Printed maps	Government	No
Malawi	Online and printed maps	Disaster Affairs department, UNICEF and other UN Agencies, Red Cross, IOM	Only partially
Philippines	Base and elevation maps (Printed) and damaged structures maps (online)	National Disaster Risk Reduction and Management Council (NDRRMS) and the general public	No
Republic of Moldova	Orthophotos and printed maps	Government of the Republic of Moldova, UNDP, Apele Moldovei/Water Agency, Emergency Agency	Yes
Romania	Printed maps	Ministry of Environment, Emergency Situations Inspectorate, local authorities	No
Saint Kitts and Nevis	Printed topographic maps	National Emergency Management Agency (NEMA), Public Works	No
Sri Lanka	Survey Department produce base maps for major cities, flood maps, other disaster related maps and digital datasets based on the stakeholder requirements.	Disaster Management center, Ministry of Disaster Management	No



Annex 11 - Major components of each core strategy across the different phases of the emergency cycle

	Pre-crisis (preparedness)	During crisis (response)	Post-crisis (recovery, reconstruction)
Awareness raising, capacity building and training	Raising awareness on the importance of data preparedness, National Spatial Data Infrastructure (NSDI) and open data policies; Strengthening of countries' technical infrastructure and capacities; Development, improvement and conduct of common data/information management training among the humanitarian/responders community based on the agreed upon standards, protocols and processes;	On site training of the data/information management officers that would not have been covered during the preparedness phase; If needed, strengthening of national institutions' capacity to ensure the timely delivery of geospatial information and geospatial information services.	Strengthening of the country's technical capacities and infrastructures based on the gaps identified during the response phase.
Common standards, protocols and processes	Agreement on and implementation of data specification/standards, metadata profile, data collection protocols and overall data/information management processes/practices in alignment with the NSDI if existing; Development/improvement of data/information products templates that answers high level process needs. Organization and documentation of all the baseline data in the common temporary or authoritative (validated by the government) data repositories and data catalogue. Validation and integration of the temporary data into the authoritative datasets. Population/update of the common contact database	Implementation of the agreed upon data specification/standards, metadata profile, data collection protocols, products templates and overall data/information management processes/practices. Coordinated collection of geospatial information and its organization in the common temporary data repository. Whenever possible, validation and integration of this data into the authoritative datasets. Capture of new responders into the common contact database.	Identification, documentation and adjustments of potential gaps in the agreed upon standards, protocols and processes/practices as part of the lessons learned. Integration of all the data collected during the crisis into the common temporary data repository and data catalogue as well as support to Governmental Agencies for the integration and validation of this data into the authoritative datasets.
Collaboration, coordination and communication	Agreement among all stakeholders and partners regarding their respective role and mandate when it comes to geospatial information and geospatial information services during crisis.	Designation and operationalization of the geospatial information and geospatial information services coordination lead to ensure collaboration and coordination among all stakeholders/partners.	Comprehensive lessons learned among all stakeholders and partners involved in the response and provision of recommendations to improve the overall framework and the flowcharts. Decommissioning of the geospatial information and geospatial information services coordination lead



Policies	Development and implementation of policies and/or agreements, institutional and legal framework aiming at improving the availability, quality and accessibility of geospatial information and geospatial information services among all stakeholders/partners.	Implementation of the policies and/or agreement put in place during the preparedness phase.	Identification of potential policy/agreements gaps and provision of recommendations to address them as part of the lessons learned exercise.
Common infrastructure and services	Development/maintenance/improvement of common platform aiming at improving accessibility and use to geospatial information as well as collaboration, coordination and communication among all stakeholders and partners; Establishment/maintenance/strengthening of a joint team that could provide common support services to address high level processes needs during crisis.	Use and maintenance of the common infrastructures and services (back office) established during the preparedness phase together with a common communication platform that connects all the stakeholders and partners.	Identification of area of improvement/adjustment of the different common infrastructures and provision of a revision plan as part of the after action review/lessons learned exercise.
Resource mobilization	Mobilization of the necessary financial and human resources to support the implementation of all the other core strategies		



Annex 12 - Comparison between the during crisis flowchart and the experience of staffs involved in recent crisis (Typhoon Yolanda/Haiyan, Ebola outbreak and Iraq)

Event Respondent (function, organization, station during the event)	Typhoon Haiyan/Yolanda				Ebola outbreak (Western Africa)				Iraq complex emergency							
	Kristina MacKinnon (Data Manager, HPC IMO focal point, UN OCHA, Philippines)				Timur Obukhov (GIS Officer, UNMEER, Ghana)				Yoshinori Nakazawa (Data Manager, CDC, Sierra Leone)				Robert Colombo (GIS officer, IMMAP, Iraq)			
	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place
Back office (meaning a team providing common support services)	No		No	I answered no but MapAction could be considered this (specifically offering Mapping/spatial data cleaning services).	Yes	Yes		GIS Unit in Accra used Carto Section and GIS Centre to provide technical support regarding data, GIS equipment, policies, platforms	No		Yes					
Common authoritative data catalogue	No		Yes	There was no catalogue in place but the COD FOD Registry could serve as the catalogue (exportable metadata in CSV could be used to investigate what was available/missing. Also had a dropdown for non-public data on transition location while data before it was registered	Yes	Yes		Data catalogues were available on WHO data portal, HDX and Geonode.	No		Yes					
Common authoritative data repository	Yes	Yes		COD FOD Registry was used http://www.humanitarianresponse.info/applications/data	Yes	Yes		Each UNMEER IM office (affected countries and Accra) used their own "authoritative" data repository, based on data availability	No		Yes					
Common contact database	Yes	Yes		located in Humanitarianresponse.info, this worked well as long as people registered. We also had people registering for others. Generally got people to register as they passed through the Info Management Unit to pick up maps etc on way to sub-office etc	Yes	Yes		Available on Google docs	No		Yes					
Common communication platform	Yes	Yes		Skype was used among IMOs	Yes	Yes		Skype IM group	No		Yes					
Common data/information management training	Only partially		Yes	IMOs were already trained prior to arrival. Training for specific tasks took place as required. Overall review of IM response and location was provided to IMOs as they passed through the capital to sub-offices and to partners as they arrived (not all received training but information was constantly being shared via Skype)	No		Yes		No		Yes					
Common product catalogue	Yes	Don't know		Used umanitarianresponse.info as product dissemination platform but it took a long time to the management to clear it (about 2.5 months into the emergency)	Yes	Yes		WHO data portal, HDX, Geonode, available on request in GIS Unit and IMUs	No		Yes					
Common temporary data repository	Yes	Yes		Dropbox was used. This served as a temporary location until it was registered on COD FOD Registry and to share data that could not be made public. Not ideal at one point we lost a great deal of data but this is the system that seems to be used in all emergencies	Only partially/YES	YES		common data repository was implemented based on HDX and Geonode and WHO Portal. Regional baseline datasets (3 countries) did not always match and UNMEER country offices were using their own datasets. Operational datasets such as ETC/CCC/Labs were used from WHO portal.	No		Yes					
Coordinated geospatial information collection/improvement	Only partially	Yes		This was done though IMWG with some success, For the first month there was a GIS Sub-group	Only partially	Yes		Among UNMEER country offices	No		Yes					
Coordination with governmental entities	Yes	Yes		Limited coordination due to government being overwhelmed. Government did share newer data but for humanitarian use only, there was an "open data" initiative that was underway which may have slowed things down. Apart from Health cluster I am not familiar with other clusters coordinating closely with government ministries on spatial data (I do not know the rationale behind this)	Only partially	Yes		Indirectly, through Information Management Units (IMUs) in UNMEER country offices	Only partially	Yes	Yes		There were some data sharing agreements and data was shared, but not in a coordinated fashion.			
Core GIS layers from the government	Yes	Yes		Datasets were shared during preparedness and New datasets were shared about a month into the emergency	Only partially	Yes		Some for few countries. However layers provided by neighboring countries overlapped and required extensive cleaning	No		Yes					
Core registries from the government	Only partially			Census data was shared (month 2.5) of the emergency but in a format that needed to be processed. No one with the skills could be identified to do this within the IMWG, I am not sure if it was ever processed	Only partially	Yes		Some for few countries	No		Yes					



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Data standards	Yes	Yes		COD data standards were in place (mostly followed changes based on demands from partners). Use of pcodes mostly used by partners in their spatial data	Only partially	Yes		Each UNMEER country office had its own standards	No		Yes					
Data collection standards	Only partially	Yes		assessment collection standards were not adhered to . 3W and monitoring was for the most part followed.	Only partially	Yes		Each UNMEER country office had its own standards	No		Yes					
Data information products standards/templates	Yes	Yes		common collection templates/standards provided (3W, monitoring). They were developed as a collaborative activity with partners	Only partially	Yes		Each UNMEER country office had its own template	No		Yes					
Data/information productions units	No		Yes	There was an Information Management Unit that took care of this for OCHA and provided common services/products. Also did compilation for clusters	Yes	Yes		is it mapping production?	No		Yes					
Geospatial information and information service coordination lead	Yes	Yes		The OCHA IMO that was already in place in Manila was a great source of information but was pulled into other activities. Someone came from HW and provided support for this but was also pulled into larger humanitarian program cycle processes. Coordination took place in the IMWG, on Skype and through bilateral meetings (this still took up about 1-2 hours a day but required a full time person in this particular emergency)	Yes	Yes		Chief IMU for UNMEER (located in HQ), Chiefs IMU in country offices	No		Yes					
Open data policy/data sharing agreements with the government	Only partially			There was only a "humanitarian uses only" agreement in place. Negotiation were held to try to make data more open but this was not successful	Don't know				No		Yes					
Products repositories	Yes	Yes		Humanitarianresponse.info was used and was quite successful	Yes	Yes		HDX, Geonode	No		Yes					
Metadata standards	Yes	Yes		COD FOD metadata standard was in placed (based on Dublin core) operational data metadata was then slimmed down a bit to encourage data sharing, I personally do not believe this helped	Only partially	Yes		Was not the same across the UNMEER country offices	No		Yes					
National Spatial Data Infrastructure (NSDI)	Only partially			a National SDI was explained to us OCHA and IMWG but it was not functioning at the time of the emergency. The open data portal part of this initiative was launched at month 2.5-3 of the response.	Only partially	Yes		Strong NSDI in Liberia and Sierra Leone. NSDI capacity in Guinea was limited.	Only partially	No	Yes	There was a government entity responsible for the geographic and census data in the country, but for some reason they were not included in the response.				



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	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place	In place during the crisis?	If yes, has this been used?	If not, would it have helped if in place?	Complement of information regarding what was in place
Technical support to governmental entities	Only partially			I believe Technical support to governmental entities could have been used to push these initiatives ahead earlier or at least enabled sharing of data within the responding community prior to the crisis. The simple compilation and dissemination of the affected population although more complete than most responses could have been improved from a technical standpoint with help from the outside. (the data was shared in multiple excel workbooks/worksheets with hidden columns and little/no information about the methodology or why there were changes to the data).The best example of technical support was from WHO which was imbedded in the Ministry of health and was providing support internally, including the development of the much needed health facilities dataset	Only partially	Yes		IMOs in UNMEER country offices provided technical support	Only partially	No	Yes	Since the national entity responsible for the geographic data was not included in the response, the interaction with them was very limited.				
Validation/integration of the temporary data by the governmental entities	Yes	Yes		Unspecified	Yes/Only partially	YES		In Sierra Leone gov. provided baseline datasets to UNMEER IMU and requested UNMEER to use Gov. provided datasets. In Liberia UNMEER has received datasets from UNMIL that was precleared by the gov. in Guinea gov. did not provide datasets or validated UNMEER's datasets. On a regional level, datasets geometry from 3 countries were not aligned. UNMEER HQ provided regional datasets with aligned boundaries.	No		Yes					

